Environmental Impact Assessment Report
Volume II

In respect of:

Strategic Housing Development
at Lissywollen, Athlone, County Westmeath

Prepared by:

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Architecture + Planning

On behalf of the applicant:

Alanna Roadbridge Developments Ltd.

February 2021

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1.0. Introduction

1.1. Introduction

1.1.1. This Environment Impact Assessment Report (EIAR) has been prepared by Delphi Design on behalf of Alanna Roadbridge Developments Ltd. who intend to apply to An Bord Pleanála for a Strategic Housing Development (SHD) at Lissywollen South, Athlone, County Westmeath. The application is being made under the Planning and Development Act 2000 as amended by the Strategic Housing Provisions of the Planning and Development (Housing) and Residential Tenancies Act, 2016. This chapter of the EIAR was prepared by Alan Fenton BA, MRUP, MRTPI, MIPI, of Delphi Design.

1.1.2. The application site comprises c. 17.64 hectares located to the north-east of Athlone town centre. The site is generally bounded to the north by the N6, Athlone Relief Road, to the south by the Old Rail Trial Greenway, to the west by Scoil na gCeithre Máistrí primary school and to the east by undeveloped lands, further east of which lie the ESB Regional Headquarters. The site consists of undeveloped greenfield land, that is bisected by the Brawny residential estate, consisting of approximately 160 no. dwellings. To the west of Brawny, the existing condition of the subject lands is largely non-descript, while to the east the subject lands are defined by trees and hedgerows which encompass existing fields. Access to the site is currently limited to a distributor road, entering from the N55 (Ballymahon Road) to the west, known as Brawney Road.

1.1.3. The application site is subject to a Local Area Plan known as the Lissywollen South Framework Plan 2018-2024 (hereafter LSFP). The LSFP was adopted in 2008 and has been extended until 2024. The lands at Lissywollen South were identified as an area to undergo comprehensive development to support the objectives of the Athlone Town Development Plan 2014-2020 (hereafter ATDP) and the previous version of same. The LSFP provides for c. 78 hectares of land and is based on a number of distinctive character areas and land-use objectives. Within the Plan, the application site is zoned for residential development.

1.1.4. The LSFP was accompanied by a Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) Screening Report. As part of the ATDP, the LSFP lands were also subject to a Strategic Flood Risk Assessment (SFRA). In the above context, the Environmental Impact Assessment (EIA) of this project is undertaken against a background of a significant amount of environmental information and assessment, which informed the preparation of the LSFP and its approval by Westmeath County Council (WCC).

1.1.5. The EIA process, including the preparation of this EIAR and the examination of the information presented by WCC, will inform the decision-making process. The purpose of this EIAR is to assist and inform An Bord Pleanála (ABP), as the competent authority, in undertaking an environmental assessment of this project.

Therefore, the objectives of this EIAR are summarised as follows:

- To identify the significant environmental impacts of the proposed development during the construction and operational phases having regard to the characteristics of the receiving environment.

- To evaluate the magnitude and significance of these impacts and propose appropriate measures to mitigate potential adverse impacts.

- To identify, where appropriate, monitoring measures to be implemented during the construction and operational phases.

The nature and extent of the development being assessed is outlined in Chapter 3 of this EIAR and summarised in Section 1.2 below. This EIAR is prepared with reference to the plans and particulars submitted with the planning application.

1.2. Proposed Development

1.2.1. Alanna Roadbridge Developments Ltd. are seeking permission for a residential development of 576 no. dwellings comprised of the following:

(a) 285 no. 2 storey detached, semi-detached & terraced houses comprising 50 no. 4 bedroom houses, 200 no. 3 bedroom houses & 35 no. 2 bedroom houses

(b) 246 no. apartments in 18 no. buildings (i.e. Blocks A, B, C, D, E, F, H, K, N, P, Q, R, S & T - all 3 storey, Block G - 2 storey, Block L - 4 storey with a 5 storey setback, Block M - 3 storey with a 4 storey setback, Block O - 2 to 4 storey) comprising 61 no. 1 bedroom apartments, 168 no. 2 bedroom apartments & 17 no. 3 bedroom apartments

(c) With 45 no. duplex units in 9 no. of the above buildings (i.e. Blocks A, B, D, E, F, H, O, Q & S) comprising 8 no. 2 bedroom duplex units & 37 no. 3 bedroom duplex units

1.2.2. The development proposal includes for the provision of a double height community hub, measuring circa 107m^2, located on the ground floor of the proposed Block D. The development proposal also includes for 2 no. childcare facilities comprised of a 2 storey crèche located adjacent to proposed Block C (measuring circa 214m^2) and a 1 storey crèche on the ground floor of the proposed Block T (measuring 362m^2).

1.2.3. The development proposal will also deliver a new east-west access route, 'Lissywollen Avenue', through the LSFP lands extending from the Ballymahon roundabout (on the R915) to the west, to the Garrycastle roundabout (on the R916) to the east, as per the objectives of the LSFP.

1.2.4. The development proposal includes for the provision of public open spaces, planting, boundary treatments & all ancillary landscape works, public lighting, drainage and attenuation, surface and basement car parking, bicycle parking, bin storage, ESB sub-stations and all associated site development works.

1.3. Definition of EIA and EIAR

1.3.1. Directive 2014/52/EU defines 'environmental impact assessment' as a process which includes the responsibility of the developer to prepare an EIAR and the responsibility of the competent authority to provide reasoned conclusions following the examination of the EIAR and other relevant information.

1.3.2. Article 1(2)(g) 4 of Directive 2014/52/EU states that "environmental impact assessment" means a process consisting of:

"(i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);

(ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;

(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;

(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and

(v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a".

The amended Directive (Directive 2014/52/EU) uses the term environmental impact assessment report (EIAR) rather than environmental impact statement (EIS).

1.3.3. A definition of EIAR has not been included in the revised directive, however, the EPA Guidelines (2017) provide the following definition:

"A statement of the effects, if any, which proposed development, if carried out, would have on the environment. The EIAR is prepared by the developer and is submitted to a CA (Competent Authority) as part of a consent process. The CA uses the information provided to assess the environmental effects of the project and, in the context of other considerations, to help determine if consent should be granted. The information in the EIAR is also used by other parties to evaluate the acceptability of the project and its effects and to inform their submissions to the CA.

The EIAR consists of a systematic analysis and assessment of the potential effects of a proposed project on the receiving environment. The amended EIA Directive prescribes a range of environmental factors which are used to organise descriptions of the environment and these factors must be addressed in the EIAR.

The EIAR should be prepared at a stage in the design process where changes can still be made to avoid adverse effects. This often results in the modification of the project to avoid or reduce effects through redesign".

1.3.4. In summary, EIA is a process for anticipating the effects on the environment caused by development. An EIAR is the document produced as a result of that process and provides information which the competent authority uses in deciding whether or not to grant consent. Where significant and likely environmental effects are identified that are unacceptable; the EIA process aims to quantify and minimise the impact specified development projects have on the environment through appropriate mitigation measures. The preparation of an EIAR document requires site-specific considerations and the preparation of baseline assessment against which the likely impacts of a proposed development can be assessed by way of a concise, standardised and systematic methodology.

1.4. EIA Legislation

1.4.1. Certain public and private projects that are likely to have significant effects on the environment are subject to EIA requirements derived from EIA Directive 85/337/EC (as amended by Council Directive 97/11/EC, Directive 2003/4/EC, Directive 2009/31/EC, Directive 2011/92/EU and recently Directive 2014/52/EU which amends EIA law in a number of respects by amending Directive 2011/92/EU) which are designed to ensure that projects likely to have significant effects on the environment are subject to a comprehensive assessment of environmental effects prior to development consent being given.

1.4.2. Article 2 of Directive 2014/52/EU provides that Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with the Directive by 16 May 2017.

1.4.3. The Department of Housing, Planning, and Local Government brought forward amendments to the Planning and Development Act 2000, as amended, and the Planning and Development Regulations, to provide for the transposition of the Directive into the Irish planning code. To this effect, the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 have now transposed the 2014 Directive into Irish law.

1.4.4. The Department has also provided an update to the 2018 *"Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment"* to provide practical guidance on legal and procedural issues arising from the requirement to undertake EIA in accordance with Directive 2014/52/EU. These new Guidelines were published in August 2018. These Guidelines have informed the preparation of this EIAR. The 2017 draft guidelines prepared by the EPA have also informed this EIAR.

1.5. EIA Guidelines

1.5.1. EIA practice has evolved substantially since the introduction of the EIA Directive in 1985. Practice continues to evolve and takes into account the growing body of experience in carrying out EIAs in the development sector. The relevant key EIA Guidance which has been consulted in the preparation of this EIAR document is detailed below. In addition, the individual chapters of this EIAR should be referred to for further information on the documents consulted by each individual consultant.

Irish Guidance

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, August 2018.
- Draft Guidelines on the information to be contained in environmental impact assessment reports, EPA, August 2017.
- Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems.
- Key Issues Consultation Paper, Department of Environment, Community and Local Government, 2017.
- Circular letter PL 1/2017 - Advice on Administrative Provisions in Advance of Transposition (2017).
- Development Management Guidelines (DoEHLG, 2007).

- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003).
- Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003).
- Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002).

European Union / European Commission Guidance (in addition to Directives referenced above)

- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (2017).
- Environmental Impact Assessment of Projects – Guidance on Screening (2017).
- Environmental Impact Assessment of Projects – Guidance on Scoping (2017).
- Study on the Assessment of Indirect & Cumulative Impacts as well as Impact Interaction (DG Environment 2002).
- EU Guidance on EIA Screening (DG Environment 2001).
- Guidance on EIA Scoping (DG Environment 2001).
- EIA Review Checklist (DG Environment 2001).

The most recent guidelines are the August 2018 EIA Guidelines for Planning Authorities and the Board.

1.5.2. The 2017 EPA draft guidelines were prepared to help practitioners interpret the amended EIA Directive and in advance of new regulations transposing Directive 2014/52/EU becoming available. They provide practical guidance to planning authorities, An Bord Pleanála, and other relevant stakeholders, on procedural issues and the EIA process, and outline the key changes introduced by Directive 2014/52/EU. Updated guidelines from the EPA will now be published following the transposition of the 2014 Directive via the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018). This updated EPA guidance had not yet been published at time of writing.

1.6. The EIA Process

1.6.1. The main purpose of the EIA process is to identify the likely significant impacts on the human environment, the natural environment and on cultural heritage associated with the proposed development, and to determine how to eliminate or minimise these impacts. The EIAR summarises the environmental information collected during the impact assessment of the proposed development.

Several interacting steps typify the early stages of the EIA process and include:

- Screening;
- Scoping;
- Assessing Alternatives;

- Assessing and Evaluating.

Screening: Screening is the term used to describe the process for determining whether a proposed development requires an EIA.

Scoping: This stage firstly identifies the extent of the proposed development and associated site, which will be assessed as part of the EIA process, and secondly, it identifies the environmental issues likely to be important during the course of completing the EIA process through consultation with statutory and non-statutory stakeholders.

Assessing Alternatives: This stage outlines the possible alternative approaches to the proposed development. Consideration of alternative sites and layouts within the final chosen site are set out in Chapter 3 of this EIAR.

Assessing and Evaluating: The central steps of the EIA process include baseline assessment (desk study and field surveys) to determine the status of the existing environment, impact prediction and evaluation, and determining appropriate mitigation measures where necessary.

1.7. Screening

1.7.1. Screening is the term used to describe the process for determining whether a proposed development requires an EIA by reference to mandatory legislative threshold requirements or by reference to the type and scale of the proposed development and the significance or the environmental sensitivity of the receiving baseline environment.

Annex I of the EIA Directive 85/337/EC requires as mandatory the preparation of an EIA for all development projects listed therein. Schedule 5 (Part 1) of the Planning & Development Regulations 2001-2018 transposes Annex 1 of the EIA Directive directly into Irish land use planning legislation. The Directive prescribes mandatory thresholds in respect to Annex 1 projects.

Annex II of the EIA Directive provides EU Member States discretion in determining the need for an EIA on a case-by-case basis for certain classes of project having regard to the overriding consideration that projects likely to have significant effects on the environment should be subject to EIA.

Schedule 5 (Part 2) of the Planning & Development Regulations 2001-2018 set mandatory thresholds for each project class. Sub-section 10(b) (iii) and (iv) addresses *'Infrastructure Projects'* and requires that the following class of project be subject to EIA:

'(b) (i) Construction of more than 500 dwelling units'.

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

1.7.2. The SHD planning application subject to this EIAR comprises of, *inter alia,* 576 no. residential dwellings, a community hub, 2 no. childcare facilities, open spaces and associated infrastructure on a site of c. 17.64 hectares. An EIA is therefore mandatory as the proposed development at Lissywollen South includes provision of 576 no. dwellings, exceeding the threshold of 500 dwelling units.

In relation to Screening, EIA Directive 2014/52/EU introduces a new mandatory section, Article 4(4). Article 4(4) introduces a new Annex IIA to be used in the case of a request for a screening determination for Annex II projects. This is information to be provided by the developer on the projects listed in Annex II.

1.8. Scoping

1.8.1. The 2017 EPA Guidelines state that 'Scoping' is a process of deciding what information should be contained in an EIAR and what methods should be used to gather and assess that information. It is stated in the European Commission guidance[1] that: *'The Directive provides that Developers may request a Scoping Opinion from the Competent Authority which identifies the content and the extent of the assessment and specifies the information to be included in the EIA Report."*

1.8.2. The applicant is committed to ensuring that all of their development is conducted in a responsible and sustainable manner. A scoping process to identify the issues that are likely to be most important during the EIA process was carried out by the applicant, design team and EIAR consultants and informed the format of this EIAR.

1.8.3. As set out within the 2018 EIA Guidelines published by the Department of Housing, Planning and Local Government, Section 7 of the Planning and Development (Housing) and Residential Tenancies Act 2016 and Planning and Development (Strategic Housing Development) Regulations 2017 allow for a prospective applicant to make a request to An Bord Pleanála for an EIA scoping opinion in regard to a proposed SHD planning application. Such requests are discretionary.

1.8.4. The EIAR prepared for the subject application has endeavoured to be as thorough as possible and therefore, the provisions included in the revised EIA Directive and all of the issues listed in Schedule 6, Sections 1, 2 and 3 of the Planning and Development Regulations 2001-2018 and in recent guidance documents have been addressed in the EIAR. In this context, the following topics/issues have been reviewed and addressed in the context of the proposed development:

- Introduction and Background,
- Planning Context,
- Project Description and Alternatives Examined,
- Population and Human Health,
- Biodiversity,
- Land and Soils,
- Water,
- Air Quality and Climate,
- Noise and Vibration,
- Archaeology and Cultural Heritage,
- Landscape and Visual Impact,
- Material Assets,
- Interactions,
- Principle Mitigation and Monitoring Measures,
- Non-Technical Summary.

1.8.5. In addition to the above, a series of standalone reports have been prepared to accompany the planning application. DBFL Consulting Engineers have prepared a Traffic and Transport Assessment Report, a Mobility Management Plan, a Construction and Environmental Management Plan, and a Site

[1] Guidance on EIA Scoping, EC, 2017

Specific Flood Risk Assessment. FGE Consulting have prepared an Appropriate Assessment (AA) Screening Report. Arbor Care have prepared tree and hedgerow surveys. AECOM has prepared a Climate / Sustainability Appraisal. Delphi Design has prepared a Building Life Cycle Report and the Outline/Preliminary Construction Management Plan while the enclosed Construction and Demolition Waste Management Plan has been prepared by the applicant Alanna Roadbridge Developments Ltd. These reports have helped inform the chapters of the EIAR where relevant.

1.8.6. It is necessary to examine each section of this EIAR with respect to the impacts that the proposed development may have on the environment. The purpose of this scoping exercise is to shape and mould the EIAR so as not to dismiss any potential impacts that may in fact be significant, and to focus on issues which need to be resolved.

1.8.7. The scope of this EIAR has been informed by the following:

- European Union (Planning and Development)(Environmental Impact Assessment) Regulations 2018 Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, August 2018.
- Draft Guidelines on the information to be contained in environmental impact assessment reports (EPA, 2017).
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (EC, 2017).
- Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems Key Issues Consultation Paper, Department of Environment, Community and Local Government, 2017.
- Circular letter PL 1/2017 - Advice on Administrative Provisions in Advance of Transposition (2017).
- The requirements of Part X of the Planning and Development Act, 2000, as amended, and Part 10 of the Planning & Development Regulations, 2001-2018.
- The requirements of the Westmeath County Development Plan 2014-2020, the Athlone Town Development Plan 2014-2020 and the Lissywollen South Framework Plan 2018-2024.
- National and Regional Planning Policy Documents.
- The likely concerns of third parties.
- The nature, location and scale of the proposal.
- The existing environment together with any vulnerable or sensitive local features and current uses.
- The planning history and environmental assessments associated with the subject site and adjoining lands.
- The likely and significant impacts of the proposed development on the environment.
- Available methods of reducing or eliminating undesirable impacts.

1.8.8. Prior to the submission of the SHD application to ABP, numerous meetings took place between the applicant and the technical staff of WCC, as well as several consultations with local residents in the vicinity of the subject site. Two no. pre-application consultations were also held between the Applicant, the Planning Authority and ABP under the SHD process, which assisted in the preparation of this EIAR and planning application.

1.8.9. The content of this EIAR has been prepared in accordance with the provisions of Article 5(1) and Annex IV of Directive 2014/52/EU. Article 5(1) states:

"The information to be provided by the developer shall include at least:

(a) a description of the project comprising information on the site, design, size and other relevant features of the project;

(b) a description of the likely significant effects of the project on the environment;

(c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;

(d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;

(e) a non-technical summary of the information referred to in points (a) to (d); and

(f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected."

Annex IV states:-

"1. A Description of the project, including in particular:

(a) a description of the location of the project;

(b) a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;

(c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;

(d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases.

2. A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

3. A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.

4. A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.

5. A description of the likely significant effects of the project on the environment resulting from, inter alia:

(a) the construction and existence of the project, including, where relevant, demolition works;

(b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;

(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;

(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);

(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;

(f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;

(g) the technologies and the substances used.

The description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project.

6. A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.

7. A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.

8. A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.

9. A non-technical summary of the information provided under points 1 to 8.

10. A reference list detailing the sources used for the descriptions and assessments included in the report."

1.9. Purpose of the EIAR

1.9.1 The objective of the EIAR is to:

- identify and predict the likely environmental impacts of the proposed development;
- to describe the means and extent by which they can be reduced or ameliorated;
- to interpret and communicate information about the likely impacts, and
- to provide an input into the decision making and planning process.

As provided for in the EPA 2017 guidelines, the EIAR focuses on:

- Impacts that are both likely and significant;
- Impact descriptions that are accurate and credible.

1.9.2 The objective of the EIAR will also be to identify and predict the likely environmental impacts of the proposed development; to describe the means and extent by which they can be reduced or ameliorated; to interpret and communicate information about the likely impacts; and to provide an input into the decision making and planning process.

The definition of Environmental Impact Assessment is clarified within the 2014 EIA Directive and is as follows:

"(g) 'environmental impact assessment' means a process consisting of:

(i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);

(ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;

(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;

(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and

(v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a".

1.9.3 Under Article 5(3) of the 2014 Directive, it is specifically required that the developer must ensure that the environmental impact assessment report is prepared by competent experts. Each chapter of this EIAR has been prepared by experts with the requisite qualifications and competences which are detailed in each relevant chapter.

1.9.4 The intention of this EIAR document is to provide transparent, objective and replicable documentary evidence of the EIA evaluation and decision-making processes which led to the selection of the final project configuration. The EIAR documents the consideration of environmental effects that influenced the evaluation of alternatives. It also documents how the selected project design incorporates mitigation measures; including impact avoidance, reduction or amelioration; to explain how significant adverse effects will be avoided.

1.10 Objectives of this EIAR

1.10.1 The EPA guidelines list the following fundamental principles to be followed when preparing an EIAR:

- Anticipating, avoiding and reducing significant effects
- Assessing and mitigating effects
- Maintaining objectivity
- Ensuring clarity and quality
- Providing relevant information to decision makers
- Facilitating better consultation

1.10.2 This EIAR document describes the outcomes of the iterative EIA process which was progressed in parallel with the project design process. This forms the first part of the EIA process which will be completed by the competent authority, which in turn will be required to examine, analyse and evaluate the direct and indirect effects of the development on the various factors listed under Section 171A of the Planning and Development Act 2000, (as amended).

1.10.3 The amended EIA Directive prescribes a range of environmental factors which are used to organise descriptions of the environment and the environmental impact assessment should identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the prescribed environmental factors which are:

(a) population and human health
(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC
(c) land, soil, water, air and climate
(d) material assets, cultural heritage and the landscape
(e) the interaction between the factors referred to in points (a) to (d)

This EIAR documents the assessment process of the prescribed environmental factors in relation to the proposed SHD residential development at Lissywollen South.

1.10.4 The EIA process was based on the following four key objectives:

i. Pursuing Preventative Action
ii. Maintaining Environmental Focus and Scope
iii. Informing the Decision
iv. Public & Stakeholder Participation

i. Pursuing Preventative Action

Pursuing preventative action is the most effective means by which potential negative environmental impacts can be avoided. An assessment of anticipated likely and significant impacts was undertaken during the screening, informal scoping and the considerations of alternatives stages of the EIA process. This involved forming a preliminary opinion, in the absence of complete data, with respect to the approximate magnitude and character of the likely environmental impacts. This assessment was based on the knowledge, experience and expertise of the EIA and project design team with reference to the amended EIA Directive, EIA guidance material and local precedents.

Avoidance of impacts has been principally achieved through the consideration of alternatives and through the review of the project design in light of identified key environmental constraints. This is outlined in greater detail in Chapter 3.

ii Maintain Environmental Scope and Focus

It is important that the EIAR document remains tightly focussed. This minimises expenses, delays and the potential for a confusing mass of data to obscure relevant facts. The EIA process has been project-managed and steered, so as to ensure that the EIAR documentation and analysis are confined to those topics and issues which are explicitly described in the legislation, and where environmental impacts may arise. Evaluation and analysis has been limited to topics where the indirect, secondary or cumulative impacts are either wholly or dominantly due to the project or development under consideration and remain focused on issues that:

- Are environmentally based
- Are likely to occur
- Have significant and adverse effects

iii. Informing the Decision

The EIAR document enables the competent/consenting authorities to reach a decision on the acceptability of the proposed development in the full knowledge of the project's likely significant impacts on the environment, if any.

iv. Public & Stakeholder Participation

Decisions are taken by competent/consent authorities through the statutory planning process which allows for public participation and consultation while receiving advice from other key stakeholders and statutory authorities with specific environmental responsibilities.

Public participation and consultation is an integral part of the SHD process as outlined in the Planning and Development (Housing) and Residential Tenancies Act 2016, as amended, and the Planning and Development (Strategic Housing Development) Regulations 2017.

The structure, presentation of the EIAR document, and the non-technical summary which accompanies same, as well as the arrangements for public access, all facilitate the dissemination of the information contained in the EIAR. The core objective is to ensure that the public and local community are aware of the likely environmental impacts of projects prior to the granting of consent.
Informal scoping of potential environmental impacts was undertaken with the Planning Authority throughout the preparation of the LFSP and the pre-application meetings held prior to the submission to the application. Direct and formal public participation in the EIA process will be through the statutory planning application process under the SHD procedures.

1.10.5 To summarise, it is the intention of this EIAR is to provide transparent, objective and replicable documentary evidence of the EIA evaluation and decision-making processes which led to the selection of the final project configuration. The EIAR documents the consideration of environmental effects that influenced the evaluation of alternatives. It also documents how the selected project design incorporates mitigation measures; including impact avoidance, reduction or amelioration; to explain how significant adverse effects will be avoided.

It is intended that this EIAR will assist ABP, statutory consultees and the public in assessing all aspects of the proposed development.

1.11 Structure Methodology

1.11.1 Structure of the EIAR

The overall structure and scope of this EIAR has regard to the information required by the EU/EC Directives, Statutory Regulations and relevant environmental guidelines prepared by the Environmental Protection Agency (EPA). The EIAR has been written and illustrated with figures in a manner which, insofar as possible, is intended to be understandable to the public generally. A Non-technical Summary has been prepared in accordance with the statutory regulations and is submitted as a separate document to this EIAR. The appendices to this EIAR contain background and technical details relating to the project and are referred to in the relevant Chapters.

The structure used in this EIAR is a Group Format structure. This structure examines each environmental topic in a separate section of the EIAR document. The Chapter Headings reflect the broadened scope of the environmental factors introduced by the 2014 Directive.

1.11.2 Contributors

This EIAR has been prepared on behalf of the developer by a design team of qualified experts, as required by Article 5(3) of Directive 2014/52/EU. The contributor involved in the preparation of this EIAR is identified at the beginning of each Chapter and in Table 1.3 of this EIAR.

1.11.3 Methodology

A systematic approach is employed using standard descriptive methods, replicable prediction techniques and standardised impact descriptions to provide an appropriate evaluation of each environmental topic under consideration. An outline of the methodology used to ensure consistency in each chapter of this EIAR and to examine each environmental topic is detailed in Table 1 below.

Section	Description
Introduction	Provides an overview of the specialist area and specifies the specialist who prepared the assessment.
Study Methodology	Outlines the method by which the relevant assessment of the development impacts has been conducted within that chapter.
Baseline Situation	Describes and assesses the receiving environment, the context, character, significance and sensitivity of the baseline receiving environment into which the proposed development will fit.
Construction Impacts and Mitigation	Describes the specific, direct and indirect impacts that may arise during the construction phases of the development. A description of the appropriate mitigation measures either practicable or reasonable is also provided in this section
Operational Impacts and Mitigation	Focuses on the operational phase of the proposed development and describes the specific, direct and indirect impacts that may arise together with appropriate mitigation measures.
Do Nothing Impact	Describes a scenario in which the development does not proceed and the environment would not change as a result.

Table 1.1 EIAR Methodology Outline

Where necessary and appropriate the following are also considered:

Monitoring	Describes the monitoring of the development in a post-development phase, if required. This section addresses the effects that require monitoring, along with the methods and the agencies that are responsible for such monitoring. The level of monitoring, along with the methods and the agencies that are responsible for such monitoring. The level of monitoring proposed is proportionate to the nature, location and size of the project and the significance of its effects. This involves a description of monitoring in a post-development phase, if required. This section addresses the effects that require monitoring, along with the methods and the agencies that are responsible for such monitoring. The level of monitoring, along with the methods and the agencies that are responsible for such monitoring. The level of monitoring proposed is proportionate to the nature, location and size of the project and the significance of its effects.
Reinstatement	While not applicable to every aspect of the environment considered within the EIAR, certain measures need to be proposed to ensure that in the event of the proposal being discontinued, there will be minimal impact on the environment.
Interactions	Where applicable, the assessment refers to impact interactions, including potential indirect, secondary and cumulative impacts.
Difficulties encountered	Where applicable, any difficulties encountered by the environmental specialist in compiling the required information are noted.

Table 1.2 EIAR Methodology Outline

1.11.4 Forecasting Methods

The individual forecasting methods used to assess the various effects of the proposed development on the environment are outlined in the relevant chapters of this EIAR under the subheading 'Assessment Methodology'.

1.11.5 Difficulties Encountered

Some details of the project and the construction methodology/programme are matters which may be subject to change depending on the contractor(s) appointed and other considerations which are not finalised at this stage, and which cannot be finalised until a grant of planning permission for the proposed development has been issued.

These are matters which can be addressed prior to the commencement of development in consultation with the Planning Authority and other relevant stakeholders. Subject to these constraints in relation to the future development of the area, no other significant difficulties were encountered in the preparation of the EIAR. Any limitations or technical difficulties associated with assessment of an environmental factor are detailed in the relevant chapter.

1.11.6 Terminology

In accordance with the EPA Guidelines on the Information to be contained in Environmental Impact Statements (2002) and Advice Notes on Current Practice in the preparation of Environmental Impact Statements (2003), the following definitions are used in this EIAR. These definitions take account of the 2017 Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Draft) and the 2015 Advice Notes for preparing Environmental Impact Statements (Draft), prepared by the EPA:

The quality of the effects is defined as:

Positive effects: A change which improves the quality of the environment (e.g. by increasing species diversity; or the improving reproductive capacity of an ecosystem, or removing nuisances or improving amenities).

Negative effects: A change which reduces the quality of the environment (e.g. lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

Neutral effects: A change which does not affect the quality of the environment.

The significance of the effects is described as:

Imperceptible: An effect capable of measurement but without noticeable consequences.

Not significant: An effect which causes noticeable changes in the character of the environment but without noticeable consequences.

Slight effects: An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.

Moderate effects: An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends.

Significant effects: An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.

Very significant: An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.

Profound effects: An effect which obliterates sensitive characteristics.

The magnitude of the effect is, where appropriate, indicated as:

Extent: Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.

Duration: Describe the period of time over which the effect will occur. (See further detail below)

Frequency: Describe how often the effect will occur. (Once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)

Context: Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)

The probability of the effect is, where appropriate, indicated as:

Likely Effects: The effects that can reasonably be expected to occur as a result of the planned project if all mitigation measures are properly implemented.

Indeterminable Effects: When the full consequences of a change in the environment cannot be described.

`Worst case' Effects: The effects arising from a project in the case where mitigation measures substantially fail.

The duration of the effect is, where appropriate, indicated as:

Momentary Effects: Effects lasting from seconds to minutes

Brief Effects: Effects lasting less than a day

Temporary Effects: Effects lasting for one year or less.

Short-term Effects: Effects lasting one to seven years.

Medium-term Effects: Effects lasting seven to fifteen years.

Long-term Effects: Effects lasting fifteen to sixty years.

Permanent Effects: Effects lasting over sixty years.

The type of effect is described, where appropriate, as:

Cumulative Effects: The addition of many small effects to create one larger, more significant, impact.

Do-nothing Effects: The environment as it would be in the future should no development of any kind be carried out.

Indeterminable Effects: When the full consequences of a change in the environment cannot be described.

Irreversible Effects: When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.

Residual Effects: The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

Worst-case: The impacts arising from a development in the case where mitigation measures substantially fail.

Synergistic Effects: Where the resultant effects is of greater significance than the sum of its constituents.

Indirect Effects: Effects that arise off-site or are caused by other parties that are not under the control of the developer (such as a quarry)

Secondary Effects: Effects that arise as a consequence of a project (a new waste water treatment plant will reduce the yield of mussels in a nearby estuary)

1.11.7 Non-Technical Summary

A Non-Technical Summary of the EIAR has also been prepared. The EIA Directive states that one of the objectives of the EIA process is to ensure that the public are fully aware of the environmental implications of any decisions. The Draft EPA Guidelines note that the non-technical summary of the EIAR should facilitate the dissemination of the information contained in the EIAR and that the core objective is to ensure that the public is made as fully aware as possible of the likely environmental impacts of projects prior to a decision being made by ABP. A Non-Technical Summary of the EIAR has therefore been prepared which summarises the key environmental impacts and is provided as a separately bound document.

1.11.8 Links between EIAR and Appropriate Assessment

A Screening Report for Appropriate Assessment (AA) was carried out for the proposed development to determine if there is a risk of effects to any Natura 2000 site, and forms part of this application for permission, accompanying this EIAR.

While AA is required by the proposer of any plan or project likely to have an adverse effect on a Natura 2000 site, EIA is required for projects listed in Annex I of the EIA Directive. The requirement for EIA relative to projects listed in Annex II of the EIA Directive is determined on a case by case. While these two different types of assessment are independent and are required by separate legislation, namely the

Birds and Habitat Directives (i.e. AA) and the EIA Directive (i.e. EIAR) there is a degree of overlap, particularly in the Biodiversity Chapter (Chapter 5) of the EIAR.

1.11.9 Availability of EIAR Documents.

A copy of this EIAR document and Non-Technical Summary is available for purchase at the offices of An Bord Pleanála and Westmeath County Council at a fee not exceeding the reasonable cost of reproducing the document. The application can also be viewed on the SHD website www.lissywollenshd.ie set up by the applicant.

1.11.10 Impartiality

This EIAR document has been prepared with reference to a standardised methodology which is universally accepted and acknowledged. Recognised and experienced environmental specialists have been used throughout the EIA process to ensure the EIAR document produced is robust, impartial and objective.

It should be noted that, as highlighted above, an important part of the EIA process is preventative action which causes the project design team to devise measures to avoid, reduce or remedy significant adverse impacts in advance of applying for consent. As a result, where no likely significant impacts have been identified where they might reasonably be anticipated to occur, the design and layout of the proposed development has generally been amended to minimise the potential of any likely significant adverse impacts.

1.11.11 Statement of Difficulties Encountered

No particular difficulties, such as technical deficiencies or lack of knowledge, were encountered in compiling any of the specified information contained in this statement, such that that the prediction of impacts has not been possible. Where any specific difficulties were encountered, these are outlined in the relevant chapter of the EIAR.

1.11.12 EIA Quality Control and Review

Delphi Design is committed to consistently monitoring the quality of EIAR documents prepared both in draft form and before they are finalised, published and submitted to the appropriate competent authority taking into account latest best-practice procedure, legislation and policy. The EPA published draft guidelines on information to be contained in Environmental Impact Assessment Report[2] and the Department of Housing, Planning, Community and Local Government have published a consultation paper[3], which have been consulted in the preparation of this EIAR. This document includes a detailed EIAR Review Checklist which has been used to undertake a review of this EIAR document.

1.11.13 Errors

While every effort has been made to ensure that the content of this EIAR document is error free and consistent there may be instances in this document where typographical errors and/or minor inconsistencies do occur. These typographical errors and/or minor inconsistencies are unlikely to have any material impact on the overall findings and assessment contained in this EIAR.

[2] *Guidelines on the Information to be contained in an Environmental Impact Assessment Report, Environmental Protection Agency, 2017*

[3] *Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems - Key Issues Consultation Paper, Department of Environment, Community and Local Government, 2017.*

1.11.14 Reference List

At the end of each chapter in Part B, each contributor has included a reference list of sources relied on in that Chapter. Below is a detailed list of references which have generally informed the descriptions and assessments included in this EIAR.

EU Directives / Legislation

- The EU Directives on Environmental Impact Assessment (85/337/EEC as amended by 97/11/EC, 2003/35/EC, 2009/31/EC (codified in 2011/92/EU) and 2014/52/EU).
- The Planning and Development Act, 2000 (as amended).
- The Planning and Development Regulations, 2001 (as amended).

EIA and related Guidance

- *Guidelines on the Information to be contained in Environmental Impact Statements*, EPA (2002)
- *Advice Notes on Current Practice in the preparation of Environmental Impact Statements*, EPA (2003)
- *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (Draft), EPA (2017)
- *Advice Notes for preparing Environmental Impact Statements* (Draft), EPA (2015)
- *Appropriate Assessment of Plans and Projects in Ireland, Guidelines for Planning Authorities* DEHLG (2009)
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*, DECLG (2013)
- Circular PL1/2017 – *Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on Administrative Provisions in Advance of Transposition,* DHPCLG (2017)

Planning Policy (National, Regional, Local)

- The National Planning Framework (Project Ireland 2040)
- Eastern & Midland Regional Assembly Regional & Spatial Economic Strategy 2019-2031
- Smarter Travel – A Sustainable Transport Future 2009-2020

- Spatial Planning and National Roads, Guidelines for Planning Authorities 2012
- Sustainable Residential Development in Urban Areas, Guidelines for Planning Authorities 2009 and Urban Design Manual, A Best Practice Guide.
- Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities 2018.
- Design Manual for Urban Roads and Streets, 2013
- The Planning System and Flood Risk Management – Guidelines for Planning Authorities 2009
- National Cycle Manual
- Westmeath County Development Plan 2014 – 2020
- Athlone Town Development Plan 2014 – 2020
- Lissywollen South Framework Plan 2014-2020

1.11.15 List of Abbreviations

The following is a non-exhaustive list of abbreviations used in this EIAR. Where an abbreviation is not listed below it is clarified in the relevant chapter of this EIAR.

AA: Appropriate Assessment
ATDP: Athlone Town Development Plan
ABP: An Bord Pleanála
CDP: County Development Plan
CFRAMS: Catchment Flood Risk Assessment and Management Study
CMP: Construction Management Plan
DoCHG: Department of Culture, Heritage and the Gaeltacht
DECLG: Department of the Environment, Community and Local Government
DEHLG: Department of the Environment, Heritage and Local Government
DELG: Department of the Environment and Local Government
DHPCLG: Department of the Housing, Planning, Community and Local Government
DMURS: Design Manual for Urban Roads and Streets
EIA: Environmental Impact Assessment
EIAR: Environmental Impact Assessment Report
EIS: Environmental Impact Statement
EPA: Environmental Protection Agency
EC: European Commission
EU: European Union
GSI: Geological Survey of Ireland
LAP: Local Area Plan

LSPF: Lissywollen South Framework Plan
NPF: National Planning Framework
NRA: National Roads Authority
NTA: National Transport Authority
RPA: Railway Procurement Agency
RMP: Record of Monuments and Places
RPS: Record of Protected Structures
RPGs: Regional Planning Guidelines
RSES: Regional Spatial and Economic Strategy
SEA: Strategic Environmental Assessment
SEO: Strategic Environmental Objective
SI No: Statutory Instrument Number
SSFRA: Site Specific Flood Risk Assessment
TII: Transport Infrastructure Ireland
WCC: Westmeath County Council

1.11.12 Project Team

This EIAR has been prepared on behalf of the developer by a team of qualified experts, as required by Article 5(3) of Directive 2014/52/EU. The contributors involved in the preparation of this EIAR are identified in Table 1.2, below, and at the beginning of their relevant Chapters in Part B.

Chapter	Contributor
Non-Technical Summary	Delphi Planning: Alan Fenton BA, MRUP, MIPI, MRTPI
1 Introduction	Delphi Planning: Alan Fenton BA, MRUP, MIPI, MRTPI
2 Planning Policy Context	Delphi Planning: Alan Fenton BA, MRUP, MIPI, MRTPI
3 Description of Project & Alternatives	Delphi Planning: Alan Fenton BA, MRUP, MIPI, MRTPI
4 Population & Human Health	Delphi Planning: Alan Fenton BA, MRUP, MIPI, MRTPI
5 Biodiversity / Species & Habitats	FGE Consulting: Domhnall Finch / Andrew Torsney
6 Land, Soils & Geology	DBFL Consulting Engineers: Shane Moynihan BEng(Hons) MSc DIC MEI
7 Water	DBFL Consulting Engineers: Shane Moynihan BEng(Hons) MSc DIC MEI
8 Air Quality & Climate	AECOM: Sam Purdon BSc MSc GradCIWEM and Glenn McKay BSc MSc MCIWEM C.WEM CEnv CSci & Marion Delaney, Associate Director
9 Noise	SLR: Benedict Sarton BSc (Hons), IOA Dip.
10 Material Assets: Built Services	Delphi Planning: Tracy Armstrong BA, MRUP, Dip. EIA/SEA Mgmt, MIPI, MRTPI
11 Material Assets: Transportation	DBFL: Thomas Jennings BEng (Hons) MSc MIEI CMILT MIHT
12 Material Assets: Resource & Waste Management	Delphi Planning: Tracy Armstrong BA, MRUP, Dip. EIA/SEA Mgmt, MIPI, MRTPI
13 Archaeology & Cultural Heritage	John Purcell Archaeological Consultancy: John Purcell Archaeologist
14 The Landscape	Ronan MacDiarmada & Associates: Ronan MacDiarmada B. Agr. Sc. (Land. Hort.)
15 Identification of Significant Impacts / Interactions	Delphi Planning: Tracy Armstrong BA, MRUP, Dip. EIA/SEA Mgmt, MIPI, MRTPI
16 Summary of EIA Mitigation & Monitoring Measures	Delphi Planning: Tracy Armstrong BA, MRUP, Dip. EIA/SEA Mgmt, MIPI, MRTPI

Table 1.3 EIAR Project Team

2.0. Planning Policy Context

2.1. Introduction

This chapter has been prepared by Delphi Design (Alan Fenton BA MRUP MIPI MRTPI) and outlines the planning context for the development proposal located on the lands at Lissywollen South, Athlone, County Westmeath.

The relevant sources for this application are as follows:

National Context

- The National Planning Framework (Project Ireland 2040);
- Smarter Travel – A Sustainable Transport Future, 2009-2020;
- Spatial Planning and National Roads, Guidelines for Planning Authorities (2012);
- Sustainable Residential Development in Urban Areas, Guidelines for Planning Authorities and Urban Design Manual, A Best Practice Guide (2009);
- Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities (2018);
- Urban Development and Building Heights Guidelines for Planning Authorities (2018);
- Design Manual for Urban Roads and Streets (2013);
- The Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009);
- The National Cycle Manual (2011);
- Quality Housing for Sustainable Communities - Best Practice Guidelines (2007);
- Guidelines for Planning Authorities for Child Care Facilities (2001);
- Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (2009).

Regional Context

- Eastern & Midland Regional Assembly Regional & Spatial Economic Strategy, 2019-2031

Local

- Westmeath County Development Plan, 2014-2020;
- Athlone Town Development Plan, 2014-2020;
- Lissywollen South Framework Plan, 2014-2020.

2.2. National Context

2.2.1. The National Planning Framework - Project Ireland 2040

The National Planning Framework (hereafter NPF) sets out a national spatial strategy for the next 20 years to support sustainable and balanced development approaches to significant demographic changes, and replaces the previous National Spatial Strategy. The NPF aims to secure the highest quality of life for people and communities through the development of high quality and well managed, built and natural environments. The NPF particularly focuses on compact growth and increased densities in appropriate locations. The NPF is accompanied by a 10 year capital investment plan known as the National Development Plan and together these publications as known as Project Ireland 2040

Within the NPF, Athlone is noted for its strategic location, scale of population, employment and services. The NFP states that Athlone has an influence that extends to part of all three regional assemblies in the country which underlines the need to develop the town in a co-ordinated manner so that sustainable growth and investment can be secured. The NPF projects that the population of Westmeath will grow by circa 21,000 people to a population of circa 100,000 by 2031, and sets a growth target of circa 8,651 persons for Athlone by 2031 (target population of 30,000). The importance of developing Athlone in a sustainable manner of scale is emphasised in National Policy Objective 2B and National Policy Objective 7.

The NPF has a number of directly relevant national policy objectives (NPO) that articulate delivering on a compact urban growth programme. These include:

- NPO 2b recognises the regional role of Athlone to the midlands;
- NPO 4 relating to attractive, well-designed liveable neighbourhoods;
- NPO 5 relating to sufficient scale and quality of urban development;
- NPO 6 relating to increased residential population and employment in urban areas;
- NPO 7 strengthening Ireland's overall urban structure, specifically referencing Athlone in the Midlands.

In addition, the NPF contains the following *inter alia* objectives:

- NPO 3a seeks to deliver at least 40% of all new homes nationally, within the built-up footprint of existing settlements;
- NPO 32 which targets the delivery of 550,000 additional households to 2040 and
- NPO 33 relates to the provision of new homes at locations that can support sustainable development and at an appropriate scale of provision relative to location.

Further details of the development proposal's compliance with the NPF policies and objectives can be found in the Statement of Consistency which accompanies this planning application.

2.2.2. Smarter Travel – A Sustainable Transport Future 2009 – 2020

The Smarter Travel document details the government's policy for delivering a more sustainable transport system and meeting an international obligation to tackle climate change. The document targets five key targets to achieve same being:

- Reduce overall travel demand and commuting distances of private car;
- Maximise the efficiency of the transport network;
- Reduce reliance on fossil fuels;

- Reduce transport emission and
- Improve accessibility to transport.

2.2.3. Spatial Planning and National Roads, Guidelines for Planning Authorities, 2012

The Spatial Planning and National Roads guidelines were prepared in the context of the previous National Spatial Strategy (replaced by the NPF) and actions identified in Smarter Travel, A Sustainable Transport Future 2009-2020. The guidelines set out planning policy consideration for developments which affect national roads outside urban areas to ensure the provision of a safe and efficient network of national roads. The guidelines put forward the following key themes for prospective developers:

- Land-use and transportation policies are highly interdependent;
- Proper planning is central to road safety;
- Development should be plan-led;
- Development Management is the key plan to plan implementation;
- Planning authorities and the national roads authority and other public transport bodies must work closely together.

2.2.4. Sustainable Residential Development in Urban Areas, Guidelines for Planning Authorities, 2009 and Urban Design Manual, A Best Practice Guide.

The Sustainable Residential Development in Urban Areas guidelines detail the key principles for new residential developments in urban areas while its accompanying Urban Design Manual translates the guidelines into practice. The guidelines promote a plan led / sequential approach to development, densities and location, sustainable neighbourhoods and better design / urban design. These guidelines are incorporated at a local level in the relevant development plan and/or local area plans and are to be considered in the preparation and assessment of planning applications.

2.2.5. Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities, 2018.

The Sustainable Urban Housing: Design Standards for New Apartments guidelines update the previous 2015 version of same and are an acknowledgement of the growing demand for apartment living in urban areas across Ireland. The guidelines provide detailed guidance on standards of apartment design (including floor areas, room sizes, storage, community facilities etc.). These standards will be used by developers in the preparation of planning applications for apartment development and by the relevant planning authorities in the assessment of applications.

2.2.6. Design Manual for Urban Roads and Streets, 2013

The Design Manual for Urban Roads and Streets were prepared by the Department of Transport, Tourism and Sport, together with the DoECLG to provide guidance and standards for urban roads and streets. These guidelines seek to avoid the creation of traffic corridors for private vehicles and promote a focus on creating places for pedestrians, cyclists and public transport.

DMURS encourages designers to give due consideration to creating a 'sense of place' which is of core significance to the creation of safe and more integrated street designs. The guidance document notes that four interlinked characteristics influence the sense of place within a street, including:

- **Connectivity:** The creation of vibrant and active places requires pedestrian activity. This in turn requires walkable street networks that can be easily navigated and are well connected.
- **Enclosure:** A sense of enclosure spatially defines streets and creates a more intimate and supervised environment. A sense of enclosure is achieved by orientating buildings toward the street and placing them along its edge. The use of street trees can also enhance the feeling of enclosure.
- **Active Edge:** An active frontage enlivens the edge of the street creating a more interesting and engaging environment. An active frontage is achieved with frequent entrances and openings that ensure the street is overlooked and generate pedestrian activity as people come and go from buildings.
- **Pedestrian Activity/Facilities:** The sense of intimacy, interest and overlooking that is created by a street that is enclosed and lined with active frontages enhances a pedestrian's feeling of security and well-being. Good pedestrian facilities (such as wide footpaths and well-designed crossings) also make walking a more convenient and pleasurable experience that will further encourage pedestrian activity.

The DMURS guidance emphasises that the above mentioned four characteristics represent the basic measures that should be established in order to create people friendly streets that facilitate more sustainable neighbourhoods.

2.2.7. The Planning System and Flood Risk Management – Guidelines for Planning Authorities. 2009

The Planning System and Flood Risk Management guidelines provide detailed guidance on the role that flood risk should play at different levels of the planning system. The Guidelines require the planning system at all levels to avoid development in areas at risk of flooding, particularly floodplains, and where the flood risk can be reduced or managed to an acceptable level without increasing flood risk elsewhere; adopt a sequential approach to flood risk management when assessing the location for new development based on avoidance, reduction and mitigation of flood risk; and incorporate flood risk assessment into the process of making decisions on planning applications and planning appeals. Planning Authorities must implement these guidelines to ensure that, where relevant, flood risk is a key consideration in development plans and local area plans and in the assessment of planning applications. The guidelines should also be utilised by developers and the wider public in addressing flood risk in preparing development proposals.

2.2.8. The National Cycle Manual, 2011

The National Cycle Manual was established by the National Transport Authority to ensure that prospective developments promote active travel means and support changing transport choices by incorporating cycling within transport networks more proactively. The manual embraces the principles of sustainable safety to offer a safe traffic environment for all road users, including cyclists, and offer guidance on integrating cycling routes in the design of urban areas.

2.2.9. Urban Development and Building Heights Guidelines for Planning Authorities, 2018

The Urban Development and Building Heights Guidelines reflect the policies and objectives of the NPF which support a move towards performance based criteria to achieve more compact forms of urban growth. The guidelines contain 4 no. Specific Planning Policy Requirements (SPPRs) which should be applied by both Planning Authorities and ABP in their assessment of development proposals. Generally, the SPPR's seek to increase building height and density in appropriate locations, even if the development proposal may contradict specific objectives of the relevant development plan or local area plan.

2.2.10. Quality Housing for Sustainable Communities - Best Practice Guidelines, 2007

The Quality Housing for Sustainable Communities Guidelines promote high standards in the design and construction of new residential developments. The Guidelines identify core principles and criteria that have been found, from experience, to be particularly relevant to the creation of high-quality living environments for future residents. Guidance within this document is arranged under five headings as follows:

- Site Selection;
- Design Brief, Procurement and Cost Control;
- Urban Design Objectives in the Provision of Housing;
- Scheme Layout and Design;
- Dwelling Design.

2.2.11. Guidelines for Planning Authorities for Child Care Facilities, 2001

The Childcare Facilities Guidelines for Planning Authorities direct Planning Authorities to facilitate the provision of childcare facilities in appropriate locations. The Guidelines state that, in general, one new facility catering for 20 childcare spaces should be developed for every 75 new residential dwellings. The Guidelines also provide broader guidance on internal standards for childcare facilities. The Guidelines state that the provision of new childcare facilities should have regard to the location of existing facilities emerging demographics in the area of development and advise that sites should from part of pre-planning consultations between applicants and Planning Authorities.

2.2.12. Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 2009

The Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities sets out the different steps and stages that are needed to establish whether a plan or project can be implemented without damaging an existing Natura 2000 site. The Guidelines indicate the role to be played by professional ecologists and other professionals in identifying potential impacts on same and provide details on potential mitigation measures to avoid of such impacts. Where such impacts cannot be avoided the Guidelines detail imperative reasons of overriding public interest which may allow a project to proceed.

2.3. Regional Context

2.3.1. Regional Planning Context - Eastern & Midland Regional Assembly Regional Spatial & Economic Strategy 2019-2031

The Eastern & Midland Regional Assembly Regional Spatial & Economic Strategy 2019-2031 (hereafter RSES) were adopted in 2019 to ensure the policies and objectives of the NPF are implemented at a regional level. At this strategic level, the guidelines provide a framework to better manage spatial planning and economic development throughout the Eastern & Midland region by setting the context for each local authority to develop their own county development plans / local area plans in a manner that ensures national, regional and local planning policies align.

The Settlement Strategy of the RSES promotes the consolidation of Dublin plus the Regional Growth Centres of Athlone, Dundalk and Drogheda, supported by planned focused growth of a limited number of self-sustaining settlements that have the assets and capacity to grow in a sustainable manner while minimising impacts on the receiving environment. Due to its location the town also has an intra-regional functional aspect for the Northern and Western Region as part of the functional urban area extends into County Roscommon. Athlone's central and accessible location nationally at a key nodal point between Dublin and Galway and at a principal crossing point on the River Shannon further enhances its role and potential. Further, the RSES designates Athlone as a Regional Growth Centre and aims to promote Athlone's sustainable and compact growth by setting the town a target population of 30,000 up to 2031. The RSES notes that the *"key to the success of Athlone is the availability of zoned and serviced lands within the existing built up area to facilitate significant population growth. The development of lands at Curragh Lissywollen, Lisseywollen South, Cornamagh, Cornamaddy and Monksland / Bellanamullia, have the potential to deliver the population targets identified in the RSES. In particular, the development of the strategic landbank at Lissywollen South, also offers the opportunity to develop a new urban quarter extending from the town centre".*

The development of Athlone as regional growth centre is emphasised in the RSES with Regional Policy Objective 4.8. seeking to:

"Support the regeneration of underused town centre and brownfield / infill lands along with the delivery of existing zoned and serviced lands to facilitate significant population growth and achieve sustainable compact growth targets of 30% of all new homes to be built within the existing built up urban area" within the town.

Further details of the development proposal's compliance with the RSES policies and objectives can be found in the Statement of Consistency which accompanies the planning application.

2.4. Local Context

2.4.1 Westmeath County Development Plan 2014 -2020

The Westmeath County Development Plan 2014-2020 (hereafter the CDP) is the current statutory development plan for the area. The Core Strategy of the CDP identifies Athlone as a Strategically Linked Gateway Town which, along with Mullingar, is listed in Tier 1 of the county's settlement strategy. The population distribution of Westmeath County is more or less evenly split between urban and rural areas with Athlone and Mullingar representing 47.6% of the county's total population (2016 Census).

Section 2.3. of the CDP details the strategic aims for the development plan, with the first aim focusing on *"Prioritising the sustainable development of the Strategic Linked Gateway Towns of Athlone and Mullingar in accordance with the Strategic Development Framework for the Midlands Gateway".*

Section 2.15 of the CDP details the preferred development strategy for Westmeath over the life of the plan. The principle focus of the county development strategy states the need for *"Promoting and facilitating development of critical mass, employment, enterprise and economic activity with particular emphasis on the role of the Gateway Towns of Athlone and Mullingar as the principal drivers of economic growth".*

As such Athlone is envisaged to take the majority of growth in the county in the longer term with Core Strategy Policy *'P-CS8'* stating the need *"To prioritise sustainable development in the Linked Gateway towns of Athlone and Mullingar, in line with National and Regional policy provisions".*

Specific objectives for the development of Athlone are detailed in the Athlone Town Development Plan 2014-2020.

The CDP contains a number of objectives for residential development within the county. Of relevance to the development proposal is *'Policy P-RD1'* which seeks to *"To promote higher residential density development in town centres and in particular Athlone and Mullingar, including on brownfield and infill sites subject to Development Management Standards being met and existing residential amenity not being compromised. In circumstances where public transport services are available car parking standards may be relaxed".*

Further details of the development proposal's compliance with the CDP housing policies and objectives can be found in the Statement of Consistency which accompanies the planning application.

2.4.2. Draft Westmeath County Development Plan 2021-2027

The Draft Westmeath County Development Plan 2021 - 2027 is yet to be adopted with the public consultation period for same having ended on 30th June 2020. Material Amendments to the Draft Plan were made and placed on public display for consultation for the period between 15th December 2020 and 20th January 2021. The Core Strategy of the Draft Plan to date has been written to ensure consistency with the NPF and RSES and as such, the Draft Core Strategy defines Athlone as a Regional Growth Centre.

Section 2.9 of the Draft County Development Plan references the development of Athlone. It is stated that *"The RSES further asserts that future development required to achieve the vision for Athlone includes the regeneration of underused, vacant or derelict lands in the town centre, to facilitate population growth and to strengthen the retail and commercial functions of the Regional Centre".*

CPO 2.1 of the Draft County Development Plan seeks to *"Support the continued growth of Athlone, with a focus on quality of life and securing the investment to fulfil its role as a key Regional Growth Centre and economic driver in the centre of Ireland, with a target population of 30,000 up to 2031".*

2.4.3. Athlone Town Development Plan 2014-2020

The Athlone Town Development Plan 2014-2020 (hereafter ATDP) is relevant plan for the settlement of Athlone. The application site is located to the north-east of Athlone town centre and is zoned *'Proposed Residential'* & *'Open Space'* in the existing ATDP.

To ensure coherent development of the town, the ATDP includes for individual Local Area Plans for specific and strategic local areas of the town. To this end, the application site is subject to a Local Area Plan known as the Lissywollen South Framework Plan 2018-2024. Lissywollen South is noted as an area to undergo comprehensive and significant development to ensure more integrated development forms and coordinated delivery of this strategic landbank.

The ATDP contains a core strategy which details the vision and strategic aims for Athlone town and its environs. Core strategy policies relevant to the development proposal are detailed below:

- *P-CS4 - To seek the delivery of physical and community infrastructure in conjunction with high quality residential developments to create quality living environments.*
- *P-CS5 - To guide the future development of Athlone in accordance with the spatial framework established in Local Area Plans in the town.*
- *P-CS7 - To ensure a sequential approach to development and promote residential development, prioritisation of infill sites / developments and the occupation of residential units in the town core, in order to promote the achievement of critical mass and protect and enhance town centre function.*
- *P-CS8 - To promote the integration of land use and transportation policy and to prioritise provision for cycling and walking travel modes and the strengthening of public transport.*
- *P-CS10 - To protect and conserve buildings, sites, public open spaces and features of special architectural, historic, archaeological, artistic, cultural, scientific, social or technical interest and to protect features of natural heritage, including the River Shannon, canal, watercourses and habitats.*
- *P-CS11 - To promote the appropriate use and re-use of town centre backland and under-utilised sites and to promote the regeneration of areas in need of renewal.*
- *P-CS12 - To facilitate the sustainable development of Athlone as part of the Midland Linked Gateway to meet economic, social and demographic growth requirements in accordance with the provisions of the National Spatial Strategy and the Midland Regional Planning Guidelines 2010-2022.*

2.4.4. Lissywollen South Framework Plan 2018-2024

The Lissywollen South Framework Plan 2018 -2024 (hereafter LSFP) provides a development strategy for the proper planning and sustainable development of the Lissywollen South area and is guided by the overarching policies/objectives contained in both the Westmeath CDP and ATDP. Consequently, the LSFP is consistent with the objectives and the provisions of both the CDP and ATDP and the core strategy contained therein.

The LSFP seeks to develop 78 hectares of strategically located land as a highly sustainable new urban quarter extending from the town centre of Athlone. The lands designated for the LSFP are divided into four development areas, as per Figure 2.1 below. The development proposal, the subject of this EIAR, is comprised of the entirety of the "Area 2" lands and the majority of "Area 1" lands.

"Area 2", known as Brawny, comprises approximately 13 hectares of land centrally located in the plan area which is characterised by the existing residential development (i.e. the Brawny residential estate of approximately 160 no. dwellings).

"Area 1", known as East End, comprises approximately 30 hectares of land to the east of the plan area and is characterised as being typical of the rural countryside, with small, irregular and enclosed field patterns enclosed by hedgerows and trees.

Fig 2.1 - Development parcels of the Lissywollen South Framework Plan 2018-2024

To ensure the coherent development of the residential zoned lands within the LSFP, the Plan divides the residential lands into 4 no. development parcels as detailed in Figure 2.2 over. The subject application site occupies all of Parcel 1 and Parcel 3 of the plan area, and partially occupies Parcel 2. The objectives for each individual parcel are detailed over:

Parcel 1

- **P1-KS01** To create a new urban streetscape with strong built form along the entirety of both the local access road serving Scoil na gCeithre Maistri, the existing distributor road serving Brawny and the Old Rail Trail.
- **P1-KS02** To ensure that new residential development shall provide an active frontage, positively address and provide passive surveillance over the Old Rail Trail and public open space area serving Brawny.
- **P1-KS03** To promote the development of family orientated, high quality, adaptable, lifelong homes through creative and energy efficient design.
- **P1-KS04** To improve connectivity to the Old Rail Trail through enhanced pedestrian and cycleway linkages.
- **P1-KS05** Permeability through the site will be promoted to successfully integrate the new residential area with the surrounding community in Brawny, taking cognisance of existing desire lines and routes to ensure ease of movement.
- **P1-KS06** To provide for a childcare facility to serve the needs of new residential communities which should cluster with existing Primary School.
- **P1-KS07** Consideration may be given to higher density units adjoining existing public open space area to the east of Parcel 1, provided that the residential amenity of adjacent dwellings is protected.
- **P1-KS08** To provide for a linear park across Parcel 1 to link existing public open space area at Brawny with the Regional Sports Centre complex.

Parcel 2

- **P2-KS01** To ensure high quality tree lined streetscape is achieved along the new East West Avenue / urban boulevard – Lissywollen Avenue through distinctive high quality street furniture, lighting, paving and public artwork that creates a distinctive character associated with this periurban location.
- **P2-KS02** To promote the creation of a high quality public realm by establishing a high quality of design in architecture and landscape architecture.
- **P2-KS03** To create and improve a hierarchy of interconnecting green spaces which link existing public open space with the Regional Sports Centre complex through the provision of safe pedestrian and cycle routes through the area, having regard to the Landscape Framework & Access Strategy.
- **P2-KS04** To provide a series of pocket parks as informal recreational spaces.
- **P2-KS05** To provide a childcare facility to serve new residential communities and the adjacent Business Park.
- **P2-KS06** To provide a public park along the eastern end of Parcel 2 to serve new residential development, the student quarter and adjoining business district.
- **P2-KS07** Consideration may be given to higher density units adjoining existing public open space area to the east of Parcel 1, provided that the residential amenity of adjacent dwellings is protected.

Parcel 3

- **P3-KS01** To minimise the adverse impacts of noise and promote good health and a good quality of life through the effective management of noise from the N6.
- **P3-KS02** To provide a landscaped buffer along the entirety of the northern boundary of Parcel 3.
- **P3-KS03** To provide a landscaped buffer along the eastern end of Parcel 3 to protect the residential amenity of future residents.
- **P3-KS04** To ensure that residential development adjoining the new East West Avenue is of the highest architectural design and positively enhances this important urban boulevard.
- **P3-KS05** To restrict the development of new residential schemes backing onto the N6.

Fig. 2.2 - Residential zoned land parcels within the Lissywollen South Framework Plan

2.4.5. Lissywollen South Framework Plan 2018-2024 Environmental Reports / Assessments

As a statutory requirement, and in accordance Article 6(3) of the EU Habitats Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna & Flora (as amended), a Screening for Appropriate Assessment was carried out in the preparation of the LSFP. The Screening for Appropriate Assessment concluded that no likely significant effects, either individually or in-combination with other plans or projects, are envisaged on the integrity of any Natura 2000 site(s) if the Plan is implemented, subject to compliance with existing policies and objectives related to the protection of the environment contained within the ATDP. Therefore, a 'Findings of No Significant Effect' was determined by WCC and no further assessment required.

Furthermore, a previous version of the LSFP was adopted in 2008 and subsumed into the existing ATDP. Therefore, all lands encompassed within LSFP area were subjected to full Appropriate Assessment in the preparation of the existing ATDP. This Appropriate Assessment concluded that, with the implementation of mitigating policies, the ATDP will not result in any significant long-term impacts on Natura 2000 sites.

In accordance with SEA Directive (2001/42/EC), transposed into Irish Law under S.I. No. 436 Planning and Development (Strategic Environmental Assessment) Regulations 2004 (as amended by S.I. No. 201/2011 (Planning and Development (Strategic Environmental Assessment) (Amendment) Regulations 2011) a Screening for Strategic Environmental Assessment (SEA) was also carried out in the preparation of the LSFP. The SEA concluded that the development of the LSFP area is unlikely to give rise to significant environmental effects, subject to compliance with all existing environmental policies and objectives contained within the ATDP.

Section 168 of the Planning and Development 2000 states that *"A Draft Planning Scheme shall also contain information on any likely significant impacts on the environment of implementing the Planning Scheme and to that effect it shall contain the information prescribed under Section 177 in so far as such information is relevant to the detail contained in the scheme".*

A full statutory EIA is not a requirement for Local Area Plans under the Act, however, it does not preclude the necessity for same in certain circumstances, for example in this case where individual developments are prescribed above the threshold requirements set out in the Schedules to the Environmental Impact Assessment Regulations implementing EC Directives 85/337/EEC and 97/337/EU. Notwithstanding same, the subject development proposal caters for 576 no. dwellings, which exceeds the threshold and has triggered an EIAR under the legislation.

2.5. Conclusion

A review of the relevant planning policy for the proposed development concludes the following:

The subject application site is located on lands subject to a Local Area Plan known as the LSFP. The LSFP has been approved by WCC and deemed to be in accordance with national and regional planning policy. Furthermore, the LSFP is compliant with the objectives and core strategy of both the Westmeath CDP and ATDP.

The environmental impacts arising from the implementation of the LSFP have been examined in the making of the Plan and the SEA assessments undertaken provide a strategic level assessment of the impacts on the receiving environment of implementing the proposals contained within the LSFP. These assessments concluded that the implementation of the plan is not likely to result in significant environmental effects.

The development proposal is put forward in compliance with the land-use zoning designation and policy objectives contained within the LSFP. Compliance with the above planning policy documents demonstrates the appropriateness of the current proposal from a proper planning and sustainable development perspective.

3.0. Description of Project and Alternatives

3.1. Introduction

This chapter has been prepared by Delphi Design Architecture + Planning (Alan Fenton BA MRUP MIPI MRTPI) and provides a description of the project site in the context of its receiving environment and a description of the project. As required by the EIA Directive and regulations thereunder, this chapter also outlines the Main Alternatives considered.

In accordance with the EIAR preparation process, various mitigation measures are detailed in this report and can either be incorporated during the planning process or as conditions of a grant of planning permission.

The project description in Section 3.3. should be read in conjunction with the plans and particulars submitted with the planning application including the statutory planning notices and the Planning Report / Statement of Consistency.

3.2. Site Context

The subject site is located within lands designated for the LSFP. The LSFP lands comprise approximately 78 hectares and are located north-east of Athlone town centre. The plan area is bounded to the north by the N6, Athlone Relief Road, to the west by the N55 (Ballymahon Road) and to the east by the R916. The plan lands are partially bisected along the south by the Old Rail Trail Greenway which forms a section of the Galway-Dublin National Cycle Network (NCN). South of the greenway are existing educational uses including for Athlone Community College and the Marist College. Other existing development in the plan lands include for Athlone Town stadium, the Regional Sports Cente, Pairc uí Chiarain GAA pitches to the west and ESB regional headquarters to the east.

Access to the Plan lands is currently limited to an existing distributor road serving the Brawny residential estate, the Regional Sports Centre and Athlone Football Club. To the east access has been created via a recently constructed roundabout at Garrycastle stores.

In the context of the LSFP, the subject site (i.e. the red line boundaries of application detailed on the drawings accompanying the application) measures c. 17.64 hectares. The subject site is comprised of lands zoned for residential development. The subject site is generally bounded to the north by the N6, Athlone Relief Road, to the south by the Old Rail Trial Greenway, to the west by Scoil na gCeithre Máistrí primary school and to the east by undeveloped lands, further east of which lie the ESB Regional Headquarters.

The subject site is currently undeveloped greenfield land, is generally flat, and bisected by the existing Brawny residential estate which comprises approximately 160 no. houses. The western section of the site, that to the west of the Brawny, is one of a largely non-descript landscape character while the eastern section, to the east of Brawny, has a typical rural landscape character consisting of fields defined by existing hedgerows.

3.2.1 Adjoining Development

To the north, beyond the N6, lies existing residential development, Athlone accommodation centre and undeveloped lands subject to the Curragh-Lissywollen Local Area Plan 2007. The Curragh-Lissywollen Local Area Plan 2007 envisages these lands to be developed for residential and mixed uses.

To the west of the subject site is Scoil na gCeithre Máistrí primary school and a range of sporting and recreational facilities including the Regional Sports Centre and Athlone Football Club. Outside of the LSFP lands, to the west and south-west lies existing residential development.

Lands to the south of the Old Rail Trail Greenway are defined by existing residential and education uses including for Athlone Community College and the Marist College. Outside of the LSFP lands, to the south-east lies residential development, while Athlone town centre lies to the south-west.

To the east, the subject site abuts an old boreen, further east of which are undeveloped lands, ESB Regional Headquarters and the Athlone Training Centre (formerly known as FAS).

3.3. Description of the Physical Characteristics of the Proposed Development

The project in question is a residential development consisting of 576 no. dwellings comprised of a mix of houses, duplex units and apartments, along with 2 no. crèches, community hub and all associated site development and infrastructural works, open spaces, car parking, landscaping, etc.

Alanna Roadbridge Developments Limited is the applicant who seeks permission for the following development:

(a) 285 no. 2 storey detached, semi-detached & terraced houses, comprised of 50 no. 4 bedroom houses, 200 no. 3 bedroom houses & 35 no. 2 bedroom houses;

(b) 246 no. apartments in 18 no. buildings (i.e. Blocks A, B, C, D, E, F, H, K, N, P, Q, R, S & T - all 3 storey, Block G - 2 storey, Block L - 4 storey with a 5 storey setback, Block M - 3 storey with a 4 storey setback, Block O - 2 to 4 storey) comprising 61 no. 1 bedroom apartments, 168 no. 2 bedroom apartments & 17 no. 3 bedroom apartments;

(c) 45 no. duplex units in 9 no. of the above buildings (i.e. Blocks A, B, D, E, F, H, O, Q & S) consisting of 8 no. 2 bedroom duplex units & 37 no. 3 bedroom duplex units.

The development proposal includes for the provision of a double height community hub measuring circa 107m^2 located on the ground floor of the Block D and 2 no. childcare facilities comprised of a 2 storey crèche located adjacent to proposed Block C (measuring circa 214m^2) and a 1 storey crèche located on the ground floor of the proposed Block T (measuring 362m^2).

The development will also deliver a new east-west access route ('Lissywollen Avenue') through the LSFP lands extending from the Ballymahon roundabout (on the R915) to the west, to the Garrycastle roundabout (on the R916) to the east. Access to the subject site will be from the Ballymahon roundabout (on the R915) to the west and the Garrycastle roundabout (on the R916) to the east. The development proposal provides for pedestrian and cyclist connectivity to Old Rail Trail Greenway to the south.

The proposed development includes for the provision of public open spaces, planting, boundary treatments and all ancillary landscape works, public lighting, drainage and attenuation, surface and basement car parking, bicycle parking, bin storage, ESB sub-stations and all associated site development works.

The locational context of the application site and the objectives of the LFSP have been carefully considered as part of the development put forward for permission, whereby the proposed site layout plan provides for:

- Development of a new east-west access route through the LSFP lands;
- Integration with the existing Brawny estate which bisects the development lands;
- Provision of a landscape buffer to the north, abutting the N6, to minimize potential noise and visual impacts;
- Provision of pedestrian and cyclist connections to existing Old Rail Trail Greenway to the south;
- Provision of 2 no. childcare facilities as per the objectives of the LSFP.

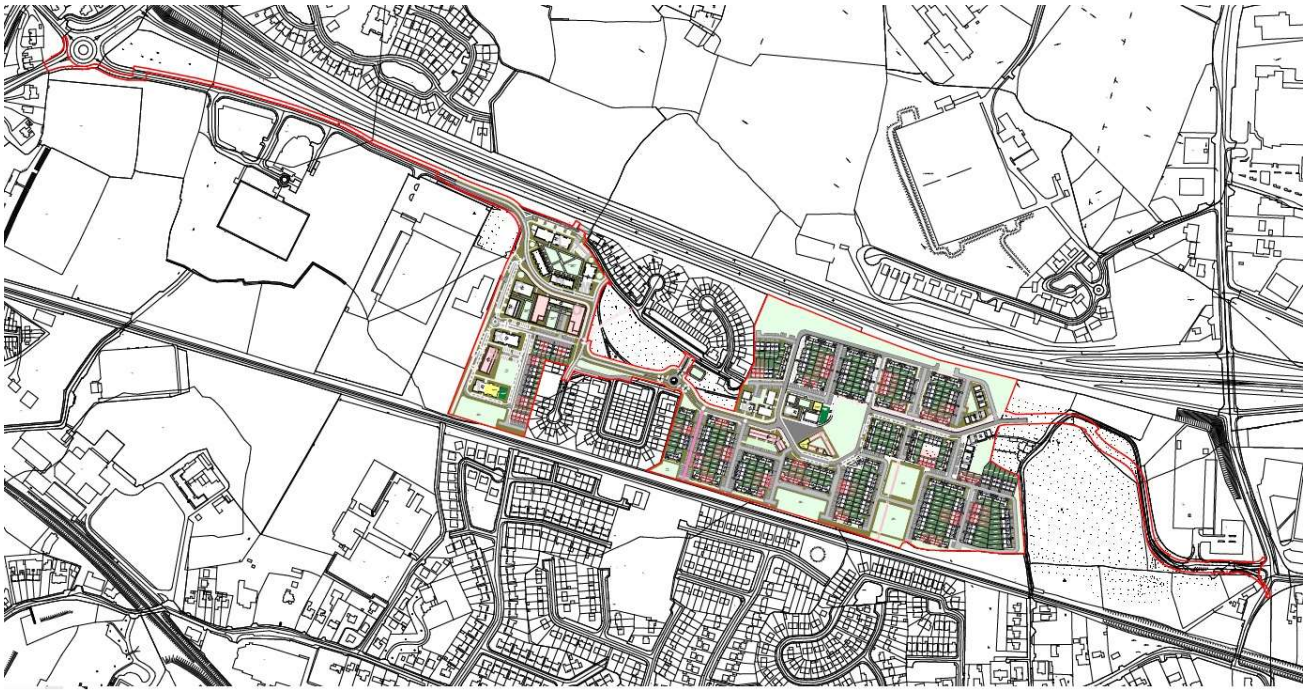


Fig 3.1 - Proposed site layout detailing the full extent of the site boundaries

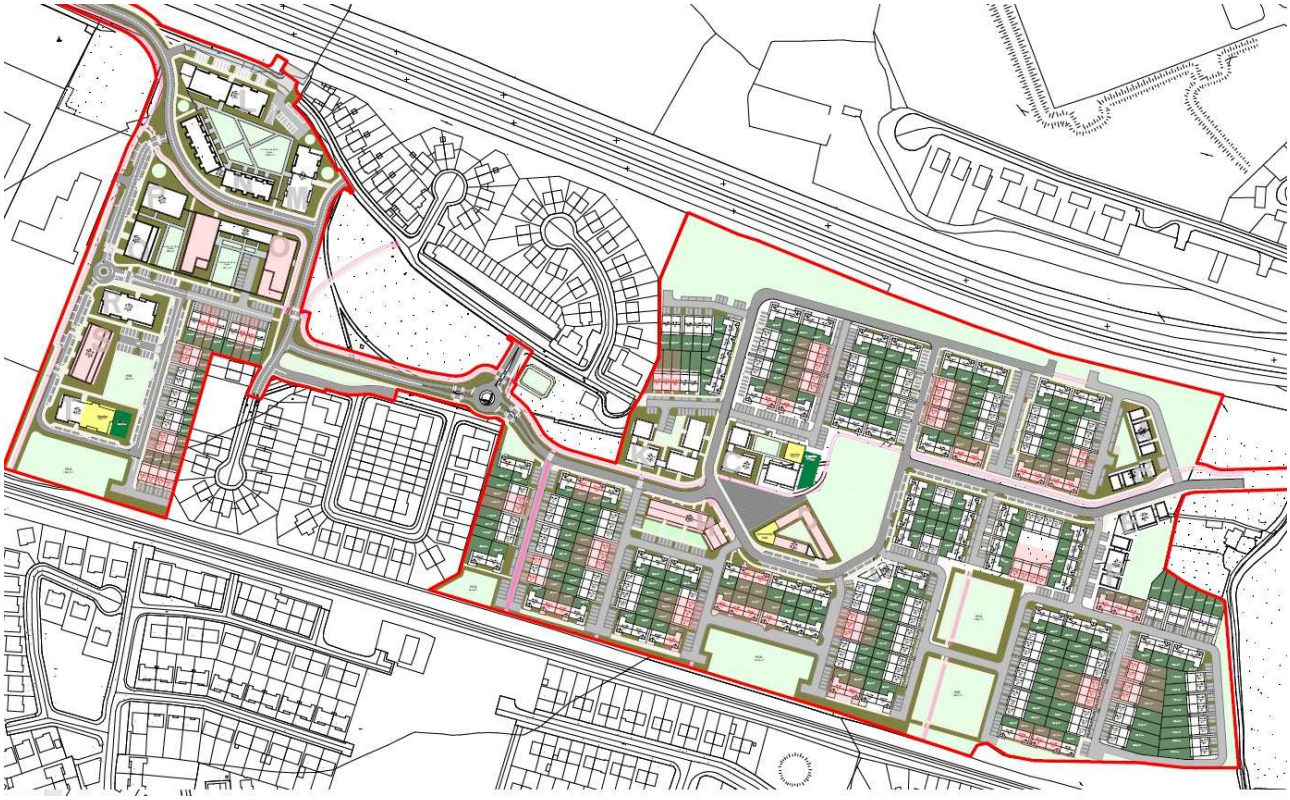


Figure 3.4 - Proposed site layout

3.4. Site and Development Works

The project includes the following works:

- Residential development (576 no. dwellings);
- Commercial / Community development (community hub & 2 no. childcare facilities);
- Public and private open spaces;
- Landscaping;
- Car / Bicycle parking and bin storage;
- Services infrastructure, utilities and public lighting;
- ESB Substations;
- Building and directional signage and
- All associated infrastructural and site development works.

Further details are provided in the plans and reports submitted with the planning application.

3.5. Project Life-Cycle

Beyond the construction and operational phases, there are no further phases of development envisaged for this project.

3.6. Demolition

There is no demolition of habitable or any other structures relating to the proposed development.

3.7 Residential Development

In summary, the proposed development comprises the construction of 576 no. dwellings consisting of 285 no. houses, 246 no. apartments and 45 no. duplex units.

Unit Type	1 bed	2 bed	3 bed	4 bed	Total
Houses	-	35	200	50	**285**
Apartments	60	169	17	-	**246**
Duplex Units	-	8	37	-	**45**
Overall Mix	**10%**	**37%**	**44%**	**9%**	**576 (100%)**

Table 3.1 – Overall Residential Development Mix

A wide variety of dwelling typologies are included in the proposal, comprising 246 no. apartments in 1, 2 and 3 no. bedroom units in 18 no. apartment buildings along with 45 no. duplex units accommodated in 9 no. buildings, all dispersed throughout the proposed development. These apartment and duplex dwellings comprise c. 51% of the overall mix of units. In addition it is proposed to provide 285 no. 2, 3 and 4 bedroom houses in a range of typologies comprising terraces, semi-detached and detached configurations.

The design intent is to provide a range of housing typologies of different heights, which include apartment blocks strategically located throughout the site in order to achieve place making, fronting onto important roads and streets. In addition, variety is provided by way of building height and typology dispersed throughout the entire application site. This built form provides variety in the street scape and offers a wide range of housing mix.

3.8 Non-Residential Development

3.8.1 Proposed Community Hub

The development proposal includes for a 1 storey, double height, community hub measuring c. 101m^2 located within Block D of the proposed development. The proposed community hub is centrally located, fronting onto the proposed east-west avenue which traverses the development and urban open space adjacent. It is considered that the proposed community hub will form an important community space capable of catering for a number of potential functions and will offer focal point for future residents of the development.

3.8.2 Proposed Childcare Facilities

The development proposal includes for 2 no. childcare facilities, proposed in compliance with the standards recommended by the 2001 Childcare Facilities-Guidelines for Planning Authority.

The first of the proposed childcare facilities consists of a 2 storey crèche measuring circa 214m^2 located adjacent to proposed Block C. This facility has an associated outdoor play area of circa 243m^2 located on its eastern side. The proposed creche has a capacity for circa 62 no. children.

The second of the proposed childcare facilities consists of a 1 storey creche measuring circa 362m^2 located on the ground floor of the proposed Block T. This facility has an associated outdoor play area of circa 292m^2 located on its eastern side. The proposed creche has a capacity for circa 83 no. children.

3.9 Car Parking and Cycle Parking Provision

A total of 752 no. car parking spaces, including dedicated disabled, electric charging, visitor and car club spaces are provided within the development proposal to cater for the proposed houses, duplex units and apartments. The 752 no. car parking spaces (which includes the 11 no. car parking spaces allocated to the adjacent school during the day) comprise 718 no. car parking spaces at surface level and 34 no. car parking spaces at basement level (i.e. located beneath Block L).

The proposed car parking is provided as follows:

- 455 no. spaces for 285 no. houses, equating to 1.6 spaces per house;
- 297 no. spaces for 246 no. apartments and 45 no. duplexes, equating to 1.02 spaces per unit;
- Underneath Block L, 34 no. car parking spaces are provided including 2 no. disabled spaces, which is part of the above mentioned overall figure of 297 no. spaces for the apartments and duplex units and not in addition to.
- The subject scheme proposals include 2 no. dedicated car club spaces. Managed by a specialised private operator (e.g. GoCar) all residents will have the option to become members of the car share service;
- Currently there are no car parking standards in the Development Plan for a creche facility. Nevertheless as detailed in Figure 5.3 of the enclosed Traffic & transport Assessment carried out by DBFL Consulting Engineers (TTA) the proposed development provides a parking / drop off area for the creche.

The proposed development includes for the provision of one on-street coach parking space and 11 no. car parking spaces immediately adjoining Scoil na gCeithre Máistrí as illustrated in Figure 5.4 of the enclosed TTA. This layout will replace the existing 6 no. car parking spaces and 1 no. bus space adjacent to the school. These proposed 11 on-street spaces could be assigned for school use Monday to Friday from 8am to 4pm. Outside of these hours, these parking spaces can be used for visitor parking by the residential development.

The quantum of proposed car parking has been developed with reference to the guidance outlined in both the Table 12.11 of the current Athlone Town Development Plan (2014-2020) which sets out the minimum parking guidance for residential developments and Chapter 4 of the Sustainable Urban Housing: Design Standards For New Apartments Guidelines For Planning Authorities, as published by the Department of Housing, Planning and Local Government (DHPLG) in March 2018. Considering the site's proximity to the town centre and the proposal extension of the bus route through the site, the

proposed development could be identified as being “Intermediate Urban Location” in reference to the DHPLG guidance.

A total of 1,602 no. bicycle parking opportunities are proposed as part of the residential development scheme (comprising a mix of Sheffield stands and single / double stacked Cardiff Stands) which include a total of 328 no. short term and 1,274 no. long term bicycle parking stands / opportunities on site within the proposed development.

The 1,602 bicycle spaces are comprised of 1,574 no. residential and 28 no. creche cycle parking spaces. The 1,574 no. residential cycle parking spaces comprise 1,260 no. long term secured / sheltered spaces and 314 no. short term parking spaces. The 28 no. cycle parking spaces proposed for the creche facilities include 12 no. at the 321m² creche located in Block C and 16 no. at the 448m² creche located in Block T.

3.10 Access

The proposed development will also deliver a new east-west access route (‘Lissywollen Avenue’) through the LSFP lands, extending from the Ballymahon roundabout (on the R915) to the west, to the Garrycastle roundabout (on the R916) to the east.

Vehicular access to the subject site will be from the Ballymahon roundabout (on the R915) to the west and the Garrycastle roundabout (on the R916) to the east. The development proposal also provides for pedestrian and cyclist connectivity to Old Rail Trail Greenway to the south.

3.11 Construction Management Strategy

3.11.1. Construction Management

A Construction & Demolition Waste Management Plan (CDWMP) has been prepared for the proposed development and accompanies the planning application. Certain assumptions are made in the CDWMP based on the information available at this time and, for the avoidance of doubt, it is not proposed or intended that the applicant / contractor(s) are bound by these proposals which may change depending on the timing and circumstances pertaining at the time of construction.

On receipt of a grant of planning and prior to the commencement of works, a detailed final Construction Management Plan (CMP) will be prepared. The contractor will be required to comply with and implement the requirements and mitigation measures as set out in this EIAR and any conditions imposed as part of planning permission. An Outline/Preliminary CMP has been prepared for the proposed project and is included with the planning application documentation. In addition, a Mobility Management Plan (MMP) has also been prepared and is also included as part of this application. Certain assumptions are made in both the Outline CMP and MMP based on the information available at this time and, for the avoidance of doubt, it is not proposed or intended that the applicant / contractor(s) are bound by these proposals which may change depending on the timing and circumstances pertaining at the time of construction.

A Construction and Environmental Management Plan has been prepared by DBFL Consulting Engineers which addresses noise and vibration, traffic management, working hours, pollution control, dust control, road cleaning, compound/public health facilities and staff parking associated with the construction works, and is submitted as part of this SHD planning application.

All of the aforementioned plans include further information on the construction programme and construction related activities. The plans also address issues relating to site access, compounds, site security, waste management contractors' responsibilities etc.

3.11.2. Construction Programme / Phasing

It is estimated that construction of the development will take approximately five years to complete. The applicant has provided an indicative construction programme in the Outline CMP & CDWMP (submitted with the Planning Application documentation) which depicts the sub-areas only for development. A phasing plan also accompanies the planning application – refer to Delphi drawing no. D1408-19-PL07 which illustrates the indicative construction staging sequence. The intended sequence of development may change post grant of planning permission, as a detailed construction programme is dependent on contractor appointment, market and other considerations.

Phase 1 will occur in Sector 0: consisting of the delivery of the proposed east-west access route through the subject site.

Phase 2 will occur in Sector 1A: Development will commence at the eastern end of the site. Sector 1A is located to the north of the east-west access route. This first phase of development will see the delivery of Blocks A, B, C & D and house no.'s 17-88. Sector 1A will therefore deliver 47 no. duplex and apartment units and 72 no. houses totalling 119 no. dwellings. Sector 1A also includes for the delivery of the childcare facility adjacent to Block C (accommodating circa 62 no. children) and the community hub located in Block D, as wells as the urban plaza and other public open spaces.

Phase 3 will occur in Sector 1B: Sector 1B is located to the east of the site and south of the east-west access route. This phase of development will see the delivery of Blocks E & F and house no.'s 137 – 222. Sector 1B will therefore deliver 17 no. duplex and apartment units and 86 no. houses totalling 103 no. dwellings. Sector 1B also provides for public open spaces and connections to the Old Rail Trail Greenway to the south.

Phase 4 will occur in Sector 2A: Sector 2A is located to the east of the existing Brawny residential estate, west of Sector 1A and north of the proposed east-west access route. This phase of development will see the delivery of Block K and house no.'s 293 – 307. Sector 2A will therefore deliver 21 no. apartments and 15 no. houses totalling 36 no. dwellings.

Phase 5 will occur in Sector 2B: Sector 2B is located to the east of the existing Brawny residential estate, west of Sector 1B and south of the proposed east-west access route. This phase of development will see the delivery of Blocks G & H and house no.'s 227 – 264, 277-292 & 329-364. Sector 2B will therefore deliver 16 no. duplex and apartment units and 90 no. houses totalling 106 no. dwellings.

Phase 6 will occur in Sector 3A: Sector 3A is located to the northwest of the development site, west of the existing public open space at Brawny. This phase of development will see the delivery of Blocks L, M, N,O, P & Q. Sector 3A will therefore deliver 146 duplex and apartment units.

Phase 7 will occur in Sector 3B: – Sector 3B is located to the southwest of the development site. This phase of development will see the delivery of Blocks R,S & T and house no.'s 555-576. Sector 3B will therefore deliver 44 duplex and apartment units and 22 no. houses totalling 66 no. dwellings. Sector 3B also includes for the delivery of the childcare facility located on the ground floor of Block T (accommodating circa 83 no. children).

Sector	Phasing Sequence	No. of dwellings	Other
Sector 0	First Phase	0	-
Sector 1A	Second Phase	119	1 no. creche 1 no. community hub
Sector 1B	Third Phase	103	-
Sector 2A	Fourth Phase	36	-
Sector 2B	Fifth Phase	106	-
Sector 3A	Sixth Phase	146	-
Sector 3B	Seventh Phase	66	1 no. creche

Table 3.2 - Summary of phasing proposals

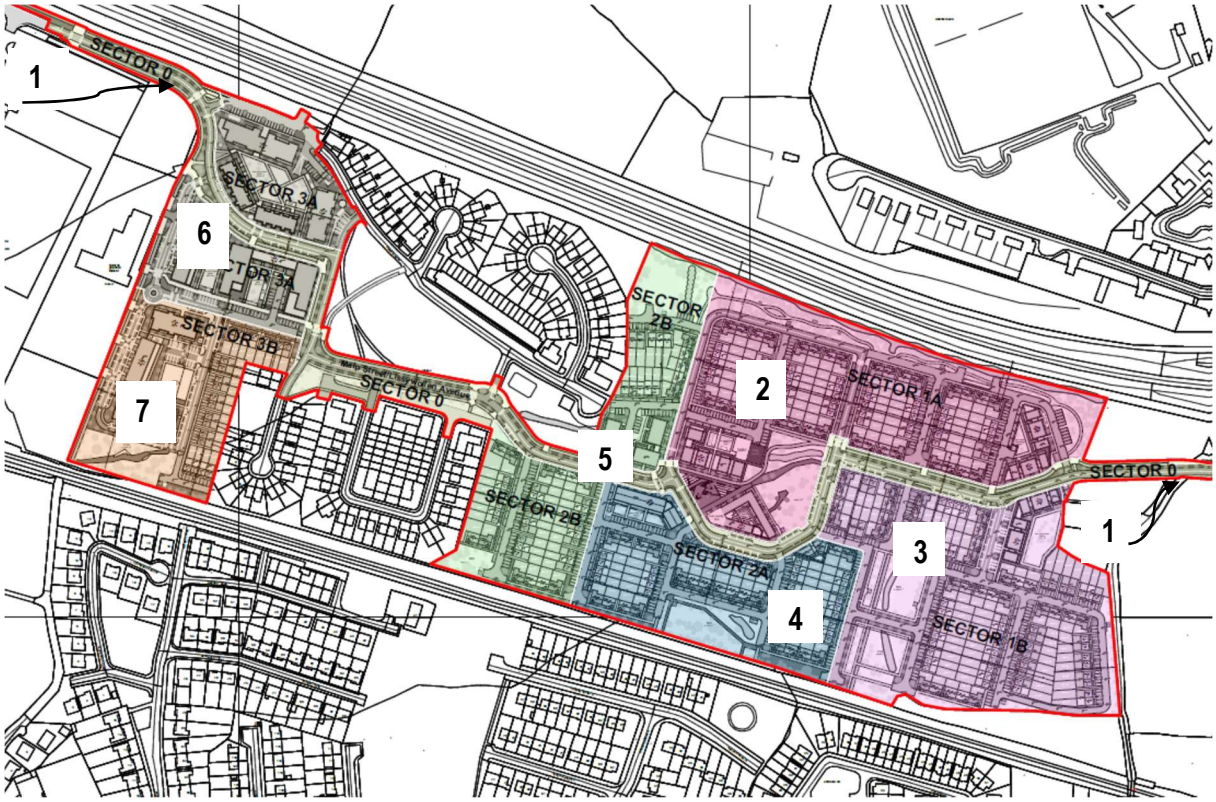


Figure 3.5 – Proposed Phasing

3.11.3. Site Preparation

There is no demolition required for the project. There is 1 no. basement car park proposed which is located below the proposed Block L. Excavated material on site will predominantly be re-used on site / within the developer's control.

The contractor(s) will require connections to the following services / utilities for the duration of the works:

- Water supply
- Foul sewer
- Surface water sewer
- Electricity
- Telecommunications

Existing services / utilities within and adjoining the site will be protected during construction.

3.11.4. Construction Activities

The construction works associated with the project will be contained within the application site boundary. These works will include excavation, earthworks, etc.

Some construction activity may take place off-site on lands within the control of the developer. These activities may include access and haul routes, site compound(s), storage of materials and soil/excavated material, screening and processing of existing materials for re-use within the development works, construction parking, staff welfare facilities etc. These areas will be identified in the detailed CMP.
Typically, construction will commence at 07.00 to 19.00 Mondays to Fridays inclusive, between 08.00 to 14.00 on Saturdays and not at all on Sundays and public holidays. During the construction period, due to exceptional circumstances, construction work may be necessary outside these standard hours. If necessary, this will be agreed in advance with WCC.

Deliveries of material to site will be planned to avoid high volume periods. There may be occasions where it is necessary to have deliveries within these times. The Contractor will develop, agree and submit a detailed Traffic Management Plan for the project prior to commencement.

The contractor will be guided by the CDWMP which accompanies the application with regard to re-use, recovery, recycle and disposal of waste produced during construction. Chapter 13 of this EIAR, Material Assets : Resource and Waste Management, also considered the re-use recovery, recycle and disposal of waste arising from the development.

3.11.5. Construction Material

The proposed development will have a requirement for imported materials, primarily concrete, steel, stone and asphalt. The estimated quantities for the overall development are provided in the CDWMP. The majority of new materials brought to site will be used immediately. The remainder will be stored within the site boundary.

Material excavated on the site will be used in construction. The re-use of this material reduces the quantity of materials being imported to the site. Prior to use, this material will be subject to appropriate testing to ensure material is suitable for construction. Locations to stockpile this material will be identified by the contractor(s) in the detailed CMP.

3.11.6. Construction Traffic

A construction traffic management plan will form part of the detailed CMP to be prepared by the appointed contractor prior to commencement of development and will outline proposals for construction deliveries and staff accessing the compounds and construction sites.

During all phases of construction, access to all existing properties adjoining the development lands will be maintained. Local traffic management procedures will be put in place where required.

Site access / egress routes and construction traffic generation are discussed in the Traffic and Transport Assessment and reflected in the CMP and CEMP which accompany the application.

3.12 Energy Statement

Conservation and Renewable Technologies that will be employed in part or in combination with each other for this development. These techniques will be employed to achieve compliance with the building regulations Part L and NZEB standards currently in public consultation.

3.12.1 Environment / Global Issues

Increasing levels of greenhouse gases have been linked with changes in climate and predicted global warming. By far the biggest human contribution to the greenhouse gases is in emissions of carbon dioxide. The development is likely to increase carbon dioxide levels in the atmosphere by the embodied emissions in the building materials used, and in the operational energy consumed during the life of each building.

To minimise the embodied emissions impact, materials will be sourced locally where possible (reducing carbon dioxide emissions associated with transportation), and preference will be given to reusing materials, and using materials in their natural state (reducing the emissions associated with processing).

3.13 Emissions and Waste

3.13.1 Effluents

Effluent arising from foul drainage from the proposed development will be discharged through piped systems to the local authority sewers. Operation of the development will involve the discharge of uncontaminated surface water from the impermeable areas to a proposed network all linking into the established public system in the environs. Details of the impacts and remedial and reductive measures for surface water and foul drainage are recorded at Chapter 7 “Water” of this Environmental Impact Assessment Report.

3.13.2 Municipal Waste/Waste Management

A Waste Management Plan (WMP) will be prepared and shall be submitted to the Planning Authority for agreement prior to commencement of development on site. The WMP will demonstrate how the

Construction Phase will comply with the following relevant legislation and relevant Best Practice Guidelines:

- Waste Management Acts 1996
- Waste Management (Collection Permit) Regulations 2007 (SI No. 820 of 2007)
- *Waste Management (Collection Permit) Amendment Regulations 2008 (SI No. 87 of 2008)*
- *Department of the Environment, Heritage and Local Government – Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects – July 2006*

The Waste Management Plan will present the potential environmental impacts, proposed monitoring methodologies, limit values where applicable, based on the concept of Best Practice and the proposed mitigation measures to be implemented at the development site. Reference to National and International Standards shall also be included where relevant.

Waste materials generated by construction activities will be managed according to the Department of the Environment, Heritage and Local Government's 2006 Publication - *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects.*

Waste minimisation and prevention shall be the primary responsibilities of the Construction Project Manager who shall ensure the following:

1) Materials will be ordered on an *"as needed"* basis to prevent over supply
2) Materials shall be correctly stored and handled to minimise the generation of damaged materials
3) Materials shall be ordered in appropriate sequence to minimise materials stored on site
4) Sub-contractors will be responsible for similarly managing their wastes

Construction Waste Disposal Management

It is proposed that from the outset of construction activities, a dedicated and secure compound containing bins, and/or skips, and storage areas, into which all waste materials generated by construction site activities, will be established within the active construction phase of the development site.

Contaminated Soil

In the unlikely event that contaminated soils are discovered, these areas of ground will be isolated, tested for contamination in accordance with *2002 Landfill Directive (2003/33/EC),* and pending the results of laboratory testing, will be excavated and exported off-site by an appropriately Permitted Waste Contractor holding an appropriate Waste Collection permit and that this hazardous material will be sent for appropriate treatment / disposal to an appropriately Permitted / Licenced Waste Facility.

Domestic Waste Management

It shall be the responsibility of the Facilities Management Company to ensure that all domestic waste generated by apartment/duplex residents is managed to ensure correct storage prior to collection by an appropriately waste permitted waste collection company on a weekly basis.

Sufficient domestic waste storage areas shall be provided throughout the proposed residential development. It shall be the responsibility of the Facilities Management Company to ensure that appropriate signage is provided in each area notifying apartment/duplex residents of the importance to recycle domestic waste items in accordance with the requirements of the contracted Waste Collection contractor.

The proposed development shall be constructed and developed to minimise the generation of construction waste. During the construction phase, construction waste shall be stored and segregated in dedicated waste storage areas which shall optimise the potential for off-site reuse and recycling. All construction waste materials shall be exported off-site by an appropriately permitted waste contractor.

The development shall be designed to provide adequate domestic waste storage areas for common residential areas (apartments) and individual houses. This will promote the appropriate segregation at source of domestic generated waste from all residential units at the development. Waste bin storage areas shall be designed in a manner to ensure that appropriate signage for the correct waste disposal and recycling is available for residents.

The crèches / community hub shall have designated commercial waste bins for both general and recyclable waste which shall be stored within the boundaries of the building areas. Waste shall be collected on a weekly basis by an appropriately permitted commercial waste contractor.

3.14 Emissions

The principal forms of air emissions relate to discharges from motor vehicles and heating appliances. With regard to heating appliances, the emission of nitrogen oxides and carbon monoxide will be minimised by the use of modern, efficient heating appliances and as a result, the potential impact is estimated to be negligible. Exhaust gases from motor vehicles will arise from car parking areas, and will be discharged directly to the atmosphere. Car parking for motor vehicles is provided at basement and surface levels. In general, it is noted that approximately 80% of all cars in Ireland run on unleaded fuel which can be expected to have a reductive effect on air emissions. It is expected therefore that the potential impact will be negligible.

Noise may be considered in two separate stages, during construction, and when the development is operational. Construction related noise impacts are an inevitable short term, limited inconvenience feature which, in general, is accepted by members of the public, subject to the standard controls typical of planning conditions attached to urban based development projects. These impacts can be reduced in a number of ways. It is standard practice to limit construction to normal working hours during the day. In addition, there are a number of regulations relating to noise during construction which the contractor will be expected to adhere to throughout the construction phase.

3.15 Direct and Indirect Effects Resulting from Use of Natural Resources

Details of significant direct and indirect effects arising from the proposed development are outlined in Chapters 4-15 which deal with *'Aspects of the Environment Considered'*. No significant adverse impact is predicted to arise from the use of natural resources.

3.16 Direct and Indirect Effects Resulting from Emission of Pollutants, Creation of Nuisances and Elimination of Waste

Details of emissions arising from the development together with any direct and indirect effects resulting from same have been comprehensively assessed and are outlined, where relevant, in the relevant in Chapters 4-15 which deal with '*Aspects of the Environment Considered*'. There will be no significant direct or indirect effects arising from these sources.

3.17 Forecasting Methods Used for Environmental Effects

The methods employed to forecast and the evidence used to identify the significant effects on the various aspects of the environment are standard techniques used by each of the particular individual disciplines. The general format followed was to identify the receiving environment, to add to that a projection of the *"loading"* placed on the various aspects of the environment by the development, to put forward amelioration measures, to lessen or remove an impact and thereby arrive at net predicted impact.

Where specific methodologies are employed for various sections they are referred to in the Receiving Environment (Baseline Scenario) sections in the EIAR. Some of the more detailed/specialised information sources and methodologies for a number of the environmental assessments are outlined hereunder.

3.18 Transboundary Impacts

Large-scale transboundary projects[4] are defined as projects which are implemented in at least two Member States or having at least two Parties of Origin, and which are likely to cause significant effects on the environment or significant adverse transboundary impact.

Having regard to the nature and extent of the proposed development, which comprises a residential development, located in Athlone, within the administrative area of County Westmeath, transboundary impacts on the environment are not considered relevant, in this regard.

3.19 Alternatives Examined

The consideration of Alternatives is an important part of the EIA process. By examining alternatives considered and indicating the main reasons for choosing the proposed development, it is possible to reduce or minimise environmental impacts and ensure that better solutions are not overlooked.

The EIA Directive (2014/52/EU) requires that Environmental Impact Assessment Reports include *"A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects."*

Article 94 and Schedule 6, paragraph 1(d) of the Planning and Development Regulations 2001 (as amended) provides for, an outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment, i.e.:

[4] The definition is based on Articles 2(1) and 4 of the EIA Directive and Article 2(3) and (5) of the Espoo Convention, respectively. http://ec.europa.eu/environment/eia/pdf/Transboundry%20EIA%20Guide.pdf

"(d) A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment."

This section of the EIAR provides an explanation of the reasonable alternatives examined throughout the design and consultation process. This serves to indicate the main reasons for choosing the proposed development, taking into account and providing a comparison of the environmental effects. The alternatives may be described at four levels:

- Alternative locations;
- Alternative uses;
- Alternative layouts;
- Alternative processes.

Pursuant to Section 3.4.1 of the Draft Environmental Protection Agency (EPA) Guidelines on the *Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2017), the consideration of alternatives also needs to be cognisant of the fact that "*in some instances some of the alternatives described below will not be applicable - e.g. there may be no relevant 'alternative location'…"*

In accordance with Draft EPA Guidelines (EPA, 2017), different types of alternatives may be considered at several key phases during the process. As environmental issues emerge during the preparation of the EIAR, alternative designs may need to be considered early on in the process or alternative mitigation options may need to be considered towards the end of the process.

The Draft 2017 Guidelines also state *"Analysis of high-level or sectoral strategic alternatives cannot reasonably be expected within a project level EIAR… It should be borne in mind that the amended Directive refers to 'reasonable alternatives… which are relevant to the proposed project and its specific characteristics'".*

The DHPLG 2018 EIA Guidelines state:

"Reasonable alternatives may relate to matters such as project design, technology, location, size and scale. The type of alternatives will depend on the nature of the project proposed and the characteristics of the receiving environment. For example, some projects may be site specific so the consideration of alternative sites may not be relevant. It is generally sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues associated with each. ***A 'mini- EIA' is not required for each alternative studied."*** *(Emphasis added).*

Thus, the consideration and presentation of the reasonable alternatives studied by the project design team is an important requirement of the EIA process, and the main alternatives considered are identified below.

The location and type of development proposed has been determined by the land use zoning objectives contained in the Westmeath CDP, ATDP & LSFP, all of which have been environmentally assessed, and statutorily adopted.

In the preparation of the LSFP, screenings for SEA and AA were carried out. The SEA screening concluded that the Plan will not have significant adverse effects on the environment if implemented. The AA screening concluded that the Plan is not foreseen to give rise to any significant adverse effects on

designated European sites, alone or in combination with other plans or projects. Furthermore, it was deemed that a Stage 2 – Natura Impact Statement (NIS) was not required.

As the LSFP, approved and adopted by Westmeath County Council, already provides a strategic framework indicating the manner in which the site should be developed, the range of alternatives was therefore lessened. The overall development for the LSFP in this case should comprise of:

- Residential uses
- Commercial uses
- Sporting & Recreational uses
- Education, Community & Institutional uses
- Enterprise & Employment uses
- Existing Residential and Open Space uses
- Development of a new east-west access route
- Development of pedestrian and cycle routes

The overall form and content of the any proposed development is fixed by the requirement of the LSFP for the lands. In this regard, the consideration of alternatives during the design stage was confined to details such as:

- Residential layout and mix
- Residential density
- Design and layout of open space
- Form and layout of the new east-west access route
- Form and layout of pedestrian and cycle routes

The development proposal in this case only considered the alternatives which were in keeping with the overall LSFP. In the first instance, the proposed development is considered relative to the "do-nothing", "do-minimum" and "do-maximum" scenarios.

3.19.1 Alternative Site Layouts

The design parameters for the development proposal are set down in the first instance in the LSFP which has determined the land use mix, the building height / plot ratio and other physical characteristics. The development proposal is put forward with the consent of the landowners, being Westmeath County Council, and as such, the development proposal has also been guided by detailed discussions with the relevant WCC departments, Planning, Roads & Traffic, Parks and Water and Drainage prior to the proposed development being prepared. These detailed discussions highlighted the environmental issues to be addressed, which informed the design process.

Alternative site layouts and siting progressed throughout the design process in order to minimise the impact on the receiving environment at the earliest opportunity. The initial stage involved a constraints analysis of the land within the proposed development site to identify all high-level constraints and aggregate them against the site to allow a suitable layout to be developed.

The proposed development of this site has also been guided by a number of community meetings with local residents in the vicinity of the development, which were held by both the Local Authority and the applicant's design team. The main outcome of meetings with local residents was the need to carefully consider the route of the proposed east-west access road ("Lissywollen Avenue") through the existing

open space lands which serve the Brawny residential estate. These considerations have informed the consideration of alternative layouts and designs, open space provision, the layout of the proposed east-west access route through the subject lands, addressing the issues of population and human health, biodiversity, archaeology and traffic and access arrangements.

The following analyses the alternative development options that were considered for the subject site, and then describing design options and changes which were incorporated into the scheme as the proposals progressed through the design process and pre-application discussions with the Planning Authority (S.247 pre-planning consultation) and with An Bord Pleanála.

The earliest proposals for the development of the site considered a greater focus on the development of traditional housing for the subject site as shown in Figure 3.6 below.

Fig. 3.6 - Layout Alternative No. 1 - Earlier alterative design layout for the subject lands

Fig. 3.7 - Layout Alternative No. 2 – Alternative layout which introduced more urban elements to the scheme

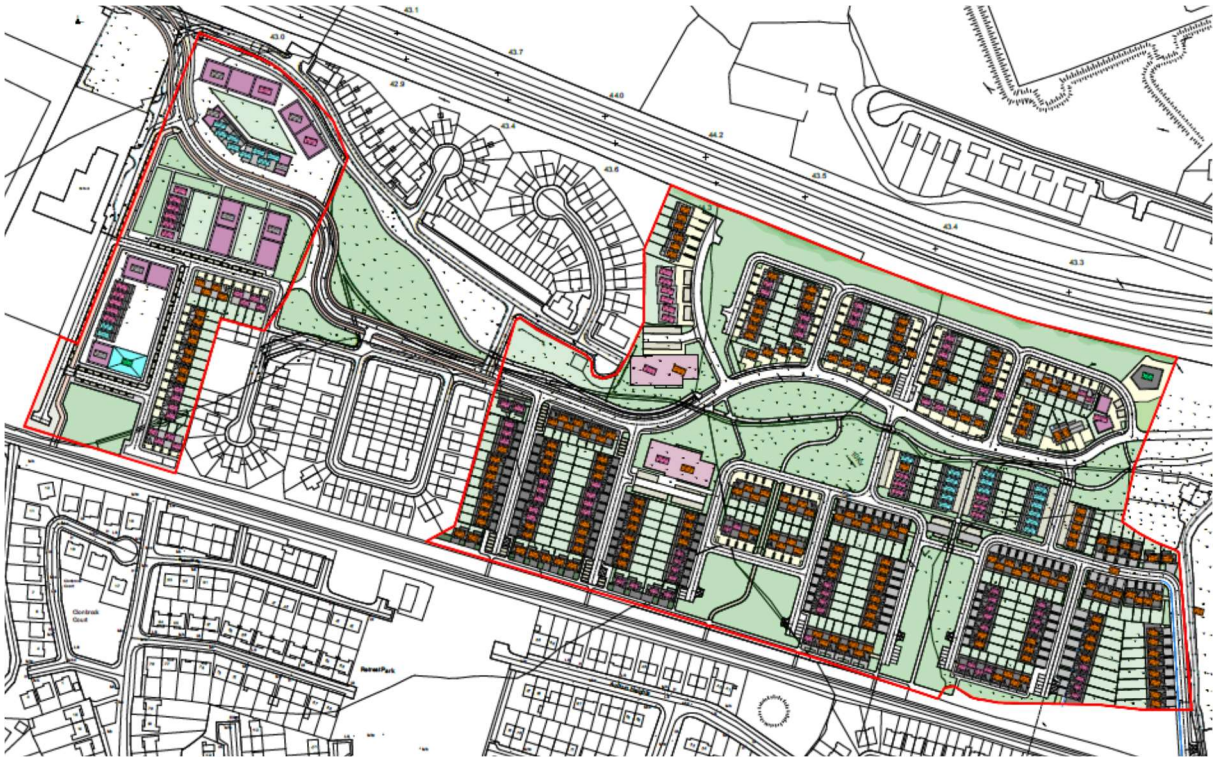


Fig. 3.8 - Layout Alternative No. 3 - presented as part of pre-planning consultation with WCC

The alternative site layout plan No. 3 identified in Fig. 3.8 represents the layout plan put forward for S.247 pre-planning consultation with Westmeath County Council, proposing the development of 555 no. dwellings and 2 no. crèches, along with site development / infrastructural works, mainly in the form of a new east-west distributor road linking the N55 Ballymahon Road to east to the Brawny Road to the west, as well as all other associated site development works, open spaces, car parking etc.

This site layout plan was submitted to An Bord Pleanála for pre-application consultation, proposing 547 no. dwellings and 2 no. creches etc.

Fig. 3.9 - Layout Alternative No. 4 - presented as part of pre-application consultation with ABP

Subsequent to the pre-application consultation tri-partite meeting, ABP requested a second meeting, and to address matters such as design an layout including the design of the east-west link road/Lissywollen Avenue. ABP requested that this should be designed as a street and not as a distributor road, with an active and strong urban edge, and that further consideration should be given across the development to achieving an appropriate level of enclosure of streets and open spaces (proposed and existing) through the built form, in addition to landscaping. Other items to be address included the car parking strategy which was to accord with the Design Manual for Urban Roads and Streets (DMURS), with a focus on a layout which is not car dominant. In addition, pedestrian and cyclist movement across the site, specifically north south across the proposed east-west Lissywollen Avenue and consideration of parking on the approaches to the access points to the Old Rail Trail Greenway were to be addressed, as was the open space strategy, particularly the hierarchy, function and usability of open space across the development. A revised site layout plan was presented at the second pre-application consultation meeting in March 2020, proposing the development of 590 no. dwellings and is illustrated as Layout Alternative No. 5 in Fig 3.10:

Fig. 3.10 - Layout Alternative No. 5 – revised layout presented at second pre-application consultation with ABP

Insofar as the EIA is concerned, a number of iterations of the site layout and alternative designs were prepared and considered for the project. This involved taking into account the various technical and environmental considerations which are addressed in the EIA and which informed the design of the proposed development.

The design process, having taken into consideration the discussions held with the WCC, local residents, individual consultants who inform the chapters of this EIAR, and the feedback received from An Bord Pleanála at the Pre-Application Consultations, has resulted in the layout now put forward for permission, which is illustrated in Fig. 3.11 as Layout Alternative No. 6. It is considered that this layout represents the best utilization of these zoned lands, complies with the objectives for the lands contained in the LSFP and mitigates against significant environmental impacts.

In summary, the development proposal will, *inter alia*:

- Comply with the land-use zoning designation for the subject site;
- Provide appropriate accommodation which can cater for different life stages by delivering houses, apartments and duplex units in a mix of 1, 2, 3 and 4 bedroom dwelling units;
- Provide an appropriate density of development, which varies across the site and achieves the LSFP's vision to develop a new urban quarter in Athlone;
- Comply with the Planning Authority's detailed quantitative standards for residential development as set out in the existing Westmeath CDP and, where appropriate, Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities (2018);

- Provide a level of social housing with equates to circa 30% of the overall quantum of proposed dwellings;
- Deliver the east-west access road through the area plan lands as envisaged by the LSFP which is designed to support public transportation routes;
- Support sustainable transport modes via the creation of pedestrian and cycle connections to the Old Rail Trail Greenway to the south, which forms part of the Dublin -Galway National Cycle Network;
- Deliver 2 no. childcare facilities in compliance with the objectives of the LSFP;
- Protect the existing residential amenity enjoyed by the residents of the Brawny estate;
- Preserve, where feasible, the natural amenity characteristics of the site, and provide for new features where necessary in order to ensure that the visual impact of the development is minimised. This has been achieved by allocating areas of open space for recreation, all of which will be developed in accordance with the overall Landscape Masterplan for this proposed development.

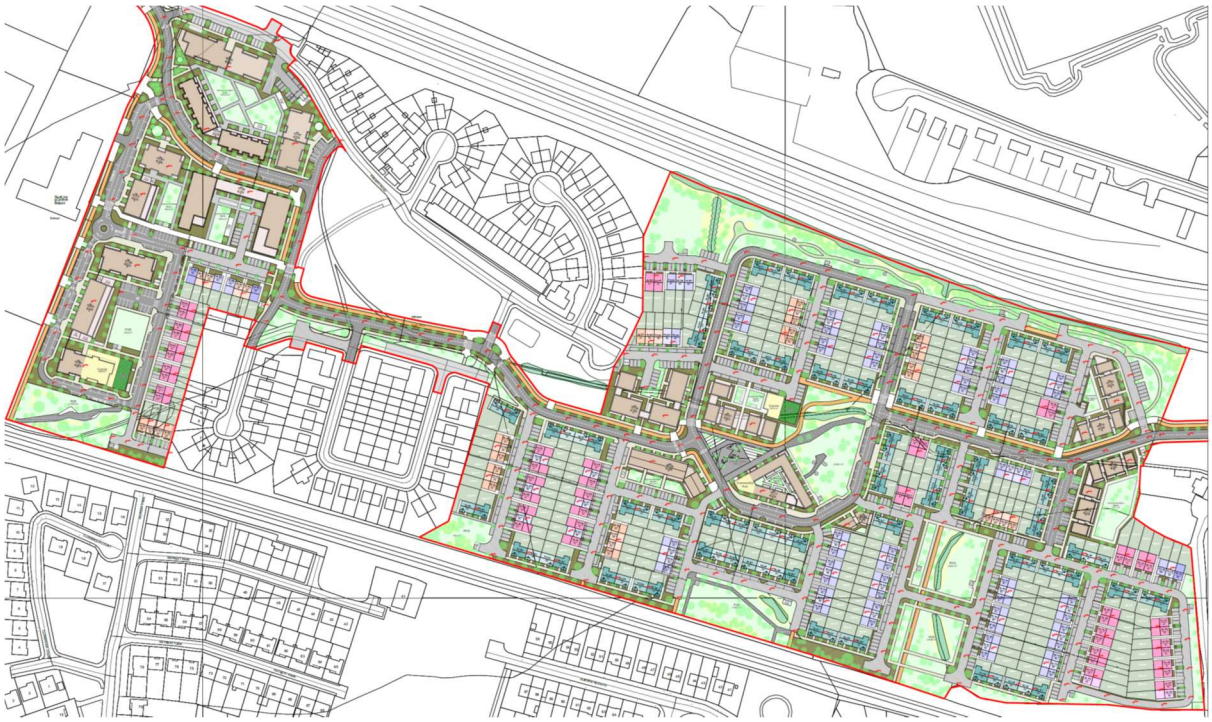


Fig. 3.11 – Final Layout / Layout Alternative No. 6 – Final site layout plan put forward for permission.

3.19.2 Final Layout Alternative

With regard to the layout put forward for permission, the iterative process included alternative site layouts that were considered with the objective of submitting an overall high-quality designed scheme which has undergone a robust consideration of relevant alternatives in reference to the comparison of environmental effects and meets the requirements of the EIA Directive, based on the multidisciplinary review across all environmental topics.

The final design now put forward for permission presents the most effective utilization of this significant site whilst also fulfilling the objectives of the Planning Authority and providing for long term, sustainable housing for which there is a considerable demand at present and providing for a use of material, architectural form and colour to create a high level of visual amenity.

An Bord Pleanála Opinion

During the course of the pre-application tripartite meeting with the Board, and within the Opinion of the Board, which was issued thereafter, a number of issues were raised which required further consideration and amendment to constitute a reasonable basis for an application for SHD.

In respect of environmental issues, the Board sought further consideration in relation to noise, surface water management, and ecology.

The proposed design consideration for the subject lands were the subject of 1 no. formal pre-application meeting with Westmeath County Council as well as two formal SHD meetings with An Bord Pleanála (which Westmeath County Council attended).

The environmental issues which most informed the design process related to tree removal (ecology), noise, water, and the potential impacts on existing and future traffic and transport in the area. These environmental considerations have informed the alternative layouts up to the submission of the current scheme as a Strategic Housing Development application to An Bord Pleanála.

Following the receipt of detailed feedback from An Board Pleanála during the course of the pre-application meeting, and following receipt of the opinion of the Board (as well as Westmeath County Council), which advised on further consideration relating to aspects of the proposed development, the applicant and design team have undertaken a number of significant changes to the development proposal which is reflected within the final development proposal submitted for permission as part of a SHD planning application.

As noted within the development description sections of this chapter, the scheme now comprises a quantum of residential development consisting of 576 no. dwellings, which has been varied form 555 no. initially and then reduced from 590 submitted at pre-application stage.

The key changes proposed related to:

- Increase in overall number of dwellings from an initial 555 to 576;
- Changes to the mix of dwelling types;
- Greater enclosure of streets through the location of buildings;
- Changes to the layout, distribution and function of open spaces;
- Alternative car parking arrangements/strategy.

Responses to each of these items have been provided as part of the SHD planning application pack, and the scheme has been updated and improved where necessary as a result.

The overall Masterplan of the proposed development takes into account all environmental effects raised with respect to the pre-application design submitted to An Bord Pleanála, and within the Board's Opinion, and provides for a sustainable development that has been optimised to emphasise positive environmental effects whilst reducing negative environmental impacts wherever possible.

The main environmental considerations has been to achieve a design solution for the preferred layout which would enable all of the functional and operational requirements of the scheme to be met, whilst also ensuring the sensitive siting of new elements within the site. Having established the quantum, type and mix of residential units, a series of alternatives were considered by the design team. This process has enabled the final proposal to evolve. The preservation of a sense of open space and the desire to ensure that the site layout plan and design of the east-west link road/Lissywollen Avenue is designed as a street and not as a distributor road, with an active and strong urban edge. The need to provide for an appropriate level of enclosure of streets and open spaces through the built form, in addition to landscaping, has driven the final layout form and design solution as proposed as part of the SHD planning application.

Alternative locations for the various built elements of the development were considered and examined at the design stage. The primary elements determining siting included natural site topography, the proximity of the site to the N6 and the Old Rail Trail Greenway in terms of noise and visual impact considerations.

3.20. The "Do Nothing'' Scenario

The "Do Nothing" Scenario describes the impacts of the proposed development, if it were not carried out. The positive benefits to the national, regional and local community arising from implementing the LSFP and the development of this site would not materialise in the "Do Nothing" scenario. In addition, the "Do Nothing" scenario would result in non-compliance with the NPF which contains the following relevant objectives:

- **National Policy Objective 3a** - Deliver at least 40% of all new homes nationally, within the built-up footprint of existing settlements;
- **National Policy Objective 32** - To target the delivery of 550,000 additional households to 2040.

This alternative is therefore not attractive.

3.21. The "Do Minimum" Scenario

The "Do Minimum" Scenario could involve the construction of the subject site at the minimum density prescribed in the LSFP for this area, i.e. net residential density of c.35 units per hectare. As outlined in the Planning Report which accompanies the application, the net developable area is c. 13.64 hectares which would result in a development of approximately 478 no. dwellings. However, the current proposal is supported by national and local planning policy to provide housing and intensify land use through increased densities. The proposal is also supported by the residential density objectives for the LSFP which seek a general density of 35 units per hectare across the Plan lands, however, the Plan states that higher densities may be permitted in appropriate areas and that density should be varied across the lands.

Alternatively, the "Do Minimum" scenario could involve the construction of the application site via a number of individual planning applications. While this alternative may reduce the level of construction activity in the short term, it is considered that it would have the effect of spreading construction over a longer period of time and could result in incoherent development which will not deliver the objectives of

the LSFP. The "Do-Minimum" scenario would also result in reduced efficiencies in construction and delays in implementation of the LSFP programme.

3.22. The "Do Maximum" Scenario

The "Do Maximum" Scenario could involve the construction of the entire site in one phase of development i.e. circa 576 residential units. This would involve a greater degree of disruption to the receiving environment in the short term. This alternative was discounted on the basis of practical considerations relating to phasing of development, funding and feasibility.

3.23. Alternative Locations

The suitably of the proposed development location has been directed by the land use zoning objectives contained in the Westmeath CDP, the ATDP and the LSFP. The LSFP was adopted to ensure that the policies and objectives of the ATDP were realised in a proper and sustainable manner and set a framework for the physical, economic, environmental development of Athlone town and its environs. The Lissywollen South area has been identified as strategic landbank to undergo significant development and/or comprehensive development. The LSFP details a coordinated strategy for Athlone, at local level, so that the town and its environs have the capacity to grow sustainably and to secure investment as the key regional centre in the Midlands.

Within the LSFP, the subject site is zoned for residential development and the development proposal is put forward in support of this land-use zoning designation and with the objectives contained in the LSFP for the delivery of development on the subject lands. This residential land bank represents a considerable resource not only in the context of the plan area but in the context of Athlone realising the population targets prescribed for the town. The overarching policies and objectives contained in the ATDP guide the content of the LSFP and consequently, the LSFP is consistent with the objectives and the provisions of the ATDP and the Core Strategy contained therein.

The strategic importance of these lands was emphasised by WCC obtaining funding via the Local Infrastructure Housing Activation Fund (LIHAF) to deliver a link road between the Ballymahon Road and the Garrycastle Road in order to 'open up' the lands east and west of the existing Brawny residential estate for private and social residential development. LIHAF was established under the Rebuilding Ireland Action Plan for Housing and Homelessness to provide funding for strategic infrastructure which would accelerate the delivery of housing across the State. There is a current demand for housing in Athlone and the LSFP will support the growth of Athlone as an important regional centre for the midlands.

It is noted that the suitability of the subject site for the nature of development proposed was considered as part of the SEA and AA screenings undertaken by WCC in the making of the LSFP

Taking all the aforementioned into consideration, it is put forward that the most logical and practical location solution to addressing the current housing shortage is through facilitating the development of lands zoned for residential use. The subject site comes within this category and therefore it seems appropriate that the proposed development is sited here. This approach is in line with EPA Guidelines (2002 and 2017 Draft Guidelines) which recognises that it is not realistic to consider alternative options for projects which have been previously determined by a higher plan as detailed below:

"Hierarchy EIA is only concerned with projects. Many projects, especially in the area of public infrastructure, arise on account of plans, strategies and policies which have previously been decided upon. It is important to acknowledge that ***in some instances neither the applicant nor the competent authority can be realistically expected to examine options which have already been previously determined by a higher authority*** *(such as a national plan or regional programme for infrastructure or a spatial plan)."* (Source: EPA Guidelines on the information to be contained in Environmental Impact Statements, Section 2.4.3 Alternatives, page 12)(Emphasis added).

3.24. Alternative Uses

The subject lands are undeveloped and have no specific / relevant previous grant of permission for similar residential development attached to them despite them being assessed for environmental impacts, as discussed above.

The development proposal is located on lands zoned for proposed residential development, therefore it is evident that the local authority envisages the development of the subject lands for residential development. The application site is also subject to a specified local area plan for these strategically located lands with the LSFP containing a detailed Land Use and Function Strategy which supports the policies and objectives contained in the Westmeath CDP and the ATDP.

Under the existing Westmeath CDP, lands with a residential zoning designation have an objective to *"provide for residential development, associated services and to protect and improve residential amenity".*

The Westmeath CDP states that in both new and established residential areas, a range of uses will be permitted in principle, in addition to housing, which has the potential to strengthen communities and encourage the enjoyment of residential amenity. Such uses include for local shops, crèches, schools, nursing homes, open space and recreation facilities, provided they are appropriate in scale and do not unduly interfere with the predominant residential land use.

The main alternative use for the subject lands would be to either remain vacant or be used for agricultural purposes. In any event, it is envisaged that in the long term, these lands will be developed for residential purposes to accommodate much needed new housing in Athlone, given that the lands are zoned for residential development and subject to an adopted Local Area Plan, being the LSFP. As such, it was not considered necessary to consider alternative uses for the proposed development. This approach is in line with EPA Guidelines (2002 and 2017 Draft Guidelines) which recognises that it is not realistic to consider alternative options for projects which have been previously determined by a higher plan as detailed below:

"Hierarchy EIA is only concerned with projects. Many projects, especially in the area of public infrastructure, arise on account of plans, strategies and policies which have previously been decided upon. It is important to acknowledge that ***in some instances neither the applicant nor the competent authority can be realistically expected to examine options which have already been previously determined by a higher authority*** *(such as a national plan or regional programme for infrastructure or a spatial plan)."* (Source: EPA Guidelines on the information to be contained in Environmental Impact Statements, Section 2.4.3 Alternatives, page 12)(Emphasis added).

3.25 Alternative Processes

This is a residential / urban development and therefore there are no alternative processes to be considered.

3.26 Conclusion on Assessment of Alternatives

Based on the foregoing, it is considered that all reasonable alternatives to the proposed development were considered and no alternatives have been overlooked which would significantly reduce or further minimise environmental impacts.

3.27 The Existence of the Project

Pursuant to the EIA Directive an EIAR document is required to set out a description of the project processes, activities, materials and natural resources utilised; and the activities, materials and natural resources and the effects, residues and emissions anticipated by the operation of the project.

The proposed development is a residential development including associated infrastructural works, 2 no. creches, a community hub and areas of open space. The primary, direct, significant environmental effects will arise during the construction stage. As a result, post-construction, the operation of the proposed development is therefore relatively benign and not likely to give rise to any significant additional impacts in terms of activities, materials or natural resources used or effects, residues or emissions which are likely to have a significant impact on population and human health, biodiversity, soils, water, air, climate, or landscape.

The primary likely and significant environmental impacts of the operation of the proposed development are fully addressed in this EIAR document; and relate to Population and Human Health, Landscape and Visual Impact and Noise and Air impacts associated with the traffic generated.

The proposed development also has the potential for cumulative, secondary and indirect impacts particularly with respect to such topics as traffic – which in many instances – are often difficult to quantify due to complex inter-relationships. However, all cumulative secondary and indirect impacts are unlikely to be significant; and where appropriate, have been addressed in the content of this EIAR document.

3.27.1 Description of Changes to the Project

Draft Guidelines on the information to be contained in environmental impact assessment reports were published by the EPA in August 2017.

The draft guidelines state in relation to change:

"Very few projects remain unaltered throughout their existence. Success may bring growth; technology or market forces may cause processes or activities to alter. All projects change and- like living entities - will someday cease to function. The lifecycles of some types of projects, such as quarries, are finite and predictable. Such projects often consider their closure and decommissioning in detail from the outset, while for most projects a general indication of the nature of possible future changes may suffice. While the examination of the potential consequences of change (such as growth) does not imply permission for such growth, its identification and consideration can be an important factor in the determination of the application."

- *Descriptions of changes may cover:*
- *Growth*
- *Decommissioning*
- *Other Changes."*

As per the draft EPA guidelines and in the interests of proper planning and sustainable development, it is important to consider the potential future growth and longer-term expansion of a proposed development in order to ensure that the geographical area in the vicinity of the proposed development has the assimilative carrying capacity to accommodate future development.

Given the proposed site layout extent and the limitations of physical boundaries, adjoining land uses and land ownership, the potential for growth of the proposed development is considered limited and confined primarily to potential minor domestic extensions, which will have a negligible impact.

The parameters for the future development of the area in the vicinity of the subject site are governed by the ATDP and the LSFP. Any adjacent undeveloped lands will be the subject of separate planning applications in the future, where they are identified as being suitable for development, and where the provision of the requisite physical and other infrastructure is available.

3.27.2 Description of Secondary and Off-Site Developments

No significant secondary enabling development is deemed necessary to facilitate the proposed development. The planning application includes details of the necessary road works, which are required to facilitate this development. These works are assessed within this Environmental Impact Assessment Report.

3.27.3 Risks of Major Accidents and/or Disasters

The surrounding context consists of a mix of residential, agricultural, employment, educational and open space public amenity lands. It does not include any man-made industrial processes (including SEVESO II Directive sites (96/82/EC & 2003/105/EC) which would be likely to result in a risk to human health and safety.

Article 3 of the Environmental Impact Assessment (EIA) Directive 2014/52/EU, requires the assessment of expected effects of major accidents and/or disasters within an EIA. Article 3(2) of the Directive states that *"The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned".*

3.28 Construction Phase

It is envisaged that the Construction Phase of the development will commence in Q4 2021 with the projected completion of the buildings by Q4 2026.

The CDWMP included with this planning application should be referred to for more detail on the Environmental Measures associated with same. The appointed Contractor will prepare a detailed final CDWMP, including detailed construction phasing and a Traffic Management Plan (TMP).

3.29 Operational Phase

The proposed development consists of residential houses, apartments and duplex units ranging in height from 2 to 5 storeys. The proposed development also includes for a community hub facility and 2 no. childcare facilities.

The primary direct significant environmental effects will arise during the construction phase. As a result, the operational phase of the development is therefore relatively benign and not likely to give rise to any significant additional impacts in terms of activities, materials or natural resources used or effects, residues or emissions which are likely to have a significant impact on human beings, flora and fauna, soils, water, air and climate.

3.30 Related Development and Cumulative Impacts

The proposed development also has the potential for cumulative, secondary and indirect impacts particularly with respect to such topics as traffic which in many instances are often difficult to quantify due to complex inter-relationships. However, all cumulative, secondary and indirect impacts are unlikely to be significant and, where appropriate, have been addressed in Chapter 15 (Interactions) and the cumulative impacts are fully addressed in the relevant specialist Chapters of this EIAR.

Each Chapter of the EIAR includes a cumulative impact assessment of the proposed development with other planned projects in the immediate area. The potential cumulative impacts primarily relate to traffic, dust, noise and other nuisances from the construction of the development, with other planned or existing projects, and each of the following EIAR chapters has regard to these in the assessment and mitigation measures proposes.

As such, with the necessary mitigation for each environmental aspect, it is anticipated that the potential cumulative impact of the proposed development in conjunction with the other planned developments will be minimal.

Part B – Effects on the Environment

4.0. Population and Human Health

4.1. Introduction

This chapter of the EIAR provides an assessment of the potential impacts of the development proposal on human beings, population, and human health within the vicinity of the application site and an assessment of these issues.

One of the principle concerns in the development process is that people, as individuals or communities, should experience no diminution in their quality of life from the direct or indirect impacts arising from the construction and operation of a development. Ultimately, all the impacts of a development impinge on human beings, directly and indirectly, positively and negatively.

The potential impacts on people identified in this EIAR, arising from the proposed development, relate to noise and dust nuisance, visual amenity and traffic etc. Most of these issues are addressed in specific chapters within the EIAR, including the risk of major accidents / disasters associated with same.

This Chapter has been prepared by Delphi Design Architects and Planners (Alan Fenton, BA, MRUP, MIPI, MRTPI).

4.2. Assessment Methodology

European Commission guidance relating to the implementation of the 2014 Directive, in reference to "human health" states: *"Human health is a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study*[5]".

The assessment involved a desktop study of the relevant planning sources and other demographic information relevant to the area outlined in Chapter 2 of this EIAR and information from the Central Statistics Office (CSO).

Census information used in this chapter has been divided into State, County, Town and District Electoral Division (DED) level. While the primary focus of this EIAR is the lands located within the immediate vicinity the development proposal i.e. the LSFP lands, Census statistics at a DED level have been used to assess the effects on the existing population as the DED level data generally provides the most accurate picture of existing population in the vicinity of a development. The proposed development lies within Athlone East Rural DED, as shown in Figure 4.1.

Based on this study, it was possible to consider the presence, importance and sensitivity of the population and the potential likely significant impacts on both the local and wider community. Based on these sources, the assessment involved a desk study of a range of planning and other sources. A profile of the residential communities adjacent to the proposed development is presented under the following headings:

[5] *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report,* European Commission, 2017 http://ec.europa.eu/environment/eia/eia-support.htm

- Land Use/ Settlement Patterns;
- Population Growth;
- Socio-economic Profile;
- Community Facilities;
- Movement and Transportation.
- Landscape and Visual
- Human Health

Chapter 1 of this EIAR noted the likely environmental effects which were assessed at a Strategic Level as part of the LSFP. The public was consulted in the making of the LSFP and their views taken into account by WCC in finalising and adopting the LSFP.

Perceptions of the proposed development are subjective, however, it is considered that the impacts presented are representative of the impacts on the majority of those residing/working within the study area.

4.2.1. Significant of Impacts

In line with the EPA's "*Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports"* (EPA, 2017); seven generalised degrees of impact significance are used to describe impacts as detailed in Table 4.1 below.

Significance of Effect	Definition
Imperceptible	An effect capable of measurement but without significant consequences
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration or intensity alters most of a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

Table 4.1 Definition of Significance of Effects

In addition, the following terms detailed in Tables 4.2 and 4.3 below are defined when quantifying the quality of effects and the duration and frequency of effects.

Quality	Definition
Positive Effects	*A change which improves the quality of the environment*
Neutral Effects	*No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecast error*
Negative / Adverse Effects	*A change which reduces the quality of the environment*

Table 4.2 - Definition of Quality of Effects

Quality	Definition
Momentary Effects	Effects lasting from seconds to minutes
Brief Effects	Effects lasting less than a day
Temporary Effects	Effects lasting less than a year
Short-Term Effects	Effects lasting one to seven years
Medium-Term Effects	Effects lasting seven to fifteen years
Long-Term Effects	Effects lasting fifteen to sixty years
Permanent Effects	Effects lasting over sixty years
Reversible Effects	Effects that can be undone, for example through remediation or restoration

Table 4.3 - Definition of Duration of Effects

4.3. Characteristics of Proposed Development

The development proposal is described in detail in Section 1.2 of this EIAR. The development proposal comprises of, *inter alia*, 576 no. residential dwellings, a community hub facility, 2 no. childcare facilities and a new east-west access route through the LSFP lands, public open space and all associated site development works.

The project does not require the demolition of any existing dwellings or buildings. Similarly, the development proposal does not require the removal and replacement of any third-party boundaries outside the control of the developer.

4.4. The Existing Receiving Environment (Baseline Scenario)

4.4.1. Introduction

A description of the relevant aspects of the current state of the environment (baseline scenario) in relation to population and human health is provided below.

The existing environment is considered in this section under the following headings:

- Land-Use Planning / Settlement Patterns;
- Population Growth
- Socioeconomic Profile
- Community and Outdoor Facilities
- Movement and Transport
- Landscape and Visual
- Human Health

4.4.2 Study Area

The application site measures c. 17.64 hectares and forms part of the lands zoned for proposed residential development in the LSFP. The application site is generally bounded to the north by the N6, Athlone Relief Road, to the south by the Old Rail Trial Greenway, to the west by Scoil na gCeithre Máistrí primary school and to the east by undeveloped lands, further east of which lie the ESB Regional Headquarters.

The application site is currently undeveloped greenfield land, generally flat, and bisected by the existing Brawny residential estate which comprises approximately 160 no. dwellings. The western part of the site has a largely non-descript landscape character while the eastern part of the site is one of a typical rural nature with fields defined by existing hedgerows.

The primary focus of this EIAR are the lands in the immediate vicinity of the application site. The vast majority of the LSFP lands, and indeed the entirety of the development site, is contained within the Athlone East Rural DED. The DED is the smallest area for which Census statistical data is published and therefore provides a detailed analysis of population fluctuations and demographic trends. A small section of the LSFP lands, containing existing educational uses, lies within the Athlone East Urban DED, however, due to the limited extent of this area, it has been excluded from the demographic analysis. For purpose of this EIAR the study area is therefore, the Athlone East Rural DED as detailed in Figure 4.1 over.

The EPA Guidelines (2002) and Advice Notes (2003) identify sensitive receptors as neighbouring landowners, local communities and other parties which are likely to be directly affected by the project. In particular homes, hospitals, hotels, schools, community facilities and commercial premises are noted. Regard is also given to transient populations including drivers, tourists and walkers.

The sensitive receptors impacted upon by Air, Noise and Visual effects are identified in the relevant Chapters of this EIAR (Chapters 8, 9 and 14 respectively). The existing receptors specifically relevant to this Chapter include:

- The residents of the existing Brawny estate;
- Staff and students of Scoil na gCeithre Máistri;
- Users and visitors to the Regional Sports Centre and Athlone Town Stadium;
- Users of the Old Rail Trail Greenway;
- Staff of the ESB Regional Headquarters.

Future receptors will be the residents of the proposed development and the users of the proposed community hub and childcare facilities.

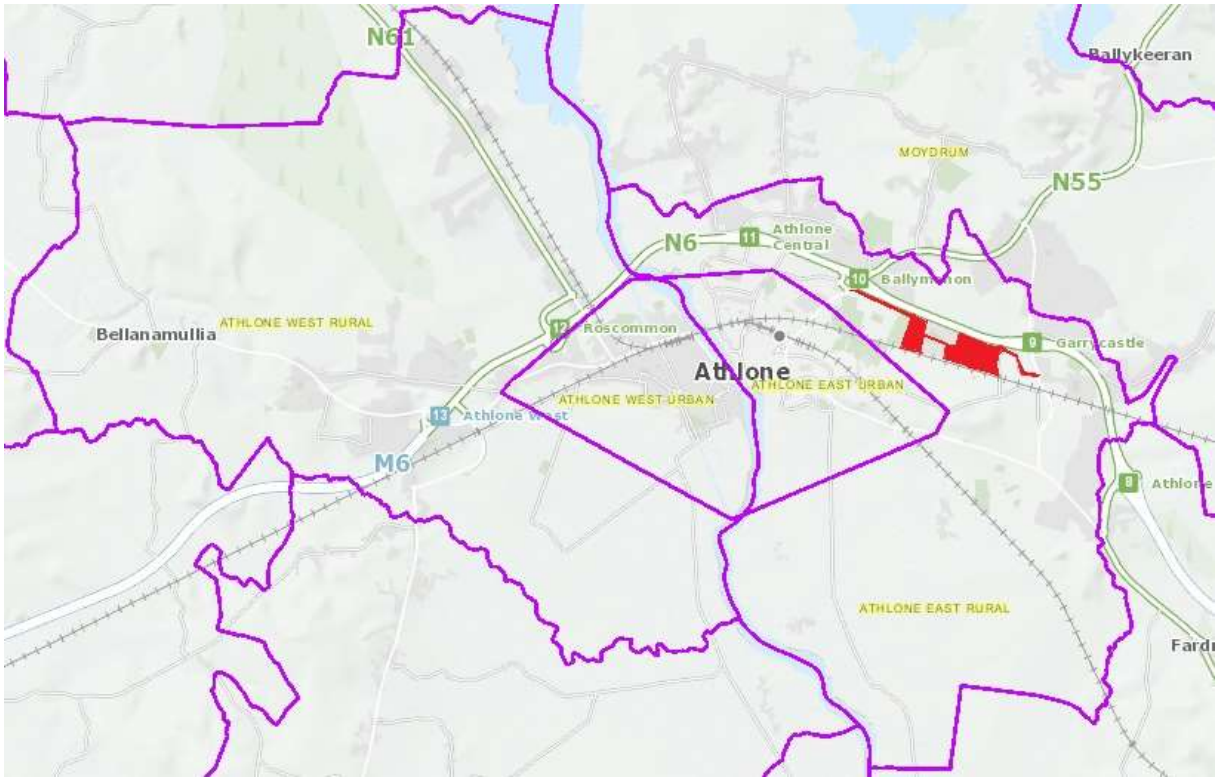


Figure 4.1 - Athlone East Rural DED (subject site in red)

4.4.3 Land Use Planning/Settlement Patterns

The application site is a greenfield site, bisected by the existing Brawny residential estate. There is no relevant or significant planning history attached to the site.

To the immediate west of the site is Scoil na gCeithre Máistri primary school (exisiting capacity of circa 293 no. students) and a range of sporting and recreational facilities including the Regional Sports Centre and Athlone Football Club. The application site is bounded to the north by the N6, north of which lies existing residential development, Athlone accommodation centre and undeveloped lands subject to the

Curragh-Lissywollen Local Area Plan 2007. The Curragh-Lissywollen Local Area Plan 2007 envisages these lands being developed for future residential and mix-uses.

To the south is the Old Rail Trail Greenway, which forms part of the Dublin-Galway National Cycle Network. Lands to the south of the greenway are defined by existing residential and educational uses including the Athlone Community College and the Marist College. To the east, the site abuts an old boreen, further east of which are undeveloped lands, ESB Regional Headquarters and the Athlone Training Centre (formerly known as FÁS).

Within the study area, the existing settlement pattern provides for a varied mix of uses including residential, light industrial, recreational, retail and service uses. Residential and proposed residential uses occupy the largest proportion of the study area. Enterprise and employment uses are concentrated to the east of the study area. Education, community and institutional uses also permeate the study area including the Athlone Community College, Marist College and Athlone Institute of Technology.

4.4.4 Population Growth

For the purposes of population evolution and growth forecasting, this EIAR has examined Census results from both the 2011 and 2016 Census in terms of the State, County and Local Level i.e. both the settlement of Athlone and the Athlone East Rural DED. The study area for the purposes of this methodology is therefore the Athlone East Rural DED.

The Athlone East Rural DED experienced minor population growth between 2011 and 2016 with the population growing by 253 persons in the five year period to 7,560 persons in 2016. This equates to a growth of circa 3.5% for the study area over the five year period. Prior to this, the Athlone East Rural DED had growth rate of circa 8% between 2006 and 2011.

Please refer to Table 4.4 below for details of population changes at State, County and Local Level from 2011 to 2016.

	2011 Population	2016 Population	Actual Change	% Change
State	4,588,252	4,761,865	173,613	4%
Westmeath County	86,164	88,770	2,606	3%
Settlement of Athlone	20,153	21,349	1,196	6%
Study Area	7,307	7, 560	253	3.5%

Table 4.4 - Population Change at State, County and Local Level 2011-2016

In addition to the resident population, there is also a significant working population within the study area.

4.4.5. Socioeconomic Profile

The socioeconomic profile of the study area is presented using 2011 and 2016 Census data under the headings of household formation, age profile, dependant age cohorts (0-14 and 65+ years), the working age group (15-64 years) and the 25-44 age cohort.

4.4.5.1. Household Formation

The 2016 Census results state that the total number of households in the study area was 2,694. This is an increase of 134 no. dwellings (5% change) from the 2011 Census.

The average household size marginally increased within the study area between 2011 and 2016 with an average of 2.72 persons per household in 2016. This is compared to 2.66 persons per household in 2011.

The average household size for the State as a whole was 2.75 persons in 2016 with County Westmeath having an average household size of 2.76 persons. Based on the above, the study area has a generally consistent household size when compared with both the State as a whole and County Westmeath.

4.4.5.2. Age Profile

This section provides a comparative demographic breakdown of the study area with Athlone Town, County Westmeath and the State. For the purposes of analysing the receiving environment, three factors will be examined:

(i) the dependant population (i.e. those persons within the 0-14 and 65+ age cohorts);

(ii) the working/independent population (i.e. those persons residing in the 15-64 year age cohorts) and

(iii) those persons within the family formation age cohorts, aged 25-44.

Tables 4.5 and 4.6 below, detail the demographic breakdown of the study area, Athlone Town, County Westmeath and the State from both the 2011 and 2016 Census.

	0-14 years	15-24 years	25-44 years	45-64 years	65+ years	Total Population
State	979,590	580,250	1,450,140	1,042,879	535,393	4,588,252
Westmeath	19,440	11,105	26,348	19,475	9,796	86,164
Athlone	4,114	3,068	7,142	3,751	2,078	20,153
Study Area	1,579	1,421	2,357	1,316	634	7,307

Table 4.5 - Age Profile at State, County and Local Level 2011

	0-14 years	15-24 years	25-44 years	45-64 years	65+ years	Total Population
State	1,006,552	576,542	1,406,291	1,135,003	637,567	4,761,865
Westmeath	19,775	10,996	25,103	21,526	11,370	88,770
Athlone	4,612	2,769	7,343	4,209	2,416	21,349
Study Area	1,666	1,308	2,338	1,472	776	7,560

Table 4.6 - Age Profile at State, County and Local Level 2016

Tables 4.7 and 4.8 below, detail the percentile of each age cohort in the study area, Athlone Town, County Westmeath and the State from both the 2011 and 2016 Census.

	0-14 years	15-24 years	25-44 years	45-64 years	65+ years
State	21.35%	12.65%	31.60%	22.73%	11.67%
Westmeath	22.56%	12.89%	30.58%	22.60%	11.37%
Athlone	20.41%	15.22%	35.44%	18.61%	10.31%
Study Area	21.61%	19.45%	32.26%	18.01%	8.68%

Table 4.7 Age Profile as percentile at State, County and Local Level 2011

	0-14 years	15-24 years	25-44 years	45-64 years	65+ years
State	21.14%	12.11%	29.53%	23.84%	13.39%
Westmeath	22.28%	12.39%	28.28%	24.25%	12.81%
Athlone	21.60%	12.97%	34.40%	19.72%	11.32%
Study Area	22.04%	17.30%	30.93%	19.47%	10.26%

Table 4.8 - Age Profile as percentile at State, County and Local Level 2016

Figure 4.2 over, illustrates the demographic breakdown of age cohorts in the study area, Athlone Town, County Westmeath and the State from the 2016 Census

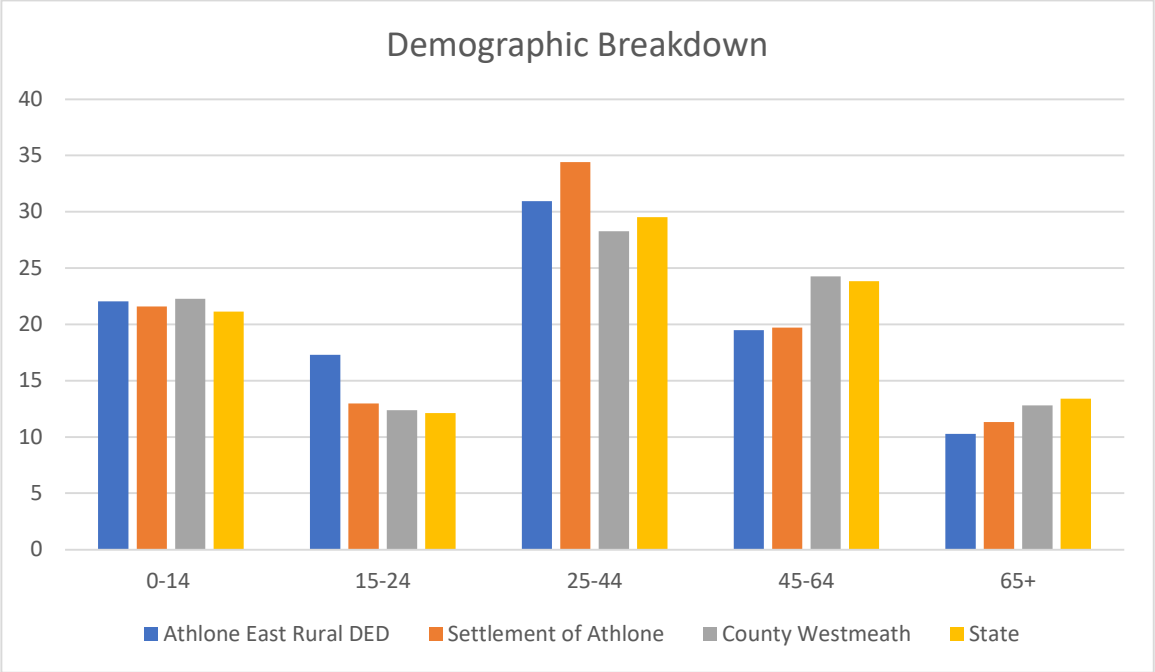


Figure 4.2 - Age profile of the defined areas

4.4.5.3. Dependant Age Cohorts (0-14 and 65+ years)

The proportion of dependants (aged 0-14 and 65+ years) within the study area was recorded at 32.3% of the population in the 2016 Census. This is a slight increase from the 2011 Census results which recorded the age dependant cohort within the study area at 30.29%.

The proportion of dependants (aged 0-14 and 65+ years) for the State as a whole was recorded at 35% of the population in the 2016 Census. This is a slight increase from the 2011 Census results which recorded the age dependant cohort for the State at 33%.

Based on the above, the study area can be seen to be following the national trend for an increase in the age dependant cohort. Both within the study area and at State level, the younger age group (0-14 years) represents the majority of the age dependant cohort (68% of the study area dependant age population and 61% of the State dependant age population).

These figures indicate that the study area has a youthful population, likely made of up young families. It is evident that it is the 0-14 age cohort that contributes most heavily to the dependant population, which has implications for the level and type of service provision across LSFP area with a likely demand for childcare facilities and schools. However, it should be noted that over the next decade the younger proportion of this age cohort will move into the working age groups and will likely increase pressure on future housing demands.

4.4.5.4. The Working Age Group (15-64 years)

The Working Age Group is defined as those persons residing within the 15-64 year age cohort. The majority of the population, in all areas examined, resides within this age cohort, which again reflects the youthful population structure of the study area and the State as a whole.

The working age group demographic within the study area represented 67.7% of the population in the 2016. This is a slight decrease from the 2011 Census results which recorded the working age group demographic within the study area at 69.7%.

The working age group demographic for the State represented 65.5% of the population in the 2016. This is a slight decrease from the 2011 Census results which recorded the working age group demographic for the State at 67%.

Based on the above, the study area can be seen to be following the national trend for an decrease in the working age cohort. Notwithstanding same, the high percentile of the working age group residing in the study area (67.7% of the population) has implications on demand for housing, services, etc. in order to service this population age, which the proposed development may contribute to satisfying this demand.

4.4.5.5. The 25-44 Age Cohort

The 25-44 age cohort is most likely to look to purchase a home, start a family and settle into a long-term community. It is therefore important to analyse this age cohort in particular as they will have the greatest impact on the social and economic conditions for the short and medium term, with regard to housing, employment and childcare facilities.

The 25-44 age cohort within the study area represented 30.93% of the population in the 2016. This is a slight decrease from the 2011 Census results which recorded the 25-44 age cohort within the study area at 32.26%.

The 25-44 age cohort for the State as whole represented 29.53% of the population in the 2016. This is a slight decrease from the 2011 Census results which recorded the 25-44 age cohort for the State at 31.60%.

For both the study area and the State, the 25-44 age cohort represents the largest age demographic of the population. It is considered that the current demand for housing reflects the large percentage of this age cohort in the existing population. It is largely this age cohort that begins to have families and set up independent households, all of which has medium and long term social and economic implications and impacts on the demand for housing. The provision of housing for these group will also have an impact on workforce retention within Athlone and therefore future economic growth of the town.

4.4.6. Community and Outdoor Facilities

The LSFP area and its environs are well served with a range of existing community facilities. The existing Brawny estate, which bisects the subject site, provides public open space for existing residents. Within the LSFP area, and to the immediate west of the subject lands, are a number of sporting and recreation facilities, including the Regional Sports Centre, Athlone Town football stadium and the playing fields and open areas provided by Athlone GAA, Pairc Uí Chiarain. Scoil na gCeithre Máistrí Gaelscoil also borders the western boundary of the development site. The Plan area also contains a skating park, play area and approval for a dog walking track.

South of the Old Rail Trail Greenway, and within the LSFP area, are Athlone Community College and Marist College secondary schools and their associated playing fields. Our Lady's Bower Secondary School is also located immediately south of the LSFP area.

The Athlone East Rural DED also includes for a number retail and commercial units, pharmaceutical and manufacturing businesses, supermarkets, Garrycastle stores (retail units), ESB Regional Headquarters, Athlone Institute of Technology and Athlone Training Centre (formerly known as FAS).

4.4.7. Movement and Transport

4.4.7.1. Road Network

The LSFP area is linked to Athlone Town Centre via the Ballymahon Road to the west of the Plan area and is bounded to the north by the N6. To the east, lies the R916 serving Garrycastle Stores. In terms of the local road network, the Brawny Road serves the existing, adjoining residential estate, the Regional Sports Centre, Athlone Town football stadium and Scoil na gCeithre Máistrí. General access into the site is currently limited to Brawny Road. Access to the R916 to the east of the Plan area has been created as far as Garrycastle stores and the ESB networks site. It is an objective of the LSFP to create a new east-west access route through the Plan lands in order to make the lands more accessible and the current application for permission includes for same.

4.4.7.2. Pedestrian & Cycle Network

There is an existing pedestrian/cycle route along the western boundary of the subject site adjacent to Scoil na gCeithre Máistrí, which connects to the Old Rail Trail Greenway to the south. The Old Rail Trail Greenway, which forms part of the Dublin-Galway National Cycle Network, extends along the southern boundary of the development site. The Greenway is planned to be extended all the way into Athlone town centre. The proposed development provides for direct pedestrian and cyclist connections onto the Old Rail Trail Greenway to increase connectivity and permeability.

4.4.7.3. Public Transport

Public transport to the LSFP area is currently limited. It is an objective of the LFSP to develop public transport routes as an integral part of the street layout, in order to provide for the extension of the existing town bus service to serve the Plan area. Key to this will be the development of an east-west access route for the Plan lands. The current SHD application for permission proposes the development of this new east-west access route, which is to be delivered in the first phase of development. The proposed road has been designed in a manner that will accommodate public transport i.e. buses.

4.4.8. Landscape and Visual

The application site is open, relatively flat greenfield lands, located immediately east of Athlone town centre. The western part of the application site has a largely non-descript landscape character. The eastern part of the site is characterised by a landscape typical of the rural countryside, with small, irregular and enclosed field patterns.

The subject site is largely bounded to the north by the N6, Athlone Relief Road. The site is generally not visible from the N6, as the northern boundary of the subject site is defined by existing mature trees.

To the south, the subject site is bounded by the Old Rail Trial Greenway. Lands to the south of the Old Rail Trail Greenway are defined by existing residential and educational uses including Athlone Community College and the Marist College. Existing trees located along the boundary of the greenway mean that the site is generally not visible from the existing residential estates to the south.

The west of the site is bounded by Scoil na gCeithre Máistrí primary school, with the existing boundary being defined by a low wooden fence. To the east, lies the ESB regional headquarters which are separated from the application site by undeveloped lands outside the control of the applicant and outside of the subject application area. Existing trees ensure that the subject site will not be visible when viewed from the east.

The application site is bisected by the existing Brawny residential estate which is separated from the site fencing and unkempt tree planting. As part of the subject application, a number of views have been taken from sensitive points where the site maybe visible from third party lands. Verified views and 3D CGI's have been prepared by 3D Design Bureau and are submitted as separate document(s) as part of this SHD planning application. In addition, Chapter 14 "The Landscape" of this EIAR takes into account the visual receptor sensitivity from the 12 no. selected view locations.

4.4.9. Human Health

Health, as defined by the World Health Organization (WHO), is "*a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*". The Healthy Ireland Framework 2013-2025 defines health as '*everyone achieving his or her potential to enjoy complete physical, mental and social wellbeing. Healthy people contribute to the health and quality of the society in which they live, work and play'*. This Framework also states that health is much more than an absence of disease or disability, and that individual health, and the health of a country, affects the quality of everyone's living experience.

Health is an essential resource for everyday life, a public good, and an asset for health and human development. A healthy population is a major asset for society and improving the health and wellbeing of the nation is a priority for the Government. The Healthy Ireland Framework 2013-2025 is a collective response to the risks that threaten Ireland's future health and wellbeing.

Health Status of Athlone East Rural DED	Very Good	Good	Fair	Bad	Very Bad	Not Stated
Total Number of People	4,275	2,326	565	94	21	279
Total Percentage of People	56.5	30.7	7.7	1.1	0.3	3.7

Table 4.9 - Health Status of Athlone East Rural DED

Table 4.9 above shows that most people (87.2%) in the Athlone East Rural DED have identified themselves as being in 'very good' or 'good' health.

4.5. Construction Impacts, Mitigation and Monitoring Measures

Overall, subject to adherence to best practice and implementation of appropriate mitigation measures detailed below and elsewhere in this EIAR, the overall temporary impacts associated with the construction phase (excluding employment ,which will be positive) are considered to be negative and slight/moderate.

The main areas of impact are as follows:

Population and Demographic

There will be no impact on the demographic profile during the Construction Phase.

Residential Amenity

Construction of the proposed development will last for approximately five years. During this time, the proposed development will cause a certain amount of loss of amenity, disruption and inconvenience to local residents, particularly the residents of the existing Brawny estate which bisects the subject site, users of the Regional Sports Centre to the west and the staff and students of Scoil na gCeithre Máistrí.

These impacts will be related to construction traffic (particularly HGVs) and travel disruption and also to the generation of noise and dust which is generally associated with the construction of such infrastructural projects. These issues are considered elsewhere in this EIAR and mitigation measures identified. In particular, the access constraints arising in respect of receptors are considered in Chapter 12 - Materials Assets: Transportation and impacts arising from the generation of noise and dust are considered in Chapter 9 – Noise and Vibration and Chapter 8 – Air and Climate respectively. The visual impacts of the development are considered in Chapter 15 – The Landscape.

The overall impacts associated with the construction phase are temporary/short term and moderate.

Land Take, Use and Planning Policy

The construction works associated with the proposed development will generally be contained within the application site boundary and the lands under the control of the applicant. The development proposal is for a residential development on lands zoned for proposed residential development.

Planning Permissions

It is possible that other construction projects may be taking place at the same time as the proposed development. Where relevant, the cumulative effect of any adjoining projects being under construction at the same time will be considered in the relevant sections of this EIAR, which have also been considered under the aforementioned environmental reports and EISs/EIARs for the subject and adjoining lands.

Employment

During the Construction Phase, the proposed development will have a short-term positive effect in terms generating economic activity. It is anticipated that up to 300 no. construction personnel will be employed either directly or indirectly during the Construction Phase which is anticipated to extend over a period of approximately 60 months. Apart from the direct employment associated with the project, additional employment will be generated through the multiplier effect. In this case, the multiplier effect refers to the indirect impact that new spending has when it is circulated through the local economy. In the context of the overall economy of the area, the impact of the project in terms of employment (direct and indirect) will be slight and positive.

Travel and Commuting

During the Construction Phase there will be some traffic impacts on the receiving environment by virtue of the works related traffic. Measures to address these impacts are detailed in the CDWMP and they will be slight and short-term.

Health and Safety

The construction of any project of this nature has potential to give rise to an impact on health and safety of human beings if such activities are not managed properly. These concerns are addressed in the CDWMP and Outline CMP submitted as part of this planning application.

Landscape and Visual

Impacts on the visual amenity of the surrounding area are fully addressed in Chapter 15 Landscape and Visual of this EIAR. During the Construction Phase, general construction, disturbance and site development has the potential to result significant temporary and short-term negative landscape and visual impact on the surrounding areas.

Human Health

The proposed development is likely to give rise to a short-term direct negative impact on the surrounding settlements during the Construction Phase, in particular the Brawny estate and Scoil na gCeithre Máistrí. This will be a short-term significant effect on a localised scale and this is further discussed in Chapter 8 (Air Quality) Chapter 9 (Noise and Vibration) and Chapter 15 (Landscape and Visual Amenity) of this EIAR.

The Construction Phase will result in an element of noise, mobility of heavy vehicles, dust and the arrival and departure of construction workers into the area. This impact will be negative, short-term, significant and localised.

Mitigation

Mitigation measures for the Construction Phase are outlined in each of the relevant chapters (No.s 4-14) and are also provided in Chapter 16 "Summary of EIA Mitigation and Monitoring Measures". During the Construction Phase a number of mitigating measures should be considered, including *inter alia:*

- Maintain a Construction Environment Management Plan (CEMP) in effect for duration of works;
- Restrict working hours from 07:00 to 18:00; Monday to Friday and from 08:00 to 14;00 on Saturdays. No general works are envisaged to be carried out on Sundays. Should there be a need to work Sundays/Bank Holidays, a written request will be made to WCC for permission to do so. Any conditions from WCC relating to out of hours working will be followed including any required notifications to relevant parties;
- Maintain a Traffic Management Plan (TMP) in effect for duration of works;
- Schedule arrivals and departures of vehicles to the site, where practical, so that they do not coincide with times when children are entering and leaving the nearby schools;
- Where practical restrict Heavy Goods Vehicles (HGVs) to outside the period where school children are entering or leaving the schools and their environs;
- The CEMP will be agreed with the Planning Authority upon receipt of planning permission. The construction of the Proposed Development shall adhere to the relevant provisions of this Plan; and;
- As part of the CEMP, maintain a Dust and Noise abatement plan in operation.

Monitoring

Measures to monitor potential negative effects on people in respect of noise, air, traffic etc. are included in the following relevant Chapters of this EIAR.

In respect of the impacts assessed above, the contractor will monitor development during the construction phase to ensure compliance with the parameters of the Construction Management Plan. Remedial action will be taken, if required, to ensure construction activities conform to its requirements.

Reinstatement

It is not considered that reinstatement works are required during the Construction Phase.

4.6. Operational Impacts, Mitigation and Monitoring Measures

Population and Demographic

During the Operational Phase of the proposed development, the demographic profile will change with additional people moving into the locality. The changing demographic profile during the Operational Phase of the proposed development is likely to ensure a balanced age profile within the local area. Projected residential population from the proposed development will be approximately 1,567 persons. This is based on the average number of persons per household for the study area in 2016 being 2.72 persons (source: Census 2016). The State average household size, as per the 2016 census, is 2.75 persons.

The impact on population is considered to be permanent but slight, and appropriate to the land-use zoning designation for the site, and the Core Strategy of the Development Plan.

Residential Amenity

All of existing local amenities will remain in place during the Operational Phase of the proposed development. Furthermore, the potential viability of these amenities going forward will be strengthened from the increased population of the area. The population increase will result in a greater demand for community and outdoor facilities in the study area. The LSFP in planning for the projected population increase has made provision for the development of new community facilities and includes for a detailed land use and function strategy, which includes for the delivery of 2 no. childcare facilities on the subject lands. The subject development proposal also includes for a new community hub which will act as a focal point for future residents.

Therefore, the effects on community and amenities is deemed to be slightly positive or neutral in the long-term.

Land Take, Use & Planning Policy

The existing ATDP and LSFP set out the overall land use patterns for the LSFP lands including the lands on which this residential project is proposed. The nature of the development is permanent and will in time change the character of the area from semi-rural to urban. It will also act as a catalyst for the future development in the area, as provided for in the settlement plans. The issue of land use and compatibility with the surrounding area has been assessed at the strategic level in the LSFP SEA. In approving the LSFP, it was accepted that the mix of land uses are compatible uses (i.e. residential, open space and enterprise and employment) and will not impact on human health. Overall, the impact on land use and settlement is considered to be moderate, permanent and positive.

Planning Permissions

It is possible that other construction projects may be take place subsequent to the carrying out of the development of the subject application (should it be permitted). The development proposal is put forward in compliance with the land use and function set out for the lands in the Westmeath CDP, the ATDP and the LSFP. Future development during the operational phase will be subject to the planning process and compliance with planning policy.

Employment

During the Operational Phase, the proposed development will have a slight, positive long-term impact. The proposed development will result in the creation of c 24 no. permanent crèche staff members, c. 2 no. permanent apartment building management jobs and transient employment in the proposed community hub. Other associated jobs such as gardening and window cleaning, with spin-off economic activity created for local retail and service providers.

Travel and Commuting

During the Operational Phase of the proposed development, there are likely to be some impacts on the receiving environment in relation to travel and commuting. The proposed development caters for the provision of a new east-west access route, capable of supporting public transport, and will provide additional people to sustain the public transport network. The impact due to the increase in number of persons potentially travelling and commuting will be significant and permanent, with a neutral long-term effect. Detailed information on the traffic impacts of the proposed development are set out in Chapter 12 Material Assets: Traffic, Waste and Utilities.

Health and Safety

The operational phase of the development is unlikely to give rise to any additional risks of health and safety on human beings. Maintenance and building management plans will form part of the programme of development upon receipt of a grant of permission.

Landscape and Visual

The proposed development is well-screened by mature plantings along the N6, the Old Rail Trail Greenway and to the east of the site. Therefore, during the Operational Phase, the landscape or visual impacts arising from the Proposed Development will be not significant from these areas. To the west of the site, the proposed development will have a significant long-term impact on the existing Scoil na gCeithre Máistrí primary school. Given the design put forward for permission, which complies with the objectives outlined in the LSFP, these effects are considered to be permanent but positive. Chapter 15 of this EIAR examines the landscape visual impact of the proposed development in detail.

Human Health

The changes in the area will have a positive impact in terms of changing the age profile and increasing the longevity of local schools. The proposed development will create a modern living environment adjacent to a wide range of amenities, within easy commuting distance of Athlone Town centre, providing locally positive health benefits to its residents.

Mitigation

Where relevant, mitigation measures to address the potential impacts of noise, air traffic etc. on people are included in the appropriate chapters of this EIAR. No likely significant impacts have been identified for population, or land use, accordingly no mitigation measures are required for the Operational Phase.

The proposed development has been designed to avoid significant impacts in relation to local amenities and recreational facilities by:

- Incorporating the provision of a new community hub facility within the design proposal;
- Incorporating the provision of 2 no. childcare facilities within the design proposal;
- Not obstructing the extensive recreational and amenity facilities located at the Regional Sports Centre to the west
- Not obstructing the operation of the existing primary school to the west and;
- The provision of c. 22,373.7sq.m / 2.23 ha area of public open space.

Accordingly, no further mitigation measures are required.

Monitoring

No additional monitoring is proposed for the Operational Phase other than that proposed in other Chapters of this EIAR.

Reinstatement

It is not considered that reinstatement works are required during the Operational Phase.

4.7. Residual Impacts

The residual effects of the construction and operational phase of the project on the socio-economic character of the area and the local community (i.e. population and human health), subject to the implementation of the various mitigation measures outlined in this EIAR are identified as follows:

- The development will facilitate the implementation of the CDP, ATDP and the LSFP proposals for the subject lands;
- The proposed development will provide new pedestrian and cycling links to the Old Rail Trail Greenway to the south;
- The proposed development will deliver a new east-west access route through the LSFP lands.

4.7 Interactions

As noted above, there are numerous inter-related environmental topics described in detail throughout this EIAR which are of relevance to human health. During the Construction Phase noise, air, traffic and consumption of materials will be the key environmental factors that will have an impact on population and human health.

This chapter of the EIAR has been instructed by updated guidance documents reflecting the changes within the 2014 EIA Directive. These documents are the Draft Guidelines on the information to be contained in environmental impact assessment reports, published by the EPA in August 2017 and the Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems, published by the Department of Environment, Community and Local Government in May 2017. In line with the guidance documents referred, this chapter of the EIAR focuses primarily on the potential likely and significant impact on Population and Human Health in relation to health effects/issues and environmental hazards from the other environmental factors and interactions that potentially may occur.

Where there are identified associated and inter-related potential likely and significant impacts which are more comprehensively addressed elsewhere in this EIAR document, these are referred to.

However, the reader is directed to the relevant environmental topic chapter of this EIAR document for a more detailed assessment.

During the Operational Phase, it is anticipated that water and traffic will be the key environmental factors impacting upon population and human health during the Operational Phase as a new suburban landscape will be created. The increase in population will result in increased traffic and increased demands on water supply and increased requirements for wastewater treatment. These are addressed in the appropriate sections of this EIAR.

4.8 Reinstatement

While not applicable to every aspect of the environment considered within the EIAR, certain measures may be proposed to ensure that in the event of the proposal being discontinued, there will be minimal impact to the environment.

There are no reinstatement works proposed specifically with respect to population and human health.

4.9 Cumulative Impacts

An increase in local housing, and some increase in employment opportunities and service provision (crèches and community hub) have the potential to generate direct, indirect impacts. The visual appearance of the landscape will be altered with the introduction of the proposed built elements including infrastructure, in cumulation with other development in the area. Implementation of the remedial and reductive measures in respect of noise/traffic management etc. in the EIAR would ensure a minimal impact on the existing communities of this area during the construction phase.

The construction of the new east-west link road ("Lissywollen Avenue"), linking the Ballymahon Roundabout to the west with the Garrycastle Roundabout to the east, will open up the lands to improved connectivity, whilst also catering for public transport services and will require works that will likely entail some localised impacts to residents. It is anticipated that a Construction Traffic Management Plan would be agreed with Westmeath County Council, by the contractor. The objective of which is to minimise the short term disruption to local residents.

There will be some short term impacts during the construction phase as the infrastructural / site development works are undertaken, particularly in respect of traffic management with regards to sensitive receptors. This may cause local short term inconvenience and disturbance to residents in the vicinity of the works. However, the works would normally be undertaken in sections on a phased/rolling programme so that the number of persons experiencing local inconveniences at any one time is kept to a minimum.

4.10 Difficulties Encountered in Compiling

No difficulties were encountered when compiling this Chapter.

4.11 'Do Nothing' Scenario

A do-nothing scenario would result in the site remaining undeveloped. If the proposed development were not to proceed there would be no immediate impact on the existing population, or economic activity for residents living in the area. However, due to the size of the application site it is considered that the housing targets for the settlement set out in the Westmeath CDP and the ATDP could not be achieved.

If the lands were to remain undeveloped, this would be an under-utilisation of zoned lands from a sustainable planning and development perspective, particularly considering the location of the lands and the objectives of the LSFP. The positive benefits to the national, regional and local community arising from implementing the residential development proposals of the CDP, ATDP and the LSFP Scheme for the subject lands would therefore not materialize.

4.12 References

- Central Statistics Office www.cso.ie
- Westmeath County Development Plan 2014–2020
- Athlone Town Development Plan 2014–2020
- Lissywollen South Framework Plan 2014-2020
- Healthy Ireland Framework 2013-2025

5.0. Biodiversity

5.1 Introduction

5.1.1 Overview and Aims

This chapter was prepared by Domhnall Finch of FGE Consulting[6] and informed by the previous work completed for the proposed site by Andrew Torsney[7] and Aoibheann Gaughran[8].

A separate stand-alone Appropriate Assessment (AA) Screening Report is also included in the planning application documentation. Under Article 6(3) of the Habitats Directive a screening for '*appropriate assessment'* of projects must be carried out to determine if significant effects are likely to arise to Natura 2000 sites. This assessment is carried out by the competent authority, in this case An Bord Pleanála.

This section assesses potential impacts that may arise from the proposed development on biodiversity within the receiving environment; in accordance with the following guidance documents:

- Environmental Protection Agency (2000). *Guidelines on Information to be contained in Environmental Impact Statements.*
- Chartered Institute of Ecology and Environmental Management (CIEEM) (2016). *Guidelines for Ecological Impact Assessment*.
- Chartered Institute of Ecological and Environmental Management (CIEEM) (2012). *Preliminary Ecological Appraisal*.
- Fossitt JA (2000). *A Guide to Habitats in Ireland*.
- The Heritage Council (2011) Habitat Survey Guidelines: *A Standard Methodology for Habitat Survey and Mapping in Ireland.*

It aims to discuss the existing ecological environment, the potential impacts of the scheme and avoidance and mitigation measures in relation to habitats, flora and fauna in the zone of influence (ZOI) of the proposed development. This section was prepared by Domhnall Finch of FGE Consulting and informed by the previous work completed for the proposed site by Andrew Torsney and Aoibheann Gaughran.

5.1.2 Legislative Context

Specific focus is placed on protected species/habitat features as well as those of local or national importance. Ireland's national biodiversity action plan *Actions for Biodiversity 2011–2016*[9], in accordance with the Convention on Biological Diversity, is a framework for the conservation and protection of Ireland's biodiversity, with an overall objective to secure the conservation, including, where possible, the enhancement and sustainable use of biological diversity in Ireland and to contribute to collective efforts for conservation of biodiversity globally. The plan is implemented through legislation and statutory instruments concerned with nature conservation. The Planning and Development Acts, 2000–2015 and the European Communities (Environmental Impact Assessment) Regulations, 1989 (as amended) are particularly important in that regard and include a number of provisions directly concerned with the protection of natural heritage and biodiversity.

[6] Senior Ecologist (M.Sc, B.Sc, PgCert, ACIEEM) of *FGE Consulting*

[7] Senior Ecologist (M.Res, B.Sc, ACIEEM) of *CAAS Ltd*

[8] Ecologist (PhD, BSc) of *CAAS Ltd*

[9] This is due to be replaced by the Action Plan for Biodiversity 2017-2023; however, this is pending

The Wildlife Acts, 1976–2012 are the principal mechanism for the legislative protection of wildlife in Ireland. They outline strict protection for species that have significant conservation value. In summary, the Wildlife Acts protect species from injury, disturbance and damage to breeding and resting sites. All species listed in the Wildlife Acts must, therefore, be a material consideration in the planning process. An important piece of national legislation for the protection wild flora, *i.e.* vascular plants, mosses, liverworts, lichens and stoneworts, is the Flora (Protection) Order, 2015, which makes it illegal to cut, uproot or damage a listed species in any way or to alter, damage or interfere in any way with their habitats. This protection applies wherever the species listed in the Schedules to the Order are found.

The European Communities (Birds and Natural Habitats) Regulations, 2011–2015 transpose into Irish Law Directive 2009/147/EC (the Birds Directive) and the Habitats Directive, which list habitats and species of Community, *i.e.* European Union (EU), importance for conservation and that require protection. This protection is afforded in part through the designation of areas that represent significant populations of listed species within a European context, i.e. Natura 2000 sites. An area designated for bird species is classed as a Special Protection Area (SPA), and an area designated for other protected species and habitats is classed as a Special Area of Conservation (SAC). Birds listed in Annex I of the Birds Directive in SPAs and habitats and species listed in Annexes I and II, respectively, of the Habitats Directive in SACs in which they are designated features have full European protection. Species listed on Annex IV of the Habitats Directive are strictly protected wherever they occur, whether inside or outside European sites. Annex I habitats outside of SACs are still considered to be of national and international importance and, under Article 27(4)(b) of the European Communities (Birds and Natural Habitats) Regulations, 2011, public authorities have a duty to strive to avoid the pollution or deterioration of Annex I habitats and habitats integral to the functioning of SPAs.

Sites of national importance for nature conservation are afforded protection under planning policy and the Wildlife Acts, 1976–2012. NHAs are sites that are designated under statute for the protection of flora, fauna, habitats and geological interest. Proposed NHAs (pNHAs) are published sites identified as of similar conservation interest but have not been statutorily proposed or designated.

The International Union for the Conservation of Nature and Natural Resources (IUCN) provides a global approach for evaluating the conservation status of species to inform and catalyse action for biodiversity conservation through the Red List of Threatened Species.

5.1.3 Approach to Ecological Evaluation and Impact Assessment

Assessing impact significance is a combined function of the value of the affected feature (its ecological importance), the type of impact and the magnitude of the impact. It is necessary to identify the value of ecological features within the study area in order to evaluate the significance and magnitude of possible impacts.

The following parameters are described when characterising impacts (following CIEEM (2016), EPA (2002) and NRA (2009)):

Direct and Indirect Impacts - An impact can be caused either as a direct or as an indirect consequence of a proposed development.

Magnitude - Magnitude measures the size of an impact, which is described as high, medium, low, very low or negligible.

Extent - The area over which the impact occurs – this should be predicted in a quantified manner.

Duration - The time for which the effect is expected to last prior to recovery or replacement of the resource or feature.

- Temporary: Up to 1 Year;
- Short Term: The effects would take 1-7 years to be mitigated;
- Medium Term: The effects would take 7-15 years to be mitigated;
- Long Term: The effects would take 15-60 years to be mitigated;
- Permanent: The effects would take 60+ years to be mitigated.

Likelihood – The probability of the effect occurring taking into account all available information.

- Certain/Near Certain: >95% chance of occurring as predicted;
- Probable: 50-95% chance as occurring as predicted;
- Unlikely: 5-50% chance as occurring as predicted;
- Extremely Unlikely: <5% chance as occurring as predicted.

The CIEEM Guidelines define an ecologically significant impact as an impact (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographic area. The integrity of a site is the coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified (CIEEM, 2016).

The results of the ecological survey were evaluated to determine the significance of identified features located in the study area on an importance scale ranging from international-national-county-local. The local scale is approximately equivalent to one 10 km square but can be operationally defined to reflect the character of the area of interest. Because most sites will fall within the local scale, this is sub-divided into three categories: high local importance - local importance - local value. The criteria used for assessing the importance of ecological features are shown in Table 5.1 over. The criteria used for assessing impact type and impact magnitude are shown in in Appendix 5.1 and 5.2.

Importance	Criteria
International	An internationally designated site or candidate site (SPA, cSPA, SAC, cSAC, Ramsar Site, Biogenetic Reserve). Also, sites which qualify for designation as SACs or SPAs – this includes sites on the NGO shadow list of SAC's.
National	A nationally designated site or candidate site (NHA, pNHA). Sites which hold Red Data Book (Curtis and McGough, 1988) plant species.
County	Sites which hold nationally scarce plant species (recorded from less than 65 of the national 10 km grid squares); unless they are locally abundant. Sites which hold semi-natural habitats likely to be of rare occurrence within the county. Sites which hold the best examples of a semi-natural habitat type within the county.
High Local Importance	Sites which hold semi-natural habitats and/or species likely to be of rare occurrence within the local area. Sites which hold the best examples of a high quality semi-natural habitat type within the local area.
Local Importance	Sites which hold high quality semi-natural habitats.
Local Value	Any semi-natural habitat.

Table 5.1 Criteria used in assessing the importance of ecological features

5.1.4 Consultation

Consultation was undertaken with Alanna Roadbridge Developments Ltd/Westmeath County Council with regard to the scope of works within the proposed project. The consultation with the NPWS identified concerns in relation to Molinia meadows which were highlighted to be present within 10km. They identified a '*species rich wetland area*' and '*green area with meadow species excellent for pollinators*' and suggested specific effort be made in relation to frog and newt investigations. The NPWS suggested that '*part of the wildflower area should be retained as a biodiversity area as a mitigation measure*'. Similarly, they suggested retaining all boundary hedgerows and supplementing where there are gaps be as a matter of priority to mitigate for the loss of a significant area of internal hedgerows and as a matter of adopting priority actions 17 and 18 of the Westmeath Biodiversity Action Plan 2014-2020. Additionally, it is noted that the consultation response indicated the requirement for suitably qualified ecologists to conduct various surveys. All of the other consultation resulted in an expression of no concern in relation to biodiversity related impacts due to the low ecological value of the receiving environment and the distance from protected sites.

5.2 Methodology

5.2.1 Desk Study

A desktop review was carried out to identify features of ecological importance within the proposed development site and the wider environment. Ecological impact assessment is conducted following a standard source-pathway-receptor model, where, in order for an impact to be established all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism is sufficient to conclude that a potential effect is not of any relevance or significance.

- Source(s) – e.g. pollutant run-off from proposed works.
- Pathway(s) – e.g. groundwater connecting to nearby qualifying wetland habitats.
- Receptor(s) – qualifying aquatic habitats and species of European sites.

Specific effort was put into the assessment of sensitive receptors of protected species/habitat features; as well as those of local or national importance. A source is any identifiable element of the Project proposal which is known to have interactions with ecological processes. Pathways are any connections or links between the source and the receptor. This report determines if direct, indirect or cumulative adverse effects will arise from the proposed development.

Field Survey Work

Data was collected after a walkover survey conducted on various dates between June 2018 and May 2019. This data covered the whole Lissywollen South site. A habitat survey of the site was conducted following standard guidelines set out in 'Best practice guidance for habitat surveys and mapping' developed by the Heritage Council of Ireland[10]. Habitats were classified using habitat descriptions and codes published by the Heritage Council in 'A Guide to Habitat Types in Ireland'[11]. Plant species nomenclature follows Rose's 'The Wild Flower Key: How to identify wild flowers, trees and shrubs in Britain and Ireland'[12]. A list of the dominant and notable plant species was taken for each habitat type. Particular emphasis was given to the possible occurrence of rare or legally protected plant species (as listed in Flora Protection Order 1999) or Red-listed plant species (Curtis & McGough 1985, Wyse Jackson *et al.* 2016).

Observations were made for fauna species present or likely to occur on site. Emphasis was placed on mammals and birds, and especially for species listed in the respective Red lists, namely Colhoun and Cummins (2013), and Marnell et al. (2009). A focus was placed on assess the wetland area identified by the NPWS for suitable habitat for frog and newt species. For mammals, searches were focused on signs of their presence, such as tracks, feeding marks and droppings, as well as direct observations. For bats, the main focus was on evaluation of suitable habitats to support roosting bats. Dedicated bat activity surveys were also undertaken in May and August 2019 to identify which species were present on site and characterise the habitat usage.

Three dedicated bird surveys were undertaken across the site following the lowland country breeding bird survey methodology; all birds were recorded by sight and sound. A single survey was undertaken in 2018 in the late season, followed by two subsequent surveys in 2019 in early and late April.

[10] Smith, George F., et al. "Best practice guidance for habitat survey and mapping." The Heritage Council: Ireland (2011)
[11] Fossitt, J.A., 2000. A guide to habitats in Ireland. Heritage Council/ Chomhairle Oidhreachta
[12] Rose, F., O'Reilly, C., Smith, D.P. and Colling

During all surveys, particular attention was given to assessing the presence of rare or protected species. Each species identified was assessed in term of the EU Habitat Directive (92/43/EEC), Bird Directive (2009/147/EC), the Wildlife Act (1976), the Wildlife Amendment Act (2000) and the Red Data Lists for threatened and protected species, published on the NPWS website (www.npws.ie).

In addition to the foregoing site visits / field surveys, an additional site visit was undertaken by Domhnall Finch on 28/01/2021 to conduct a habitat assessment, amphibian survey and mammal survey. This was completed to identify if any changes in habitat types may have occurred since the initial surveys outlined above. The results are as follows:

Flora

There were no observed changes to habitat types found on site[13] compared to those identified during the 2018 and 2019 surveys. None of the habitats on the site were found to contain Annex I type features; additionally, all of the habitats present on site were of low ecological importance at both landscape and local scales. Habitats recorded on site include Buildings and Artificial Surfaces (BL3), Re-colonised Bare Ground (ED3), Hedgerows (WL1) and Treelines (WL2), Agricultural Grassland (GA1), Amenity Grassland (GA2), Drainage Ditches (FW4), and Dry Meadow and Grassy Verge (GS2). There were no species identified on site which are invasive and subject to restrictions (Third Schedule) under Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations, 2011. Due to the recent rainfall, some of the ditches previously identified as dry had some water in them.

Fauna

Mammals

There was evidence of fox (footprints) and rabbit activity (droppings and burrows) on site. There were no signs of any badger activity and no badger setts were identified. There were no bat roosts found on site, and no trees that were of sufficient size and architecture to be suitable roosts. The disused building along the eastern boundary of the site had no bat roost potential as it was too exposed.

(**Note:** a limitation to the field survey of 28/01/2021is that due to the time of year no bat activity survey or breeding bird survey could be completed).

Amphibians

The fields to the west of the site have a notable wet flush area as indicated by the reeds (Juncus spp.) present (also identified by the NWPS consultation response). During the time of this site visit, parts of those fields had surface water present. No newts, frogs or frog spawn were identified on site at the time of the survey.

Conclusion to field survey January 2021

There were no changes to the habitat composition recorded during the current site visit and ecological surveys when compared to the previous surveys conducted in 2018 and 2019.

The habitats present on site are of low ecological value both at a local and landscape scale. There were no rare, protected or threatened species identified on site. Similarly, the site has limited potential to

[13] As of the 28/01/2021

support a wide variety of biodiversity due to its nature and composition. There were no trees present on site with bat roosting potential, and the disused building adjacent to the site also had no potential. There were no signs of any badger activity found on site, and no setts were identified.

Due to no changes in habitat composition being observed and as a result of no protected species being identified on site, it is perceived that there would be no significant change in the species diversity or composition recorded on site now compared to the surveys undertaken in 2018 and 2019.

5.2.2 Limitations

The site is composed of improved and amenity grasslands with hedgerows/treelines. Overall, it is considered that there are no significant limitations to the present assessment of the ecological importance of the site.

5.3 Proposed Development

The proposed works relate to a residential housing development. Full details of the proposed development are discussed in Chapter 3.

The development proposal consists of the construction of a residential development of 576 no. dwellings, a community hub, 2 no. crèches as follows:

- 576 no. residential dwellings, comprised of 285 no. houses and 291 no. apartment and duplex units consisting of:
- 285 no. 2 storey detached, semi-detached & terraced houses (50 no. four beds, 200 no. three beds & 35 no. two beds)
- 8 no. apartments & duplexes (4 no. one beds & 4 no. three beds) in Block A (3 storeys);
- 8 no. apartments & duplexes (4 no. one beds & 4 no. three beds) in Block B (3 storeys);
- 15 no. apartments (15 no. two beds) in Block C (3 storeys);
- 16 no. apartments & duplexes (7 no. one beds, 5 no. two beds & 4 no. three beds) in Block D (3 storeys);
- 9 no. apartments & duplexes (5 no. one beds, 1 no. two bed & 3 no. three beds) in Block E (3 storeys);
- 8 no. apartments & duplexes (4 no. one beds & 4 no. three beds) in Block F (3 storeys);
- 4 no. apartments (4 no. one beds) in Block G (2 storeys);
- 12 no. apartments & duplexes (12 no. three beds) in Block H (3 storeys);
- 21 no. apartments (21 no. two beds) in Block K (3 storeys);
- 36 no. apartments (36 no. two beds) in Block L (5 storeys with 5th storey setback);
- 20 no. apartments & duplexes (6 no. one beds, 6 no. two beds & 8 no. three beds) in Block M (4 storeys with 4th storey setback);
- 27 no. apartments (27 no. two beds) in Block N (3 storeys);
- 43 no. apartments & duplexes (14 no. one beds, 24 no. two beds & 5 no. three beds) in Block O (2 to 4 storeys);
- 12 no. apartments (6 no. one beds & 6 no. 2 beds) in Block P (3 storeys);
- 8 no. apartments & duplexes (4 no. two beds & 4 no. three beds) in Block Q (3 storeys);

- 18 no. apartments (6 no. one beds & 12 no. two beds) in Block R (3 storeys);
- 12 no. apartments & duplexes (6 no. two beds & 6 no. three beds) in Block S (3 storeys);
- 14 no. apartments (4 no. one beds & 10 no. two beds) in Block T (3 storeys);

- Development of 2 no. crèche facilities comprised of a 2 storey crèche of circa 321m^2 located on the ground & first floors of Block C; & a 1 storey crèche of circa 448m^2 located on the ground floor of Block T.

- Development of 1 no. community hub facility of circa 101m^2 located within Block D.
- Construction of basement level car parking of circa 1,089m^2 forming part of Block L.
- Construction of an east-west access road through the application site from the Ballymahon roundabout (on the R915 - to the west) to the Garrycastle roundabout (on the R916 - to the east), which is to be delivered as part of the objectives for the Lissywollen South Framework Plan 2018-2024, and all associated road development works.
- Provision of public open spaces, hard and soft landscaping, public lighting, car & bicycle parking, pedestrian and cyclist connections to Old Rail Trail Greenway, bin storage, ESB sub-stations, drainage and attenuation, utility services etc. and all associated site development works.

The design incorporates mitigation measures as described in relevant sections of this EIAR. A Construction Environmental Management Plan (CEMP) accompanies this application and provides additional management measures which will be implemented during construction.

The CEMP has detailed methods relating to the control of potential impacts such as:

- Chemicals – Other Than Fuel, Lubricants and Solvents;
- Dust;
- Waste;
- Noise.

5.4 The Existing Receiving Environment (Baseline Scenario)

5.4.1 Overview

The site sits to the northeast of Athlone town, on the edge of the urban area. It is bordered by the N6, residential development, agricultural land and the Old Rail Trail Greenway. The surrounding area north of the site is dominated by agricultural lands with some bog, industrial estates and residential areas. There are no water courses within the boundary of the proposed site. The closest waterways are the Kippinstown Stream (26K74) located approximately 1.1km to the north, which flows north and joins the Garrynafela River (26G51) before entering Lough Ree. Approximately 740m to the south of the site an unidentified stream flows east and joins the Upper Shannon River (26S02) at the River Shannon Callows (Figure 5.1).

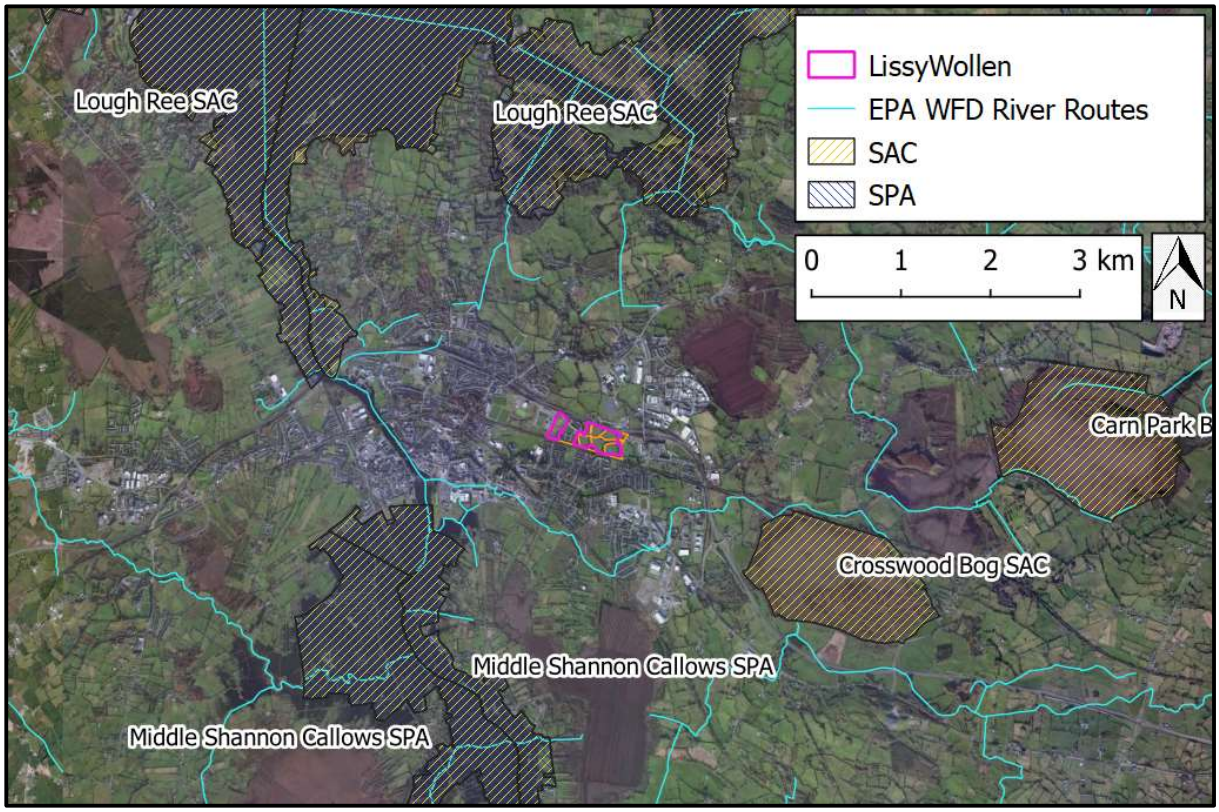


Figure 5.1 River system in the surrounding area of the Lissywollen Site.

5.4.2 Zone of Influence

The operational phase works are not anticipated to have any impacts beyond the site boundary due to the proposed characteristics of the development. Specific noise pollution and surface water assessments were undertaken (detailed in chapters 9 and 7 respectively). In light of these assessments, following the source-pathway-receptor model, the Zone of Influence (ZOI) was identified to be localised/within the immediate vicinity and no significant impact were identified; given the nature of the proposed works.

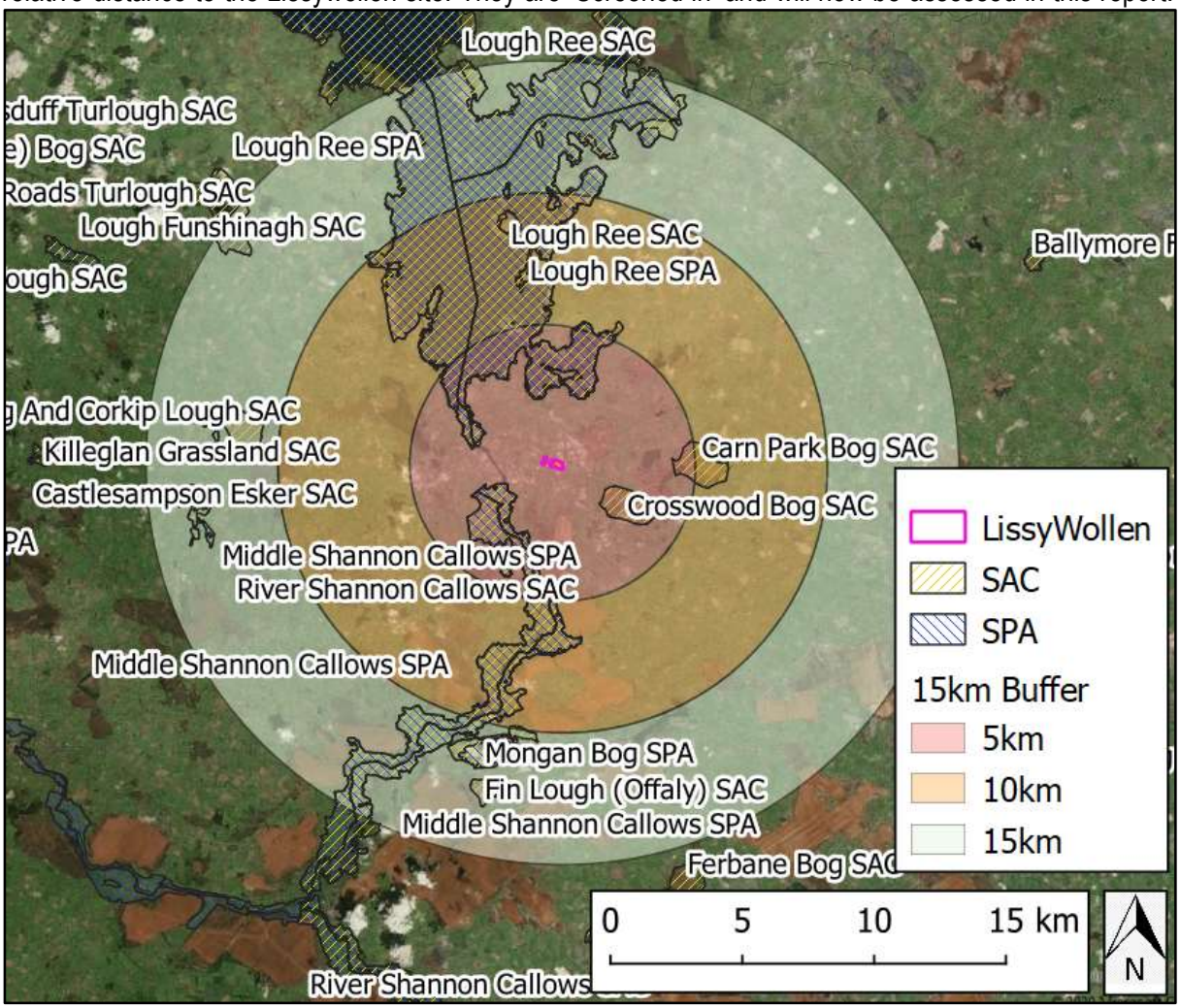
5.4.3 Designated Areas

In accordance with the European Commission Methodological Guidance (EC2001), a list of European Designated Sites that can be potentially affected by the works has been compiled. A dedicated Appropriate Assessment Screening, reviewing all European sites within the zone of influence of the project, was undertaken. A review of the conservation objectives and qualifying interests of these sites was undertaken in order to identify what habitats and/or species could be vulnerable to risk of impact from the proposed development. This was done by assessing whether any source receptor links existed between the qualifying interests of the designated sites and the site.

When assessing ecological impacts, the CIEEM Guideline[14] recommend a 15km zone of influence as an adequate buffer for effects. Due to the characteristics of the project, all other Natura 2000 sites and pNHA/NHA sites beyond threshold distances of 15km are considered to be far enough away that no significant effects could be caused either directly or indirectly or in combination with other plans or projects to their interest features. Any impacts caused by the Lissywollen development have no valid impact pathway to transfer along to reach any of the receptor interest features. These sites are 'screened out' and not considered further.

In addition to examining European sites, NHAs and pNHA have been considered. Although NHAs and pNHAs do not form part of the Natura 2000 Network, they often provide an important supporting role to the network, particularly when it comes to fauna species which often do not obey site boundaries. There are however, NHAs and pNHAs that are designated for features that are not important at an international level and may not interact with the Natura 2000 network.

Appendix 5.1 gives a detailed list of all of the designated sites considered within the assessment and their relative distance to the Lissywollen site. They are 'Screened in' and will now be assessed in this report.



[14] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.

Figure 5.2 and Figure 5.3 show the designated sites within and outside a 15km radius buffer of the proposed Lissywollen site.

The Lissywollen site has limited hydrological pathways to other Natura 2000 Sites (see Chapter 7 for further details). There are no water courses present on site; however, approximately 1.1km to the north, the Kippinstown Stream (26K74) flows north and joins the Garrynafela River (26G51) before entering Lough Ree. Approximately 740m to the south, an unidentified stream flows east and joins the Upper Shannon River (26S02) at the River Shannon Callows. All surface water will be managed through a Surface Water Drainage plan. A stand-alone AA screening report, accompanying this SHD planning application, expands on the potentially affected designated sites and their conservation objectives in more detail. The screening identified 10 European sites within a 15km buffer zone of Lissywollen.

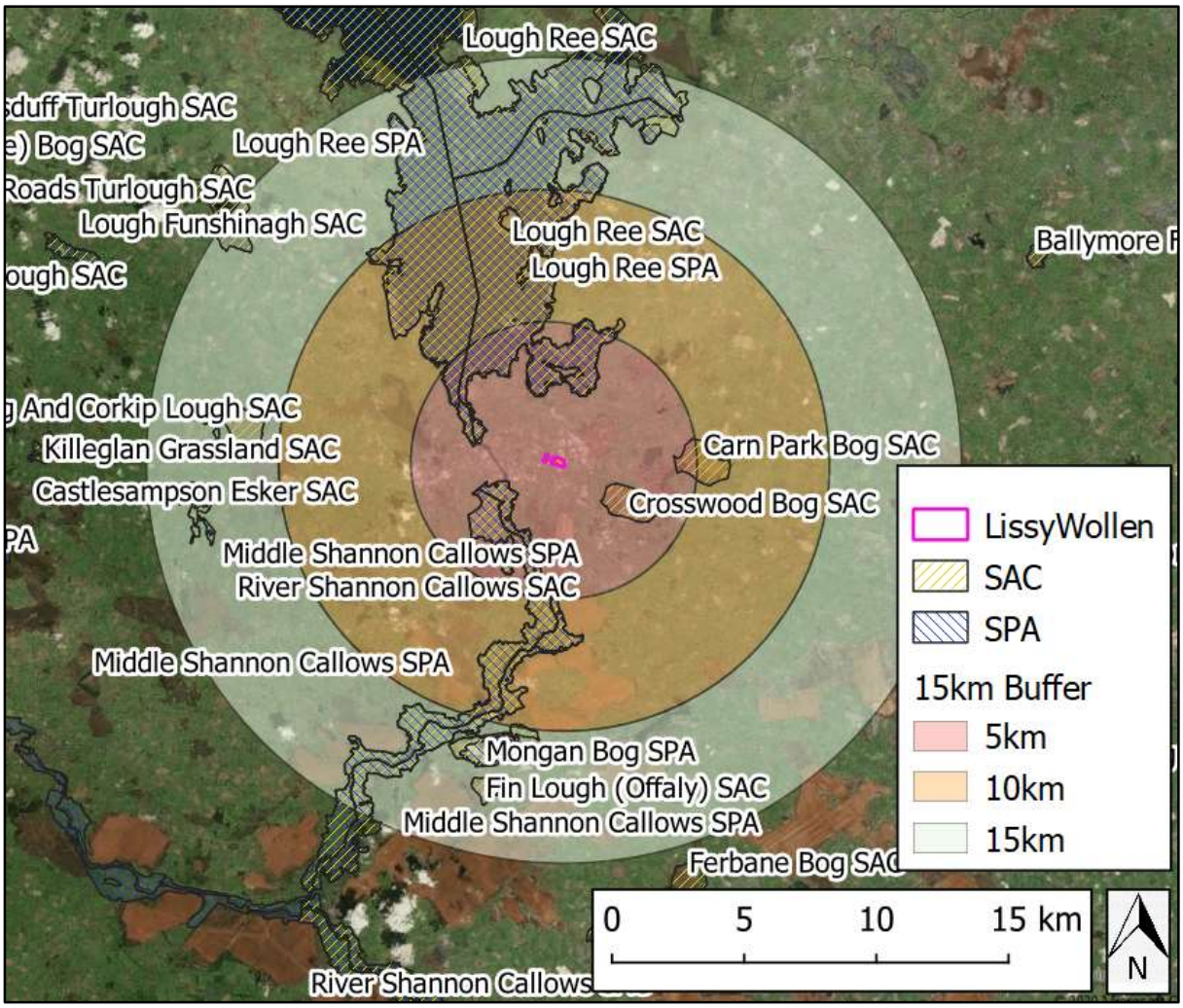


Figure 5.2 - SACs and SPAs considered within the assessment process

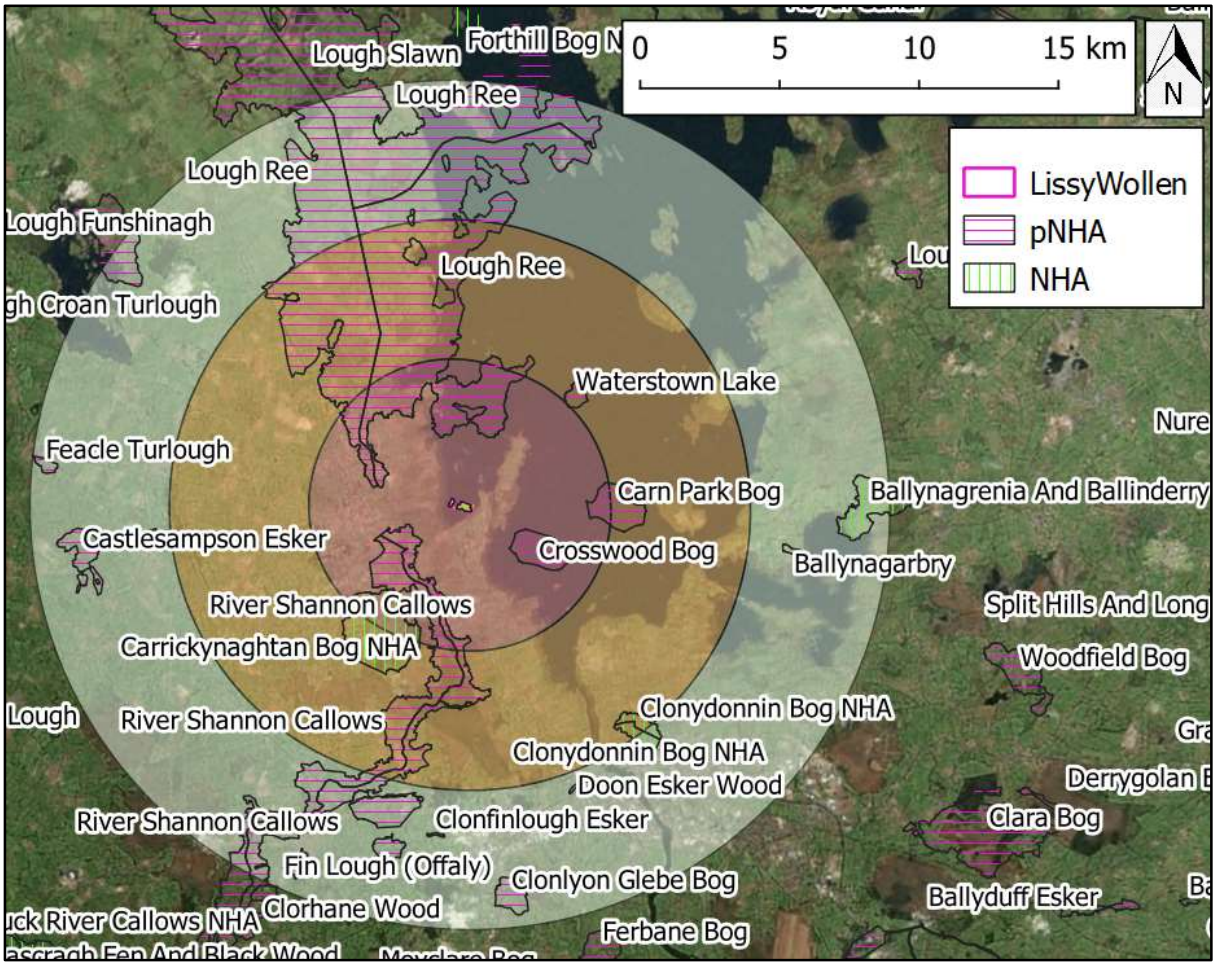


Figure 5.3 - NHAs and pNHAs considered within the assessment process

5.4.4 Records of protected, rare or other notable Flora and Fauna Species

The digital database of the National Biodiversity Data Centre (NBDC) was consulted to assess known records of rare, protected and invasive species that occur in the surrounding landscape. The collation of this information, as well as examination of aerial photographs allowed areas of potential ecological importance to be highlighted prior to field survey work. A search was undertaken of records of Red Data Book and Protected species held by the National Biological Data Centre Database. Records of Rare or Protected Species from the 10km x 10km grid square occupied by the study area (N04) are listed in Appendix 6.2 [NBDC data].

Invasive Flora Species

Publicly available NBDC data was accessed to identify invasive species in the hectad in which the proposed project is located (N04). Four of the flora species and three of the fauna species listed below are subject to restrictions (Third Schedule) under Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations, 2011.

5.4.5 Field Survey Results

Flora

None of the habitats on the site were found to contain Annex I type features; additionally, all of the habitats present on site were of low ecological importance at both landscape and local scales. Habitats recorded on site include Buildings and Artificial Surfaces (BL3), Re-colonised Bare Ground (ED3), Hedgerows (WL1) and Treelines (WL2), Agricultural Grassland (GA1) and Amenity Grassland (GA2), Dry Meadow and Grassy Verge (GS2); a full habitat map can be found in Figure 5.4. There were no species identified on site which are invasive and subject to restrictions (Third Schedule) under Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations, 2011. There were no significant habitats found directly adjacent to the site. Refer to Appendix 5.3 for further detail on habitat characteristics and descriptions. There central hedgerow provides a linear feature of moderate local importance with potential for breeding birds to use it.

Figure 5.4 - Habitats present on site[15]

Fauna

Mammals

There was evidence of fox and rabbit activity on site. There were no signs of any badger activity and no badger setts were identified. The site has moderate potential for bat activity based on the habitat available for 3 species of bat; Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*) and Leisler Bat (*Nyctalus leisleri*). The survey results indicated low levels of bat activity, however, following the precautionary principle, it is assumed that all of the treelines present onsite support commuting, foraging and socialising of these three species. The ED3/GA1 Mosaic habitat has moderate suitability as a foraging site for bats. However, targeted bat surveys following the EUROBATS survey

[15] at April and May 2019

guidelines identified minimal bat activity, with two species identified, Leisler's Bat and Common Pipistrelle. Bat activity was confined to the east of the site around the hedgerows in the vicinity of the abandoned bungalow. There were no bat roosts found on site, and no trees that were of sufficient size and architecture to be suitable roosts. The disused building along the eastern boundary of the site had no bat roost potential as it was too exposed.

Birds

The breeding bird surveys identified common farmland/garden bird passerine species to be present on site; such as Blackcap (*Sylvia atricapilla*), Wren (*Troglodytes troglodytes*), Blue Tit (*Cyanistes caeruleus*), Chaffinch (*Fringilla coelebs*), Coal Tit (*Periparus ater*), Common Blackbird (*Turdus merula*), Common Bullfinch (*Pyrrhula pyrrhula*), Common Chiffchaff (*Phylloscopus collybita*), European Goldfinch (*Carduelis carduelis*), European Robin (*Erithacus rubecula*), Dunnock (*Prunella modularis*), Great Tit (*Parus major*), Song Thrush (*Turdus philomelos*), Mistle Thrush (*Turdus viscivorus*), House Sparrow (*Passer domesticus*), Pied Wagtail (*Motacilla alba subsp. yarrellii*), Woodpigeon (*Columba palumbus*), Collared Dove (*Streptopelia decaocto*), Starling (*Sturnus vulgaris*), Rook (*Corvus frugilegus*), Jackdaw (*Corvus monedula*), and Magpie (*Pica pica*). Black-headed Gulls (*Larus ridibundus*) and Buzzards (*Buteo buteo*) were also recorded in flight within the receiving environment. The habitats on site are grassland and disturbed ground fields and the treelines on site are of low local ecological importance due to the proximity to the N6 and availability of similar habitat.

Protected Fish, Amphibians & Reptiles

There were no open water sources identified within the area during any of the surveys. The fields to the west have a notable wet flush area as indicated by the reeds (*Juncus spp.*) present (also identified by the NWPS consultation response), however, this area was dry during all field visits and there is no bankside vegetation, shade or refugia for amphibians or reptiles; therefore, the site has no potential for any protected fish, amphibians or reptiles.

In addition, the hydrological assessment (detailed in chapter 7) confirmed that there will be no effects to water quality of the surrounding area.

5.4.6 Summary of Ecological Evaluation

The habitats present on site are of low ecological value both at a local and landscape scale. There were no rare, protected or threatened species identified on site. Similarly, the site has limited potential to support a wide variety of biodiversity due to its nature and composition. There were no trees present on site with bat roosting potential, and the disused building adjacent to the site also had no potential. The treelines are suitable for commuting roots for bats, with the ED3 habitats providing potential suitable foraging habitat for bat species. However, very little bat activity was recorded. There were no signs of any badger activity found on site, and no setts were identified. Due to the nature and characteristics of the treelines present there is potential for nesting birds; the central hedgerow has the highest ecological value in this regard due to the semi mature nature and dense understory.

5.5 Potential Impacts

Taking the baseline ecological data, the extent, the scale and the characteristics of the proposed development into account, the following potential impacts have been identified:

- Hedgerow removal;
- Impacts on Surface Water;
- Earthworks – causing the mobilisation of particles;
- Noise and vibration.

These potential impacts are discussed in the following paragraphs.

Hedgerow removal

The removal of hedgerows could result in the loss of habitat connectivity and potential breeding bird habitat. This would result in moderate local scale impacts to biodiversity, if unmitigated.

Impacts on Surface Water

The operational phase elements of the project will be consistent with the urban context of the site and therefore, there are no long terms sources for impacts to surface water. The construction phase elements of the project could interact with water quality and therefore a CEMP is required. Further details on the hydrological interactions are detailed in chapter 7.

Earthworks

The existing site is agricultural and amenity grassland and there are no habitats present on site that are of high ecological value. The earthworks proposed within the project description will not have effects beyond the site boundary. Furthermore, the CEMP contains measures to reduce potential impacts in this regard (see below).

Noise / Vibration

The construction phase and movement of heavy vehicles across the site could cause localised disturbance of breeding birds that may use the perimeter vegetation. Given the low levels of activity identified on site by birds impacts in this regard be very low. This would be expected to have a probable, short-term impact at a local level but there is likely to be an existing degree of habituation to regular traffic on the site so this impact may not be across the whole area. Bird species are particularly sensitive to disturbance effects due to increased noise and on-site activity. Full details of the noise pollution data can be found in chapter 9.

An assessment of the project detail outlined in Chapter 4 indicates the potential impacts to biodiversity are predominantly associated with construction phase works which are temporary. The site was found to have low ecological value following the CIEEM (2016) Ecological Impact Assessment Guidelines; informed by the results of both the desktop study and the field surveys. The operational phase elements of the project are thought to have negligible impacts given the low ecological value of the existing habitats. The potential operational phase activities are consistent with the existing land use of the receiving environment, the on-site land use is changing from agricultural to residential; residential impacts are low level and confined to the site boundary.

5.5.1 Potential Impacts on Designated Sites

The AA Screening Report sets out the likelihood and significance of any potential impacts on European designated sites. There are no significant adverse effects foreseen to be likely to affect the ecological integrity of any European sites. The closest SAC and SPA within the zone of influence of the project is the River Shannon Callows, which is also designated as an pNHA, and is located 1.49km from the proposed development. The closest NHA is Carrickynaghtran Bog which is located 3.56km from the proposed development. The proposed development is not hydrologically connected to this NHA, which is designated for raised bog. The targets and attributes of the River Shannon Callows conservation objectives relate to the maintenance of the structure and function of habitat and community dynamics. These habitat and community dynamics are vulnerable to direct interactions, and/or interactions with water quality and turbidity. The proposed works will have no direct interaction with the River Shannon Callows and there will be no direct effects to the targets or attributes of the site. The project is not directly hydrologically connected to the pNHA. However, chapter 7 "Water" of this report provides a detailed hydrological assessment that shows the proposed works will have no effect on water quality. Additionally, the CEMP submitted as part of the project design details the best practice approach that will be undertaken during construction. These measures take account of possible interactions with water quality. There are no pathways for effects to any other pNHA or NHA sites.

5.5.2 Construction Phase

The following potential impacts are likely to occur during the construction phase in the absence of mitigation:

Habitat loss: agricultural grassland and disturbed ground habitats are to be lost along with approximately 990m of semi-mature hedgerows of varying quality.

The loss of habitat will result in local impacts to breeding birds, plants and animals.

In the absence of mitigation, the effect of habitat loss is likely, negative, significant and permanent.

The direct mortality of species during land clearance or tree felling. This impact is especially acute during the bird nesting season, but can also affect small mammals and other fauna. Under the Wildlife Act 1976 (as amended, 2000) it is prohibited to removed 'uncultivated' vegetation between the months of March and July inclusive.

Without mitigation, this effect is likely, negative, significant and permanent.

5.5.3 Operational Phase

The following potential impacts are likely to occur during the operation phase in the absence of mitigation:

Disturbance to species from increased human activity (lighting, etc.). Many of the species/habitats present on this site are not considered sensitive to disturbance from noise or general human activity, given that this is already present from nearby residential uses.

In the absence of mitigation, this effect is likely, negative, significant and permanent.

Loss of ecological corridors. The removal of linear woodland habitats (i.e. hedgerows) will result in impacts to plant and animal species by disrupting movement corridors which are of value for feeding, resting, breeding and dispersal. The magnitude of this effect is dependant upon the species in question but bats are known to rely heavily on these corridors and can be considered a proxy for wider effects to biodiversity. However, the survey results indicated low levels of bat activity on the subject site.

This effect is related to the installation of artificial lighting which can result in disruption to movement corridors for wildlife. This effect is **likely**, **negative**, **significant** and **permanent**.

Pollution from surface water. Surface water attenuation measures will comply with Local Authority standards. This will include on-site attenuation storage, detention basins and green roofs.

This effect is likely, neutral, imperceptible and permanent.

Pollution of water from foul wastewater arising from the development. Foul wastewater from the development is to be treated at the Athlone wastewater treatment plant, which discharges treated effluent into the Shannon, and it is noted that there are two separate Irish Water projects to improve foul drainage infrastructure in Athlone and increase capacity at the Athlone wastewater treatment plant. The plant is licenced to discharge this effluent by the EPA (licence number D0007-01). The most recent annual environmental report by Irish Water on the plant, for 2019 (dated 05.03.2020), shows that the discharge from the wastewater treatment plant is not having an observable impact on water quality and does not have an observable negative impact on the Water Framework Directive Status. The plant discharges treated wastewater to the River Shannon and monitoring of the receiving environment shows that the effluent “does not have an observable negative impact on the water quality”.

This effect is likely, neutral, imperceptible and permanent.

5.6 Mitigation Measures

Following the best practice management measures detailed in the project description and within the CEMP no specific mitigation measures are required to moderate the potential impact to the ecological integrity of any designated site (SACs, SPAs or NHAs). However, the CEMP contains measures to ensure impacts to local biodiversity are minimised.

5.6.1 Hedgerow Removal

The localised impacts related to hedgerow removal are minimised as some of the central hedgerow will be maintained and augmented planting will occur to the north of the site using native tree and plant species. For specific detail in relation to the green spaces to be maintained, please refer to the enclosed landscaping proposals for details and to Chapter 14 “The Landscape”.

Figure 5.5 – Hedgerow Removal / Retention

The central segment of the hedgerow will be maintained as it has a full canopy and complex understory. Connectivity to the wider landscape will be maintained to the north of the site and augmented supplementary planting of native trees will increase the condition of the existing hedgerow to the north. Overall, 36% of the available hedgerows will be lost due to the implementation of the project.

Where hedgerow removal is required all works in that regard will be constrained to outside 1st March and the 31st August. Should hedgerow removal be required within this time then a relevant derogation licence must be sought. In addition to this an Ecological Clerk of Works (EcOW) will be appointed to monitor all hedgerow removal for disturbance to potential badger setts, bat roosts and/or bird nests. The EcOW will ensure that none of the hedgerows to be maintained, identified above, are interfered with in any way that impacts their ecological integrity throughout the implementation of the construction works.

5.6.2 Impacts on Surface Water

The CEMP details measures to prevent accidental spill offs while a Surface Water Urban Drainage System (SUDS) scheme is to be implemeted across the site. Interactions with surface water are therefore thought to be minimal as there are no existing water courses across the site or in the immediate vicinity. Further details on the hydrological interactions are detailed in chapter 7.

5.6.3 Earthworks

The CEMP dictates that a dust control strategy must be implemented for all construction works. The existing site is agricultural and amenity grassland and there are no habitats present on site that are of any ecological value. The earthworks proposed within the project description will not have effects beyond the site boundary.

5.6.4 Noise/Vibration

The construction phase and movement of heavy vehicles across the site could cause localised disturbance of breeding birds that may use the perimeter vegetation. Given the low quality of habitat available this is expected to be very low. This would be expected to have a probable, short-term impact

at a local level but there is likely to be an existing degree of habituation to regular traffic on the site so this impact may not be across the whole area. Bird species are particularly sensitive to disturbance effects due to increased noise and on-site activity. Full details of the noise pollution data can be found in chapter 9.

5.7 Cumulative Impacts

A review of planning applications in proximity to the proposed development was undertaken to assess the possibility of cumulative impact arising from proposed development at Lissywollen and proposed developments in the site's environs. No other large-scale developments have been identified within proximity to the site at Lissywollen. The planning applications within the area relate to site use change and small single-story developments or retention permission applications. A full list of projects in the surrounding area can be found in the submitted AA Screening report. The receiving environment has low ecological value. The operational phase of the project is consistent with the current land use of the receiving environment and construction impacts will be localised and temporary. These factors combined with the robust mitigation measures for the protection of local ecological features within the CEMP further reduce potential impacts. Therefore, the project is not expected to contribute significant cumulative impacts.

5.8 Residual Impacts

Given the ecological features identified on site and the associated ecological value of the receiving environment, combined with the current site usage, the potential impacts to ecological processes are low. Following the management measures detailed in the project description, the CEMP and landscape proposals, potential impacts to the flora and fauna of the existing environment are foreseen to be low at a landscape scale and low/moderate at a local scale.

The characteristics of the development detailed above indicate any potential impacts will be localised due to the magnitude of works being undertaken. There will be a short-term reduction of habitat connectivity and the availability of local breeding bird habitat during the implementation of the landscape management plan as the supplementary planting is undertaken and the trees establish and mature.

There will a permanent loss of around 990m of semi-mature hedgerows of varying quality. Given the urban context of the site, the low abundance of species identified on site and the availability of similar habitat in the area, this is not identified as a significant impact to the flora and fauna of the receiving environment.

There are no other long-term residual impacts identified as the majority of the site is currently heavily managed agricultural grassland or disturbed ground.

5.9 Monitoring

The impacts are foreseen to be low due to the characteristics of the project, and the ecological value of the receiving environment is also low. Monitoring measures are proposed during construction phase and compliance with the CEMP and landscape management plan; this is detailed in the policies of the plan which commit to ensure compliance with the CEMP by all contracted workers. All vegetation removal will be supervised by an Ecological Clerk of Works who will be responsible for ensuring the hedgerows to be maintained are left intact. This process is foreseen to be sufficient monitoring with regard to ecological impacts and the integrity of the wider landscape ecology.

5.10 Difficulties Encountered

No difficulties were encountered while developing this report.

Chapter 5 Appendices

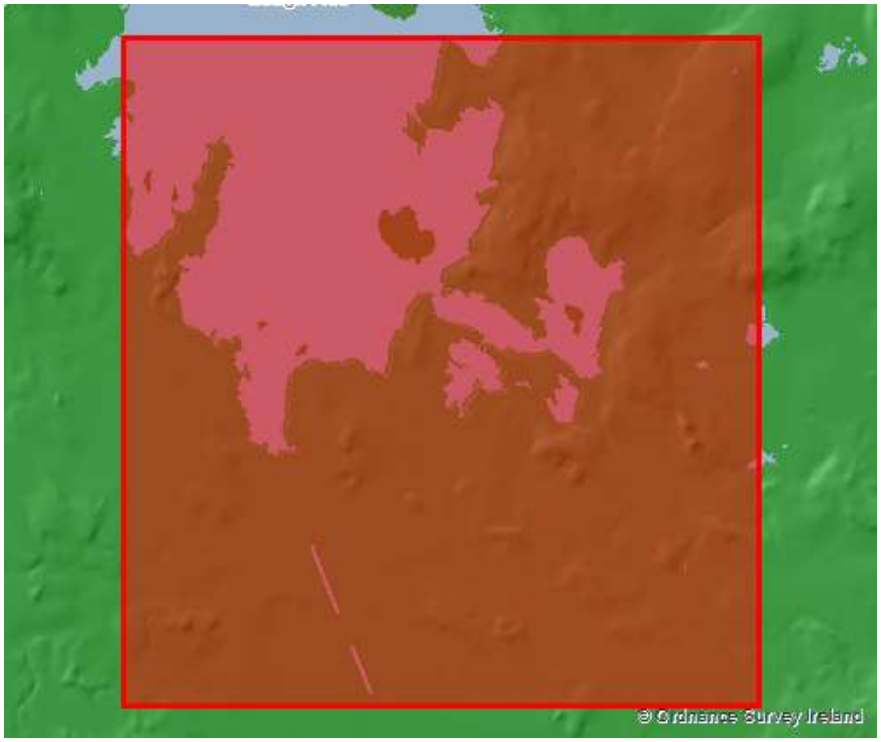
Appendix 5.1

The Designated Natura 2000 Sites, Natural Heritage Areas and proposed Natural Heritage Areas within 15km of site, arranged according to distance

Site Name	Code	SAC	SPA	NHA	pNHA	Distance [km]
River Shannon Callows	000216	✓	✓		✓	1.49
Crosswood Bog	002337	✓			✓	1.75
Lough Ree	000440	✓	✓		✓	2.19
Carrickynaghtan Bog	001623			✓		3.56
Carn Park Bog	002336	✓			✓	4.15
Waterstown Lake	001732				✓	4.96
Clonydonnin Bog	000565			✓		9.02
Pilgrim's Road Esker	001776	✓			✓	9.88
Mongan Bog	000580	✓	✓		✓	10.26
Castlesampson Esker	001625	✓			✓	10.29
Doon Esker Wood	001830				▯	10.38
Ballynamona Bog and Corkip Lough	002339	✓				10.64
Ballynagarbry	001713				✓	11.23
Clonfinlough Esker	000892				✓	11.60
Fin Lough Offaly	000576	✓			✓	11.98
Ballynagrenia and Ballinderry Bog	000674			✓		13.09
Clonlyon Glebe Bog	000893				✓	13.18
Lough Nanag Esker	000910				✓	13.39
Lough Funshinagh	000611	✓			✓	13.52
Feacle Turlough	001634				✓	14.09

Appendix 5.2

Site location within the NBDC hectad (10 x 10km Grid Square) N04.



Rare and protected species found within the N04 hectad around the South Lissywollen Site.

Species name	Designation
Common Frog (*Rana temporaria*)	Protected Species
Smooth Newt (*Lissotriton vulgaris*)	Protected Species
Barn Owl (*Tyto alba*)	Protected Species
Barn Swallow (*Hirundo rustica*)	Protected Species
Black-headed Gull (*Larus ridibundus*)	Protected Species
Common Coot (*Fulica atra*)	Protected Species
Common Goldeneye (*Bucephala clangula*)	Protected Species
Common Grasshopper Warbler (*Locustella naevia*)	Protected Species
Common Kestrel (*Falco tinnunculus*)	Protected Species
Common Kingfisher (*Alcedo atthis*)	Protected Species
Common Linnet (*Carduelis cannabina*)	Protected Species
Common Pheasant (*Phasianus colchicus*)	Protected Species
Common Pochard (*Aythya ferina*)	Protected Species
Common Redshank (*Tringa totanus*)	Protected Species
Common Sandpiper (*Actitis hypoleucos*)	Protected Species
Common Snipe (*Gallinago gallinago*)	Protected Species
Common Starling (*Sturnus vulgaris*)	Protected Species
Common Swift (*Apus apus*)	Protected Species
Common Tern (*Sterna hirundo*)	Protected Species
Common Wood Pigeon (*Columba palumbus*)	Protected Species
Corn Crake (*Crex crex*)	Protected Species
Eurasian Curlew (*Numenius arquata*)	Protected Species
Eurasian Oystercatcher (*Haematopus ostralegus*)	Protected Species
Eurasian Teal (*Anas crecca*)	Protected Species
Eurasian Wigeon (*Anas penelope*)	Protected Species
Eurasian Woodcock (*Scolopax rusticola*)	Protected Species
European Golden Plover (*Pluvialis apricaria*)	Protected Species
Great Black-backed Gull (*Larus marinus*)	Protected Species
Great Cormorant (*Phalacrocorax carbo*)	Protected Species
Great Crested Grebe (*Podiceps cristatus*)	Protected Species
Hen Harrier (*Circus cyaneus*)	Protected Species
Herring Gull (*Larus argentatus*)	Protected Species
House Martin (*Delichon urbicum*)	Protected Species
House Sparrow (*Passer domesticus*)	Protected Species
Lesser Black-backed Gull (*Larus fuscus*)	Protected Species
Little Egret (*Egretta garzetta*)	Protected Species
Little Grebe (*Tachybaptus ruficollis*)	Protected Species
Mallard (*Anas platyrhynchos*)	Protected Species
Merlin (*Falco columbarius*)	Protected Species
Mew Gull (*Larus canus*)	Protected Species
Mute Swan (*Cygnus olor*)	Protected Species
Northern Lapwing (*Vanellus vanellus*)	Protected Species
Northern Pintail (*Anas acuta*)	Protected Species
Northern Shoveler (*Anas clypeata*)	Protected Species
Peregrine Falcon (*Falco peregrinus*)	Protected Species
Red Grouse (*Lagopus lagopus*)	Protected Species

Red-breasted Merganser (*Mergus serrator*)	Protected Species
Ringed Plover (*Charadrius hiaticula*)	Protected Species
Rock Pigeon (*Columba livia)*	Protected Species
Sand Martin (*Riparia riparia*)	Protected Species
Sky Lark (*Alauda arvensis)*	Protected Species
Snowy Owl (*Bubo scandiaca*)	Protected Species
Spotted Flycatcher (*Muscicapa striata*)	Protected Species
Stock Pigeon (*Columba oenas*)	Protected Species
Tufted Duck (*Aythya fuligula*)	Protected Species
Water Rail (*Rallus aquaticus*)	Protected Species
Whooper Swan (*Cygnus cygnus*)	Protected Species
Yellowhammer (*Emberiza citrinella*)	Protected Species
European Eel (*Anguilla anguilla*)	Threatened Species
Freshwater White-clawed Crayfish (*Austropotamobius pallipes*)	Protected Species
Narrow-leaved Helleborine (*Cephalanthera longifolia*)	Protected Species
Chaetarthria seminulum	Threatened Species
Georissus crenulatus	Threatened Species
Gyrinus distinctus	Threatened Species
Haliplus (Haliplinus) lineolatus	Threatened Species
Hydraena rufipes	Threatened Species
Hygrotus (Hygrotus) versicolor	Threatened Species
Limnebius nitidus	Threatened Species
Nebrioporus (Nebrioporus) depressus	Threatened Species
Dingy Skipper (*Erynnis tages*)	Threatened Species
Large Heath (*Coenonympha tullia)*	Threatened Species
Marsh Fritillary (*Euphydryas aurinia)*	Protected Species
Small Blue (*Cupido minimus*)	Threatened Species
Small Heath (*Coenonympha pamphilus*)	Threatened Species
Scarce Emerald Damselfly (*Lestes dryas*)	Threatened Species
Barbut's Cuckoo Bee (*Bombus (Psithyrus) barbutellus*)	Threatened Species
Gipsy Cuckoo Bee (*Bombus (Psithyrus) bohemicus*)	Threatened Species
Large Red Tailed Bumble Bee (*Bombus (Melanobombus) lapidarius*)	Threatened Species
Pale Evening Mayfly (*Procloeon bifidum*)	Threatened Species
Cliff Scalewort (*Porella cordaeana*)	Threatened Species
Spurred Threadwort (*Cephaloziella elachista*)	Threatened Species
Blind Snail (*Cecilioides (Cecilioides) acicula*)	Threatened Species
Common Whorl Snail (*Vertigo (Vertigo) pygmaea*)	Threatened Species
Desmoulin's Whorl Snail (*Vertigo (Vertigo) moulinsiana*)	Protected Species
Duck Mussel (*Anodonta (Anodonta) anatina*)	Threatened Species
English Chrysalis Snail (*Leiostyla (Leiostyla) anglica*)	Threatened Species
Field Slug (*Deroceras (Deroceras) agreste*)	Threatened Species
Geyer's Whorl Snail (*Vertigo (Vertigo) geyeri*)	Protected Species
Globular Pea Mussel (*Pisidium hibernicum*)	Threatened Species
Glutinous Snail (*Myxas glutinosa*)	Threatened Species
Heath Snail (*Helicella itala)*	Threatened Species
Marsh Whorl Snail (*Vertigo (Vertigo) antivertigo*)	Threatened Species
Moss Bladder Snail (*Aplexa hypnorum*)	Threatened Species
Moss Chrysalis Snail (*Pupilla (Pupilla) muscorum*)	Threatened Species
Plaited Door Snail (*Cochlodina (Cochlodina) laminata*)	Threatened Species

Smooth Grass Snail (*Vallonia pulchella*)	Threatened Species
Striated Whorl Snail (*Vertigo (Vertigo) substriata*)	Threatened Species
Tree Snail (*Balea (Balea) perversa*)	Threatened Species
Whirlpool Ramshorn (*Anisus (Disculifer) vortex*)	Threatened Species
Bordered Screw-moss (*Tortula marginata*)	Threatened Species
Chalk Hook-moss (*Drepanocladus sendtneri*)	Threatened Species
Fine-leaved Marsh Feather-moss (*Campyliadelphus elodes*)	Threatened Species
Large White-moss (*Leucobryum glaucum*)	Protected Species
Red-neck Forklet-moss (*Dicranella cerviculata*)	Threatened Species
Common Lizard (*Zootoca vivipara*)	Protected Species
Brown Long-eared Bat (*Plecotus auritus*)	Protected Species
Daubenton's Bat (*Myotis daubentonii*)	Protected Species
Eurasian Badger (*Meles meles*)	Protected Species
Eurasian Pygmy Shrew (*Sorex minutus*)	Protected Species
Eurasian Red Squirrel (*Sciurus vulgaris*)	Protected Species
European Otter (*Lutra lutra*)	Protected Species
Lesser Noctule (*Nyctalus leisleri*)	Protected Species
Pine Marten (*Martes martes*)	Protected Species
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	Protected Species
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	Protected Species
West European Hedgehog (*Erinaceus europaeus*)	Protected Species

Invasive species found within the N04 hectad around the South Lissywollen Site.

Scientific Name	Common Name
Fauna	
Mustela vison	American Mink
Myodes glareolus	Bank Vole
Hemimysis anomala	Bloody-red mysid
Cornu aspersum	Common Garden Snail
Sciurus carolinensis	Eastern Grey Squirrel
Oryctolagus cuniculus	European Rabbit
Potamopyrgus antipodarum (fw aquatic)	Jenkins' Spire Snail
Arthurdendyus triangulates	New Zealand flatworm
Rutilus rutilus	Roach
Candidula intersecta land	Wrinkled Snail
Dreissena Dreissena polymorpha	Zebra Mussel
Flora	
Buddleja davidii	Butterfly-bush
Elodea canadensis	Canadian Waterweed
Orobanche minor	Common Broomrape
Pseudotsuga menziesii	Douglas Fir
Leycesteria formosa	Himalayan Honeysuckle
Impatiens glandulifera	Indian Balsam
Fallopia japonica	Japanese Knotweed
Rhododendron ponticum	Rhododendron
Acer pseudoplatanus	Sycamore
Clematis vitalba	Traveller's-joy

Appendix 5.3

Habitat characteristics and descriptions from the Field Surveys referred to in Section 5.4.5 & Figure 5.4

Buildings and Artificial Surfaces (BL3)

The site consists of a derelict bungalow, associated out-buildings and an access road.

Agricultural Grassland (GA1)

This habitat occurs in the eastern section of the site. The dominant grass species on site are Perennial Ryegrass (*Lolium perenne*), Timothy (*Phleum pratense*), and Cocksfoot (*Dactylis glomerata*). Other species that were present were thistles (Asteraceae Spp.), broadleaf dock (*Rumex obtusifolius*), and ribwort plantain (*Plantago lanceolata*) etc. There were no species of note recorded within the redline. There were significant levels of disturbance and bare ground caused by overuse from the large horse herd within the fields.

Re-colonised Bare Ground (ED3)

The recolonized area occurred in the north-eastern corner of the site. The field dominated by recolonised bare ground had significant evidence of trampling from the horses, causing damage to the habitat. There was very little coverage of grass species but a number of common disturbed ground species such as Sheeps Sorrel (*Rumex acetosella*), willow-herbs (*Epilobium spp.*), Common Sorrel (*Rumex acetosa*), Spear Thistle (*Cirsium vulgare*), Colt's Foot (*Tussilago farfara*), Nettle (*Urtica dioica*), Dandelion (*Taraxacum spp.*), Ragworts (*Senecio spp.*), Greater Plantain (*Plantago major*), Knotgrass (*Polygonum aviculare*), Pineappleweed (*Matricaria discoidea*) and Shepherd's-purse (*Capsella bursa-pastoris*).

Amenity Grassland (GA2) and Wet Grassland (GS4)

This habitat occurred in between the existing housing development and the school. It is maintained as an amenity area. The dominant grass species on site are Perennial Ryegrass (*Lolium perenne*) and is managed by an extensive mowing regime. These areas also contained areas that were less intensively managed which had taller grass species and a number of vegetative species such as thistles (Asteraceae Spp.), broadleaf dock (*Rumex obtusifolius*), and ribwort plantain (*Plantago lanceolata*) etc. However, these areas still had low levels of diversity. There was one patch of reeds (*Juncus sp.*) in the centre, indicative of wetter conditions. This was dry on the day of survey and had no bankside vegetation or potential refugia such as shading or rocks within it. Therefore, it was not identified as a distinct habitat type.

Dry Meadows and Grassy Verge (GS2)

This habitat occurred along the southern boundary of the western section of the site between the amenity grassland and greenway. The dominant grass species on site are Sweet vernal grass (*Anthoxanthum odoratum*), Timothy (*Phleum pratense*), and Cocksfoot (*Dactylis glomerata*). Other species included thistles (*Asteraceae Spp.*), Greater Stitchwort (*Stellaria holostea*), Common Speed Well (*Veronica persica*), Herb Robert (*Geranium robertianum*), Stinging nettle (*Urtica dioica*) and Cows Parsley (*Anthriscus sylvestris*) etc. There were no species of note recorded within the redline.

Mosaic 1 (ED3/GS2)

This habitat occurred in the south-western corner of the larger section of the site, adjacent to the existing residential area. This mosaiced habitat is a well-established recolonised bare ground habitat that is transitioning into a complex grass meadow. However there is still a high level of bare ground and disturbed/trampled terrain.

Mosaic 2 (GA1/ED3)

This habitat occurred in the south-eastern corner of the site. This mosaiced habitat consists of agricultural grassland in the centre that transitions to recolonised bare ground habitat towards the edges. However, there is still a high level of bare ground and disturbed/trampled terrain.

Hedgerows (WL1) and Treelines (WL2)

There are hedgerows and treelines present on site which are vary in height and density. These form the boundaries between existing grassland fields in the eastern section of the site, and run along the northern, southern and eastern the boundaries of the site.

Drainage Ditches (FW4)

Drainage ditches are associated with some, but not all, of the hedgerows and treelines on site. There are varying levels water in different ditches, none of which had a directional flow. Some ditches were dry.

6.0. Land, Soil & Geology

6.1 Introduction

This chapter of the EIAR comprises of an assessment of the likely impact of the proposed development on the soils and the geological environment, as well as identifying proposed mitigation measures required to minimise any impacts. This chapter was prepared by Shane Moynihan BEng(Hons) MSc DIC MEI of DBFL Consulting, Engineers.

The proposed site is bordered to the north by Brawny Road, Athlone Town Stadium to the West, a residential development to the south and agricultural lands to the east.

The proposed site is a Greenfield site and the development seeks to construct 576 no. residential units, childcare facilities, a community hub and all associated site and infrastructural works. It is located approximately 1km from Athlone town centre and has an area of 17.54ha.

The proposed development will also include the following associated engineering infrastructure:

- Provision of a site access point from the Ballymahon roundabout via Brawny Road.
- Construction of an east-west access route through the subject site from the Ballymahon roundabout (on the R915) to the west to the Garrycastle roundabout (on the R916) to the east.
- Provision of pedestrian and cyclist connectivity improved facilities to Old Rail Trail Greenway to the south.
- Facilitation of potential future pedestrian links through adjacent lands.
- Provision of internal site road network including associated footpaths & cycling infrastructure.
- Provision of surface water drainage, foul drainage and water supply infrastructure.
- Provision of public open spaces and associated public lighting, landscaping etc.

A more detailed description of the proposed development can be found in Chapter 3 of this EIAR.

6.2 Assessment Methodology

Assessment of the likely impact of the proposed development on soils and the geological environment includes the following activities:

- Preliminary Ground Investigation Study
- Review of information available on the Geological Survey of Ireland (GSI) online mapping service

Preliminary Ground Investigations for the proposed development were carried out by GII on May 2019 and consisted of the following:

- 2 no. Trial Pits
- 28 no. Plate Bearing Tests

Refer to Appendix 6-A Ground Investigations Ireland Ltd. Report (GII, Project No. 8709-05-19, Issued 16th May 2019).

6.3 Receiving Environment

6.3.1 Soils

Review of information available on the GSI's online mapping service ("Quaternary Sediments") indicates that the site is underlain predominantly by a sediment type described as "GLs – Gravels derived from Limestones". With a section to the east of the eastern catchment described as "BasEsk - Eskers comprised of gravels of basic reaction". Refer to Figure 6.1 below.

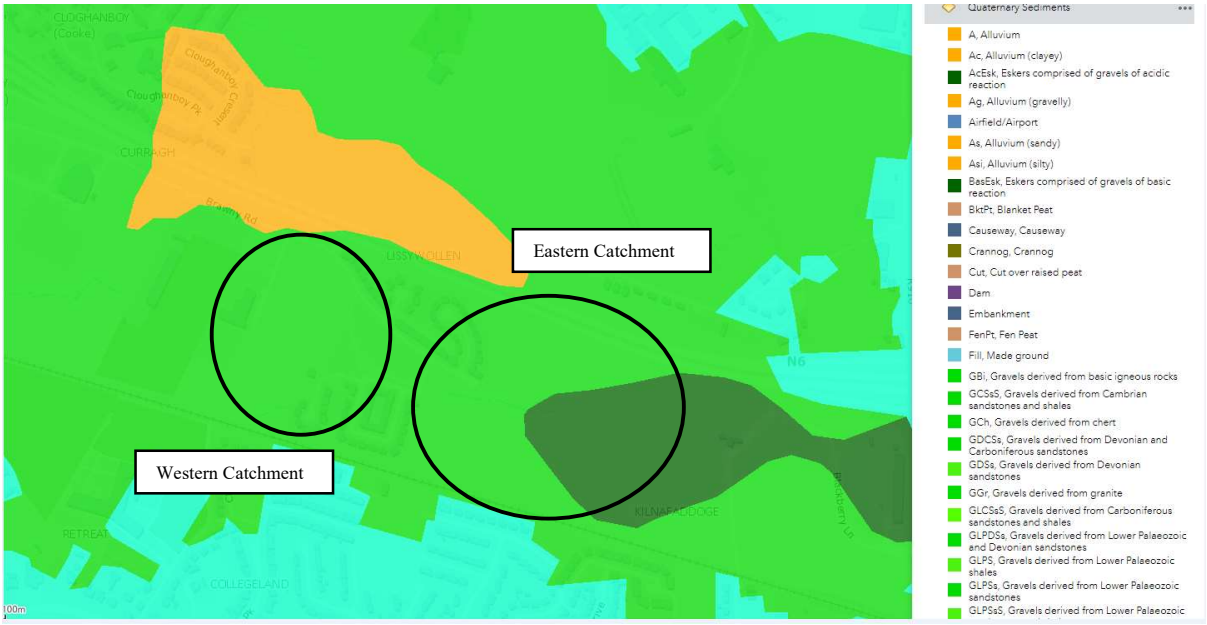


Figure 6.5 Extract from Quaternary Sediments Map (source GSI Online Mapping Service)

Ground conditions at the site, as observed during preliminary ground investigations, are summarized as follows:

- 0.1m thick topsoil layer overlying
- Firm light brown sandy clay with occasional cobbles
- Firm to stiff brown sandy clay with occasional greyish blue lenses of fine sand
- Stiff grey slightly sandy clay with many cobbles and boulders
- Excavations continued to approx. 2.4m BGL where excavation was discontinued due to frequency of boulders.

Both trial pits were dry and excavations were stable (no groundwater ingress noted).

6.3.2 Geology & Hydrogeology

A review of GSI's online mapping service ("Bedrock Geology") describes geology in the vicinity of the site as "Waulsortian Limestones". Refer to Figure 6.2 below.

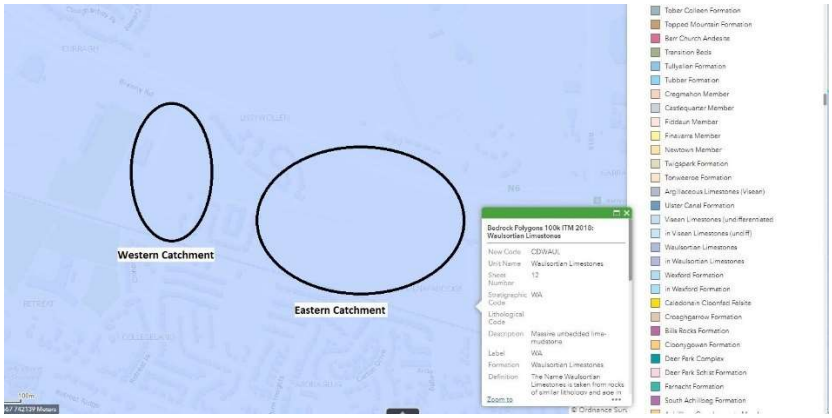


Figure 6.6 Extract from Bedrock Map (source GSI Online Mapping Service)

GSI have classified the site's groundwater vulnerability as "high" across the entire site. GSI also classified underlying bedrock aquifers as "locally important". Refer to Chapter 7 (Water) of this EIAR for further commentary regarding Hydrogeology.

6.3.3 Radon

A review of the EPA's online mapping service ("Radon Map") shows that between one and five per cent of the homes in this 10km grid square are estimated to be above the reference level of 200 becquerel per cubic metre (Bq/m3). Refer to figure 6.3 over.

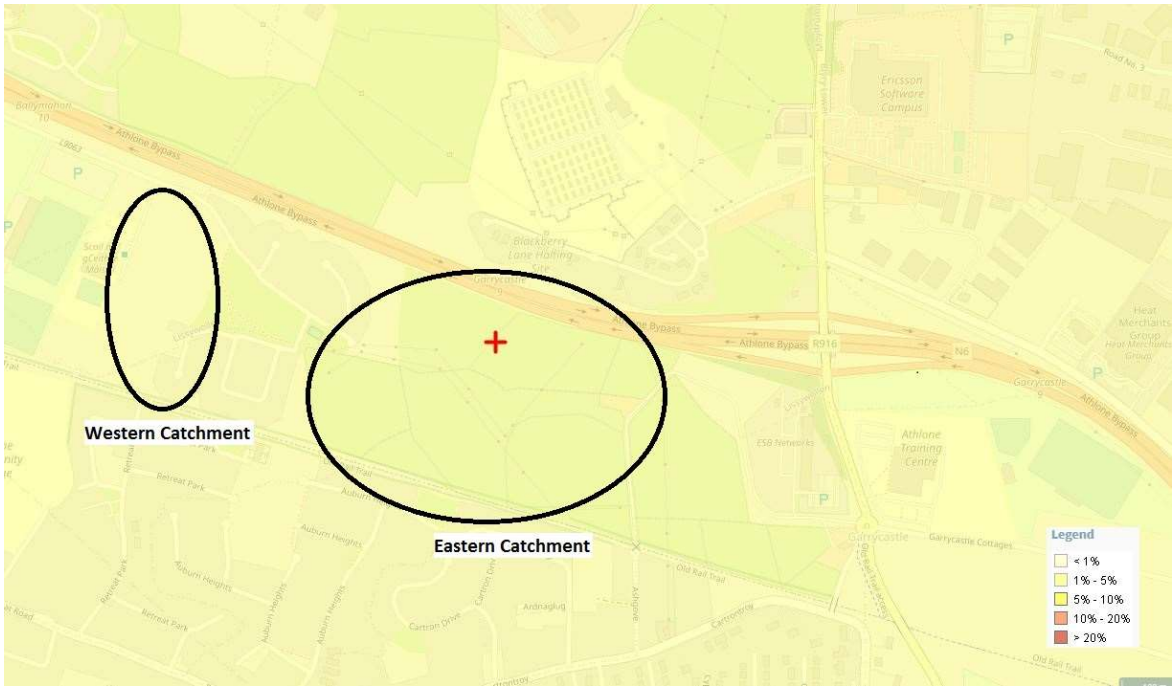


Figure 6.3 Extract from EPA Mapping Service (Radon Mapping)

6.3.3 Soil Contamination

There are no known areas of soil contamination on the site of the proposed development. According to the EPA online mapping (http://gis.epa.ie/Envision), there are no licenced waste facilities on or within the immediate environs of the site of the proposed development.

There are no historic mines at or in the immediate vicinity of the site of the proposed development that could potentially have contaminated tailings.

6.4 Characteristics of the Proposed Development

The proposed development, described in detail in Chapter 3, consists of 576 no. residential dwellings and will generally comprise the following:

- 576 no. residential dwellings, comprised of 285 no. houses and 291 no. apartment and duplex units consisting of:
- 285 no. 2 storey detached, semi-detached & terraced houses comprising 50 no. 4 bedroom houses, 200 no. 3 bedroom houses & 35 no. 2 bedroom houses;
- 291 no. apartments in 18 no. buildings (Blocks A, B, C, D, E, F, H, K, N, P, Q, R, S & T - all 3 storey, Block G - 2 storey, Block L - 5 storey with a 5 storey setback, Block M - 4 storey with a 4 storey setback, Block O - 2 to 4 storey) comprising 60 no. 1 bedroom apartments, 169 no. 2 bedroom apartments & 17 no. 3 bedroom apartments;
- With 45 no. duplex units in 9 no. of the above buildings (Blocks A, B, D, E, F, H, M, O, Q & S) comprising 8 no. 2 bedroom duplex units & 37 no. 3 bedroom duplex units
- Development of 2 no. crèche facilities comprised of a 2 storey crèche of circa 321m^2 located on the ground & first floors of Block C; & a 1 storey crèche of circa 448m^2 located on the ground floor of Block T;
- Access to the subject site will be from the Ballymahon roundabout (on the R915) to the west via Brawny Road and the Garrycastle roundabout (on the R916) to the east. The development proposal includes for road development works and the construction of an east-west access route through the subject site from the Ballymahon roundabout (on the R915) to the west to the Garrycastle roundabout (on the R916) to the east. The development proposal provides for pedestrian and cyclist connectivity to Old Rail Trail Greenway to the south;
- The development proposal includes for the provision of public open spaces, planting, boundary treatments & all ancillary landscape works, public lighting, drainage and attenuation, car & bicycle parking, bin storage, ESB sub-stations and all associated site development works.

The proposed development will typically require alteration of ground levels to ensure it is at an adequate level for the proposed surface water drainage, foul water drainage and to mitigate flood risk.

Site development works will include stripping the 100mm thick topsoil layer. It is expected that all stripped topsoil will be reused on site (incorporated into landscaping of back gardens and public open spaces).

Excavation of subsoil layers will be required in order to allow road construction, foundation excavation, drainage and utility installation and provision of underground attenuation of surface water. Underlying subsoil layers are also expected to be suitable for reuse as non-structural fill (e.g. build-up of back gardens areas or build-up of open spaces).

Importation of fill will be required beneath houses, driveways and to roadways (structural fill). Importation of fill will also be required in areas, to raise the ground levels throughout the site in order to achieve a gravity drainage solution (thus avoiding the need for a pumped drainage solution). Further information regarding importation of fill is included in Section 6.5.1.3 of this Chapter (quantity, type of material etc.).

6.5 Identification of Likely Significant Impacts

6.5.1 Construction Phase

6.5.1.1 Stripping of Topsoil

Removal of the existing topsoil layer will be required. As noted previously, it is expected that all stripped topsoil will be reused on site (incorporated into landscaping of back gardens and public open spaces).

Stripping of topsoil will result in exposure of the underlying subsoil layers to the effects of weather and construction traffic and may result in subsoil erosion and generation of sediment laden runoff.

Table 6.1 Preliminary Estimated Topsoil Volumes (+/- 10%)

	Volume (m^3)
Topsoil Strip (100mm thick layer)	18,000
Topsoil Reuse (landscaping of open spaces etc.)	18,000

6.5.1.2 Excavation of Subsoil Layers

Excavation of existing subsoil layers will be required in order to allow for basement excavation, drainage and utility installation and provision of underground attenuation of surface water.

Underlying subsoil layers are sandy gravelly clay with occasional cobbles and are expected to be generally suitable for reuse as non-structural fill (e.g. build-up of back gardens areas or build-up of open spaces).

Table 6.2 Excavation of Subsoil / Reuse of Excavated Material (+/- 10%)

	Volume (m^3)
Cut (excavation of subsoil layers as described in 7.5.1.2 above)	23,000
Reuse of Excavated Material as Non Structural Fill	23,000

The excavated materials removed from the site will be recovered or reused.

Concrete will be used to form foundations, basement levels, and buildings and hard paved areas. The removal of the natural soils and rock will have a slight negative, permanent effect on the soils and geology at the site/local scale.

The remaining construction works will have a negative, slight, temporary effect on the soils and geology beneath the site.

6.5.1.3 Imported Fill

In the context of materials imported to site, these will be natural stones sourced from locally available quarries in accordance with the appropriate statutory guidelines, greenfield / inert soil imported under a Waste Permit issued by the local authority; or materials that have been approved as by-products by the EPA in accordance with the EPA's criteria for determining a material is a by-product, per the provisions of article 27(1) of the European Communities (Waste Directive) Regulations, 2011.

Imported materials will be granular in nature and used in the construction of road pavement foundations, drainage and utility bedding and surrounds. Imported fill will be required to raise the development to the required level for drainage.

Materials will be brought to site and placed in their final position in the shortest possible time. Any imported material will be kept separate from the indigenous arisings from the site. All excavation to accommodate imported material will be precisely co-ordinated to ensure no surplus material is brought to site beyond the engineering requirement.

Table 6.3 Imported Fill (+/- 10%)

	Volume (m^3)
Fill (Total)	60,000
Reuse of Excavated Material (Non Structural Fill)	24,000
Topsoil Reuse (landscaping of open spaces etc.)	18,000
Imported Fill	18,000

6.5.1.4 Construction Traffic

Earthworks plant (e.g. dump trucks) and vehicles delivering construction materials to site (e.g. road aggregates, concrete deliveries etc.) have potential to cause rutting and deterioration of the topsoil layer and any exposed subsoil layers, resulting in erosion and generation of sediment laden runoff. This issue can be particularly noticeable at site access points (resulting in deposition of mud and soil on the surrounding road network). Dust generation can also occur during extended dry weather periods as a result of construction traffic.

Mitigation Measures will be discussed in the following sections.

6.5.1.5 Accidental Spills and Leaks

During the construction phase there is a risk of accidental pollution from the sources noted below. Accidental spills and leaks may result in contamination of the soils underlying the site.

- Storage of oils and fuels on site;
- Oils and fuels leaking from construction machinery;
- Spillage during refuelling and maintenance of construction machinery;
- Use of cement and concrete during construction works.

Groundwater vulnerability is mapped as 'high' by the GSI at the proposed site. This vulnerability will likely be temporarily increased due to the removal of soils, subsoils and made ground cover during construction. Therefore, accidental spillages may impact on the 'locally important' aquifer.

Mitigation Measures will be discussed in the following sections.

6.5.1.6 Geological Environment

Any excavations associated with development of the site are expected to be moderate with the deepest excavations associated with diversion of existing drainage infrastructure (approximately 5m). The remaining drainage infrastructure will require excavations of approximately 2.0m with 3.5m in the deepest sections. A basement is proposed under Block L, which is expected to be in the region of approximately 3m. Current site investigation trial pits were excavated down to 2.4m BGL before halting due to boulders. It is possible that underlying geology may be disturbed in areas of deep excavation, this will be verified by further site investigation works following the receipt of planning permission. Any potential impacts to underlying geology as a result of these excavations will be further assessed following more detailed Site Investigation works prior to any construction work.

6.5.2 Operational Phase

Once the construction stage is complete and the development is in-situ and operational, the geology beneath the proposed site will remain unchanged. Subsoil will either be covered by surface hardstanding, building footprint or landscaped areas.

There will be no direct discharges to soil or groundwater during the operational phase of the proposed development. Foul effluent and surface water will be discharged to the Irish Water sewer and surface water drainage network following the required treatment measures.

There will be no significant storage or use of hazardous materials during the operational phase that could adversely impact subsoil, groundwater or surface water in the vicinity of the site. Accidental losses of oil, petrol or diesel on roadways or in car parks could cause contamination if these elements entered the underlying soil and groundwater. However, the presence of surface hardstanding throughout these areas would render this unlikely. In addition, all surface water will be routed through a suitably sized petrol interceptor before entering the public surface water network.

In the absence of mitigation measures, should accidental losses of oil, diesel, or petrol to ground occur, they would be considered direct, negative impacts of temporary duration, given that they would be confined to one-off releases. This would be considered a medium impact to a medium sensitivity environment, and the significance of the impact would be moderate.

6.5.3 'Do Nothing' Scenario

Should the development not proceed the site would remain in its current state with the only likely impact on the underlying soil and/or aquifer due to agricultural processes. The continued use of the site for agricultural purposes is likely to have a Neutral and Imperceptible effects on the environment.

6.6 Mitigation Measures

6.6.1 Construction Phase

6.6.1.1 Stripping of Topsoil

Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development. At any given time, the extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas.

Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter existing surface water drains.

Topsoil stockpiles will also be located so as not to necessitate double handling.

Surface water runoff from areas stripped of topsoil will be directed to temporary on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.

On-site settlement ponds are to include geotextile liners and riprapped inlets and outlets to prevent scour and erosion.

6.6.1.2 Excavation of Subsoil Layers

Excavation of existing subsoil layers has been minimised as far as reasonably practicable. Cut type earthworks operations will not be required to achieve designed site levels, however, some cut type earthworks will be required to construct block basements and attenuation features. Cut material is considered likely to be suitable to be reused as non-structural fill elsewhere on site.

Disturbed subsoil layers will be stabilized as soon as practicable (e.g. backfill of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping). The duration that subsoil layers are exposed is to be minimised in order to mitigate against weather effects.

Similar to comments regarding stripped topsoil, stockpiles of excavated subsoil material will be protected for the duration of the works. Stockpiles of subsoil material will be located separately from topsoil stockpiles.

Measures will be implemented to capture and treat sediment laden surface water runoff (e.g. sediment retention ponds, surface water inlet protection and earth bunding adjacent to open drainage ditches).

6.6.1.3 Imported Fill

As noted in section 6.5.1.3 above, importation of fill to site will be required.

The source of aggregate, fill material and topsoil imported to site will be carefully selected and vetted in order to ensure that it is of a reputable origin and that it is “clean” (i.e. will not contaminate the environment). Project contract and procurement procedures will be developed to ensure that aggregate, fill material and topsoil are acquired from reputable sources with suitable environmental management systems as well as regulatory and legal compliance.

No large or long-term stockpiles of fill material will be held on the site. At any time, the extent of fill material held on site will be limited to that needed in the immediate vicinity of the active work area.

Smaller stockpiles of fill, where required, will be suitably protected to ensure no sediment laden runoff enters existing surface water drains. Such stockpiles are to be located in order to avoid double handling.

6.6.1.4 Construction Traffic

A construction traffic management plan will be developed and implemented in order to minimise the disturbance caused by large vehicles. This management plan shall include and detail:

- Predetermined haul routes for earthworks plant and vehicles delivering construction materials to site.
- Vehicle wheel wash facilities in the vicinity of any site entrances and road sweeping to maintain the road network in the immediate vicinity of the site.
- Dust suppression measures (e.g. dampening down)

6.6.1.5 Accidental Spills and Leaks

Due to the presence of a locally important aquifer beneath the site, it will be necessary to employ mitigation measures at the construction site in order to prevent spillages to ground of fuels, and to prevent consequent soil or groundwater quality impacts. These measures are outlined in the Construction & Environmental Management Plan (CEMP) and are listed here as follows:

- Over Ground Oil / Diesel Storage – Only approved storage system for oil / diesel within the site will be permitted, (i.e. all oil / diesel storage to be located within a designated area placed furthest away from adjacent watercourses and contained within constructed bunded areas e.g. placed on 150mm concrete slab with the perimeter constructed with 225mm solid blockwork rendered internally);
- The bunded area will accommodate the relevant oil / diesel storage capacity in case of accidental spillage. Any accidental spillages will be dealt with immediately on site however minor by containment /removal from site;
- All hazardous substances on-site shall be controlled within enclosed storage compounds that shall be fenced-off and locked when not in use to prevent theft and vandalism;
- Fixed plant shall be self-bunded; mobile plant must be in good working order, kept clean, fitted with drip trays where appropriate and subject to regular inspection; water runoff from designated refuelling areas shall be channelled to an oil-water separator, or an alternative treatment system, prior to discharge; and,
- Spill kits and oil absorbent material shall be carried with mobile plant and located at vulnerable locations around the site to reduce risk of spillages entering the sub-surface or groundwater environment; booms shall be held on-site for works near drains or dewatering points.

6.6.1.6 Geological Environment

No mitigation measures are proposed in relation to the geological environment.

6.6.1.7 Reinstatement

- All temporary construction compounds are to be removed upon completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawings.
- All construction waste and / or scrapped building materials are to be removed from site on completion of the construction phase.
- Oil, fuel etc. storage areas are to be decommissioned on completion of the construction phase. Any remaining liquids are to be removed from site and disposed of at an appropriate licenced facility.
- All sediment control measures (e.g. sediment retention ponds) are to be decommissioned on completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawings.

6.6.2 Operational Phase

The operational phase of the development is unlikely to have any significant adverse impacts on the local geological / hydrogeological environment due to the environmental considerations incorporated into the design. These measures will seek to avoid or minimise potential effects, in the main through the implementation of best practice construction methods and adherence to all relevant legislation.

6.7 Predicted Impact of the Proposed Development

6.7.1 Construction Phase

Implementation of the measures outlined in Section 6.6.1 will ensure that the potential impacts of the proposed development on soils and the geological environment do not occur during the construction phase and that any residual impacts will be short term / imperceptible.

6.7.2 Operational Phase

There are no predicted impacts arising from the operational phase. Accordingly, the predicted impact will be long-term-imperceptible-neutral.

6.8 Monitoring

Proposed monitoring during the construction phase in relation to the soil and geological environment are as follows:

- Adherence to the CEMP
- Construction monitoring of the works (e.g. inspection of existing ground conditions on completion of cut to road formation level in advance of placing capping material, stability of excavations etc.).

- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities.
- Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill, protection of soils for removal from site from contamination)
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.)

No ongoing monitoring is proposed on completion of the construction phase.

6.9 Reinstatement

All temporary construction compounds and site entrances are to be removed upon completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawings.

All construction waste and / or scrapped building materials are to be removed from site on completion of the construction phase.

Oil, fuel etc. storage areas are to be decommissioned on completion of the construction phase. Any remaining liquids are to be removed from site and disposed of at an appropriate licenced facility.

All sediment control measures (e.g. sediment retention ponds) are to be decommissioned on completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawings.

During decommissioning of the proposed development, there is a risk of localised accidental pollution incidences from the following sources:

- Spillage or leakage of temporary oils and fuels stored on site;
- Spillage or leakage of oils and fuels from machinery or site vehicles; and
- Spillage of oil or fuel from refuelling machinery on site.

Accidental spillages may result in localised contamination of soils and groundwater underlying the proposed development site, should contaminants migrate through the subsoils and impact underlying groundwater i.e. unmitigated. Groundwater vulnerability at the proposed development site is classified as High. Therefore, this is considered the 'Worst Case' scenario.

6.10 Interactions and Potential Cumulative Impacts

Land, soils and geology can interact with several other environmental aspects during both the construction and operational phases of the development. These interactions are discussed below.

6.10.1 Interactions

Transportation

Interactions with Traffic and Transport arise during the construction phase when soil and subsoils and demolition waste is being transported to and from the site and raw materials for construction are being imported to the site. A construction traffic management plan will be implemented in order to minimise the disturbance caused by traffic.

Water

Interactions with Water and Hydrology arise during the construction phase and the operational phase. Surface water from the site will be discharged to existing surface water sewers during the operational phase. However, surface water run-off may have the potential to infiltrate into underlying soils. During the construction phase a site-specific CEMP will manage site water during the construction phase and will mitigate the risk of surface contaminants infiltrating into the underlying geology and hydrogeology. Surface water drainage from the operational site will be designed in accordance with Greater Dublin Strategic Drainage Study (GDSDS) and SuDs methods will be used to manage drainage. Surface water discharge rates will be controlled by a Hydrobrake type vortex control device in conjunction with attenuation.

Resource & Waste Management

Interactions with Waste Management arise during the construction phase when soil, subsoils and demolition waste are being transported from the site. These waste materials will require appropriate transport and disposal. A Waste Classification Report for soils and subsoils shall be prepared in order to define appropriate waste disposal outlets.

Noise & Vibration

Development of the site will result in a level of noise and vibration related effects on the environment during the construction phase. The interaction between Soils, Land & Geology and Noise and Vibration is considered to be moderate and temporary in nature. A construction traffic management plan will be implemented in order to minimise the disturbance caused by traffic.

Air Quality

There is a potential for soil excavation activity to impact on air quality in terms of dust generated. Dust generation can also occur during extended dry weather periods as a result of construction traffic. However, the implementation of suitable mitigation measures as outlined in Chapter 8 - Air Quality and the CEMP for the site will ensure a neutral impact.

Biodiversity / Species & Habitat

Removal of the existing topsoil layer will be required across the site as well as removal of some trees, hedgerows etc. Further details including any potential issues and mitigation measures are outlined in Chapter 5 (Biodiversity).

6.10.2 Potential Cumulative Impacts

Due to the lack of significant residual impacts from the development that would affect the wider geological environment, there will be no significant cumulative impacts to land, soil and geology resulting from this project, and other local existing developments, projects and plans. All impacts on soils and geology relating to the proposed project will be localised and within the development footprint.

6.10.3 Residual Impacts

With appropriate mitigation measures implemented during the construction phase, the potential impact on land, soils and geology during construction is considered to have a short term, imperceptible significance.

There are no likely significant impacts on the land, soil or geological environment associated with the proposed operational development of the site. As such, the impact is considered to have a long term, imperceptible significance with a neutral impact on quality.

6.10.4 Risks to Human Health

The following risk to human health from soils and the geological environment can occur during construction:

Dust generation occurring during extended dry weather periods as a result of construction traffic.

With the implementation of the aforementioned mitigation measures, the likelihood of such events occurring would be local and not significant

6.10.5 Unplanned Events

The following accidents & disasters involving soils during construction could potentially give rise to a serious incident putting people at risk:

- Collapse of trench during excavation works.
- Accidental spills and leaks may result in contamination of the soils underlying the site.

With the implementation of the aforementioned mitigation measures, the likelihood of such events occurring would be local and not significant.

On completion of the construction phase, there will be no further unplanned events anticipated on soils and the geological environment.

6.11 Difficulties Encountered

No difficulties were encountered while developing this report.

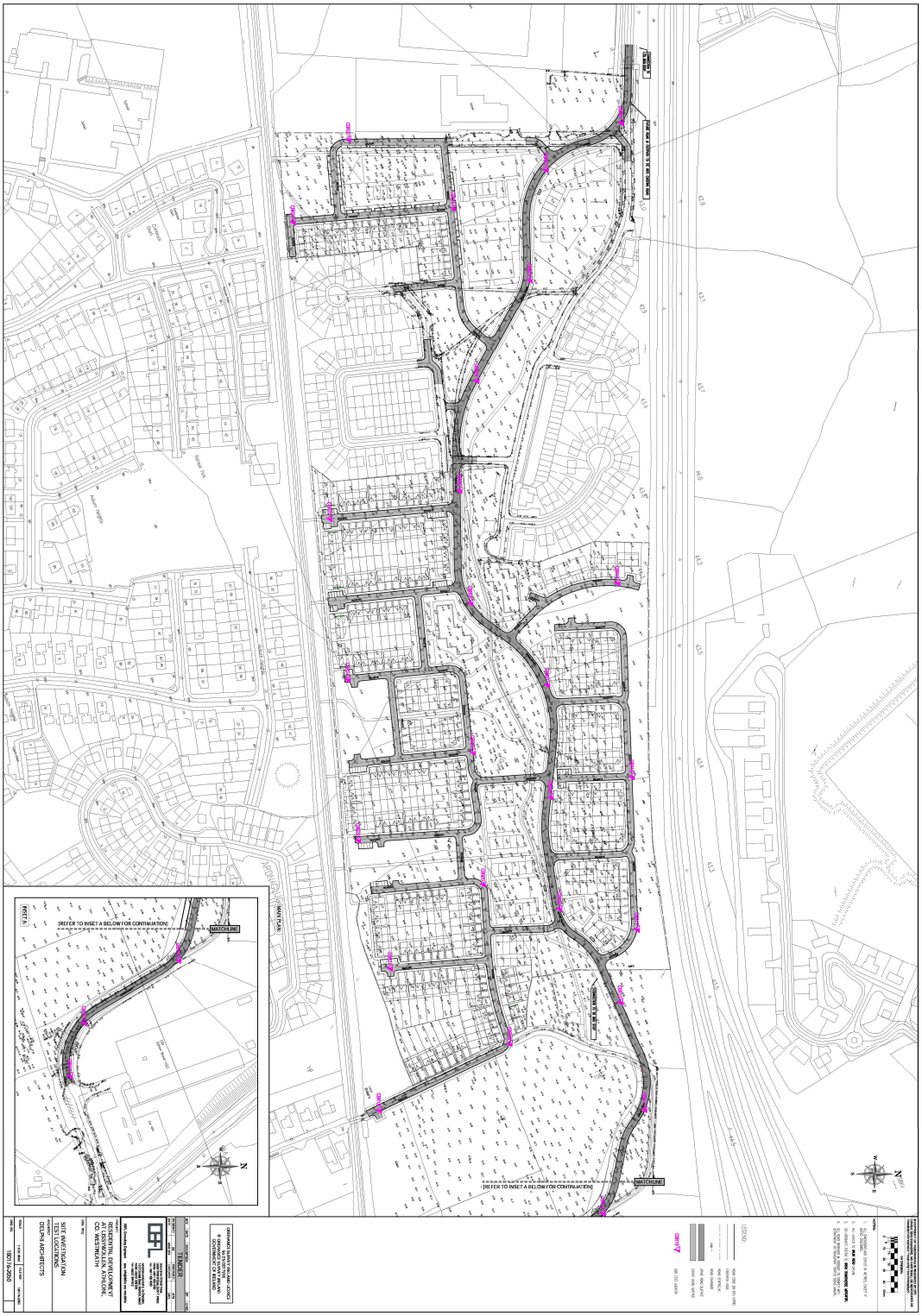
6.12 References

- Greater Dublin Strategic Drainage Study (2005) – Fingal County Council, Dublin City Council, Dún Laoghaire-Rathdown County Council, South Dublin County Council, Wicklow County Council, Kildare County Council, Meath County Council
- The Greater Dublin Region Code of Practice for Drainage Works (2012) – Fingal County Council, Dublin City Council, Dún Laoghaire-Rathdown County Council, South Dublin County Council, Wicklow County Council, Kildare County Council, Meath County Council
- Code of Practice for Water Infrastructure (2020) – Irish Water
- Code of Practice for Wastewater Infrastructure (2020) – Irish Water
- Ground Investigation Report (IGSL, Issue Date November 2018, report no. 21281).
- Environmental Protection Agency (EPA) Onliine Mapping Service
- Geological Survey of Ireland (GSI) online mapping service
- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements. Institute of Geologists of Ireland (2013)
- Guidelines on the information to be contained in environmental impact assessment reports. Environmental Protection Agency (Draft 2017).

Chapter 6 APPENDICES

Appendix 6A - Preliminary Ground Investigation Report

Carried out by IGSL Ground Investigation Report, November 2018



Ground Investigations Ireland Ltd
www.gii.ie

Site Lissywollen Residential Development, Athlone			**Trial Pit Number** TP01
Machine : 8 Tonne Excavator **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client** Roadbridge **Job Number** 8709-05-19
	Location	**Dates** 16/05/2019	**Engineer** **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.10	Light brown sandy gravelly TOPSOIL with occasional grass and rootlets		
					(0.50)	Firm light brown sandy CLAY with occasional cobbles		
					0.60	Firm to stiff brown sandy CLAY with occasional greyish blue lenses of fine sand		
					(1.80)			
					2.40	Trial Pit terminated due to boulders		
						Complete at 2.40m		

Plan

Remarks

Trial pit terminated due to boulders at 2.4m BGL
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:50	P. Cochran	8709-05-19.TP01

Ground Investigations Ireland Ltd
www.gii.ie

Site Lissywollen Residential Development, Athlone			**Trial Pit Number** TP02
Machine : 8 Tonne Excavator **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client** Roadbridge	**Job Number** 8709-05-19
	Location	**Dates** 16/05/2019	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.10	Light brown sandy gravelly TOPSOIL with occasional grass and rootlets		
					(0.60)	Firm light brown sandy CLAY with occasional cobbles		
					0.70	Firm to stiff brown sandy CLAY with occasional greyish blue lenses of fine sand		
					(1.20)			
					1.90	Stiff grey slightly sandy CLAY with many cobbles and boulders		
					(0.50)			
					2.40	Trial Pit terminated due to boulders		
						Complete at 2.40m		

Plan

Remarks

Trial pit terminated due to boulders at 2.4m BGL
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:50	P. Cochran	8709-05-19.TP02

Lissywollen Residential Development – Trial Pitting Photographs

TP01

TP01

TP01

TP01

TP02

TP02

TP02

TP02

TP02

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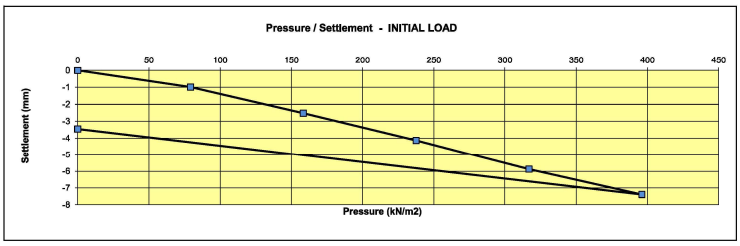
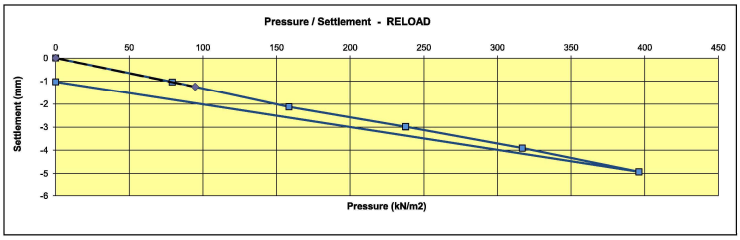
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9789**	**Site / Client Ref. No.**	PG/15/5/1 PLT 1
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 1
Date Tested / Operator	15/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	7.4



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.98
158	-2.53
238	-4.14
317	-5.88
396	-7.39
0	-3.46



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.04
158	-2.13
238	-2.98
317	-3.90
396	-4.93
0	-1.03

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	12	18	MN / m²
Modulus of subgrade reaction (k)	=	33954	34618	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=		1.5	
Equivalent CBR % Value in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)	=	**4.3**	**4.5**	

Remarks:

Signed: D. Jordan for Testall Ltd **Date:** 17/05/2019

Authorised signatories : ☒ D. Jordan - Laboratory Manager ☐ G.McHugh - Quality Manager

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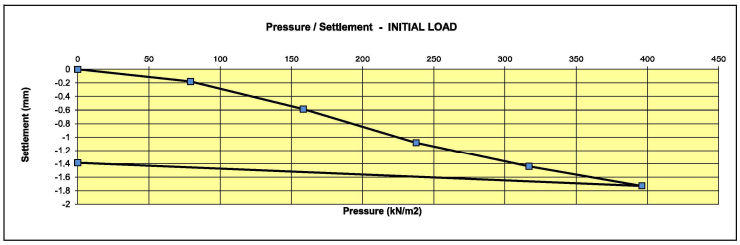
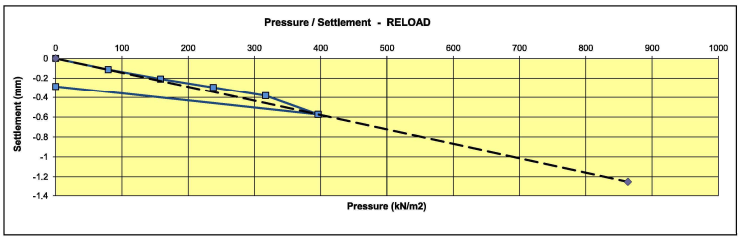
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9796**		**Site / Client Ref. No.**	PG/15/5/8	PLT 2
Supplier	Insitu		**Source**	Insitu	
Material Description	Subgrade		**Deposition**	Lissywollen, Athlone	
Chainage			**Offset**	PLT 2	
Date Tested / Operator	15/05/2019	PG	**Level**	OGL - 0.3m	
Plate Size (mm)	300		**Plate Correction factor**	0.46	(in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396		**Max Deformation (mm)**	1.7	



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.18
158	-0.59
238	-1.08
317	-1.44
396	-1.73
0	-1.39



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.11
158	-0.21
238	-0.30
317	-0.38
396	-0.57
0	-0.29

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	50	180	MN / m²
Modulus of subgrade reaction (k)	=	100383	315605	KN / m³ / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	3.6		
Equivalent CBR % Value	=	**28**	**207**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan **Date:** 17/05/2019

for Testall Ltd **Authorised signatories :** D. Jordan - Laboratory Manager C.McHugh - Quality Manager

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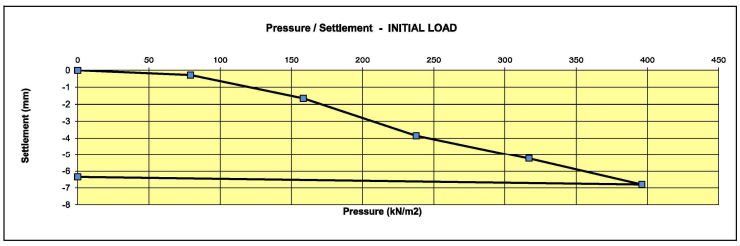
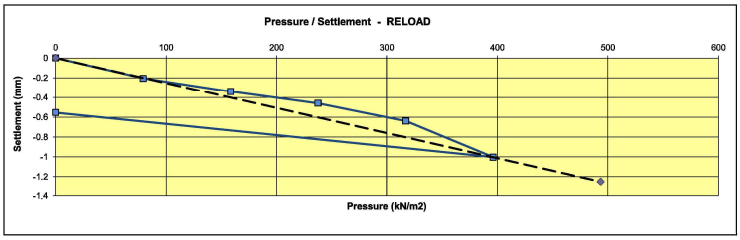
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9797**	**Site / Client Ref. No.**	PG/15/5/9 PLT 3
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 3
Date Tested / Operator	15/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	6.8



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.28
158	-1.66
238	-3.86
317	-5.24
396	-6.80
0	-6.34



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.21
158	-0.34
238	-0.46
317	-0.64
396	-1.00
0	-0.55

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	13	108	MN / m²
Modulus of subgrade reaction (k)	=	49330	180346	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=		8.5	
Equivalent CBR % Value in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)	=	**8.3**	**78**	

Remarks:

Signed: D. Jordan for Testall Ltd **Date:** 17/05/2019

Authorised signatories : D. Jordan - Laboratory Manager; G.McHugh - Quality Manager

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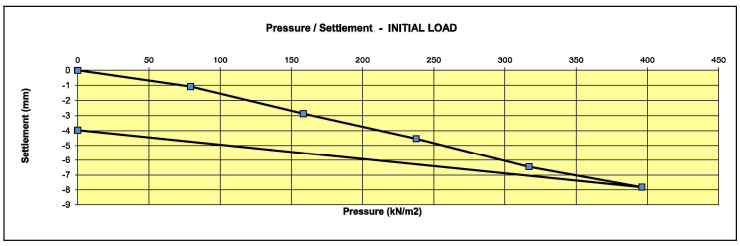
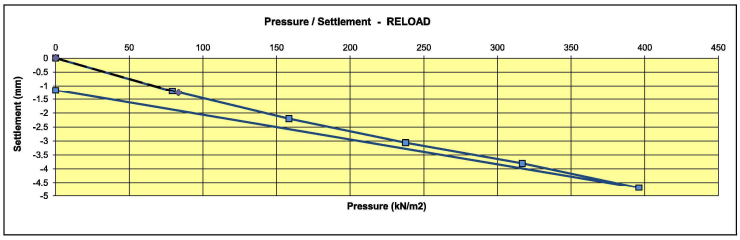
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9792**	**Site / Client Ref. No.**	PG/15/5/4 PLT 4
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 4
Date Tested / Operator	15/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	7.8



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.08
158	-2.87
238	-4.54
317	-6.45
396	-7.82
0	-3.97



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.20
158	-2.20
238	-3.06
317	-3.81
396	-4.69
0	-1.17

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	11	18	MN / m²
Modulus of subgrade reaction (k)	=	31745	30485	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	1.6		
Equivalent CBR % Value in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)	=	**3.9**	**3.6**	

Remarks:

Signed: D. Jordan for Testall Ltd **Date:** 17/05/2019

Authorised signatories : ☒ D. Jordan - Laboratory Manager ☐ G.McHugh - Quality Manager

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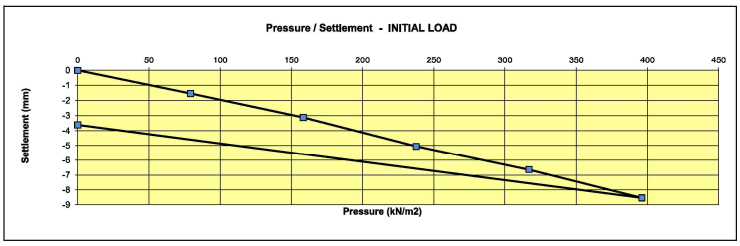
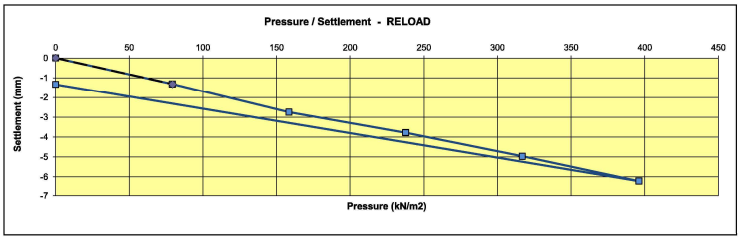
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9791**	**Site / Client Ref. No.**	PG/15/5/3 PLT 5
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 5
Date Tested / Operator	15/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	8.5



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.55
158	-3.13
238	-5.06
317	-6.64
396	-8.54
0	-3.63



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.32
158	-2.75
238	-3.78
317	-4.96
396	-6.21
0	-1.33

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	10	14	MN / m²
Modulus of subgrade reaction (k)	=	23394	27480	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=		1.4	
Equivalent CBR % Value in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)	=	**2.3**	**3.0**	

Remarks:

Signed: D. Jordan for Testall Ltd **Date:** 17/05/2019

Authorised signatories : D. Jordan - Laboratory Manager; G.McHugh - Quality Manager

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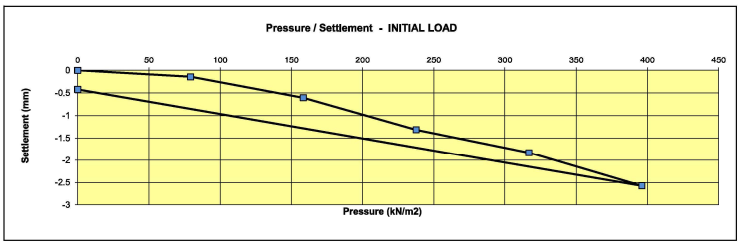
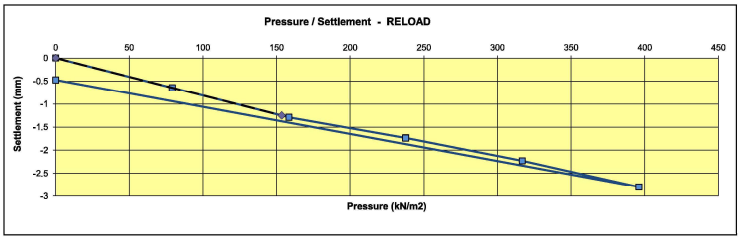
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9752**	**Site / Client Ref. No.**	PG/10/5/1 PLT 6
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 6
Date Tested / Operator	10/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	2.6



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.14
158	-0.61
238	-1.32
317	-1.83
396	-2.58
0	-0.42



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.65
158	-1.29
238	-1.73
317	-2.23
396	-2.80
0	-0.48

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	33	31	MN / m²
Modulus of subgrade reaction (k)	=	84136	56103	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=		0.9	
Equivalent CBR % Value in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)	=	**21**	**10**	

Remarks:

Signed: D. Jordan for Testall Ltd **Date:** 16/05/2019

Authorised signatories : D. Jordan - Laboratory Manager; G.McHugh - Quality Manager

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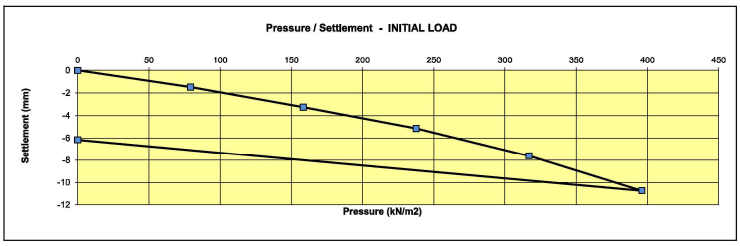
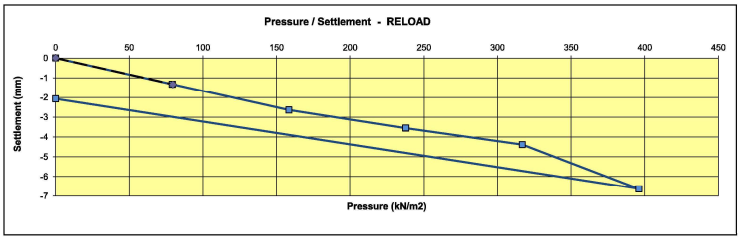
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9747**	**Site / Client Ref. No.**	PG/9/5/2 PLT 7
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 7
Date Tested / Operator	09/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	10.7



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.48
158	-3.26
238	-5.16
317	-7.60
396	-10.74
0	-6.16



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.32
158	-2.64
238	-3.55
317	-4.38
396	-6.63
0	-2.07

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	8	16	MN / m²
Modulus of subgrade reaction (k)	=	24425	27348	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=		2.0	
Equivalent CBR % Value in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)	=	**2.5**	**3.0**	

Remarks:

Signed: D. Jordan for Testall Ltd **Date:** 16/05/2019

Authorised signatories : D. Jordan - Laboratory Manager; G.McHugh - Quality Manager

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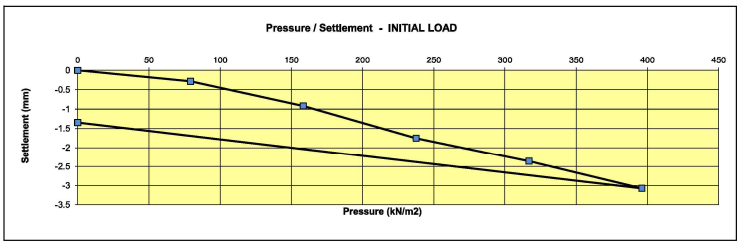
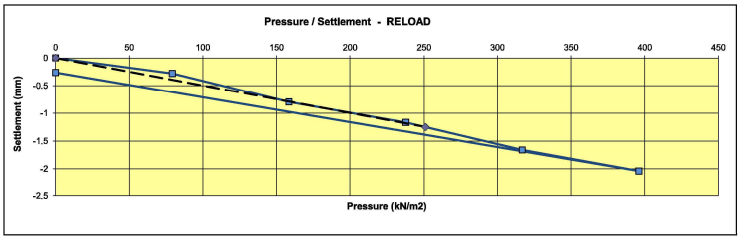
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9749**	**Site / Client Ref. No.**	PG/9/5/4 PLT 8
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 8
Date Tested / Operator	09/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	3.1



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.28
158	-0.92
238	-1.75
317	-2.36
396	-3.07
0	-1.35



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.28
158	-0.80
238	-1.17
317	-1.66
396	-2.04
0	-0.26

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	28	42	MN / m²
Modulus of subgrade reaction (k)	=	69438	91745	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=		1.5	
Equivalent CBR % Value in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)	=	**15**	**24**	

Remarks:

Signed: D. Jordan for Testall Ltd **Date:** 16/05/2019

Authorised signatories : ☒ D. Jordan - Laboratory Manager ☐ G.McHugh - Quality Manager

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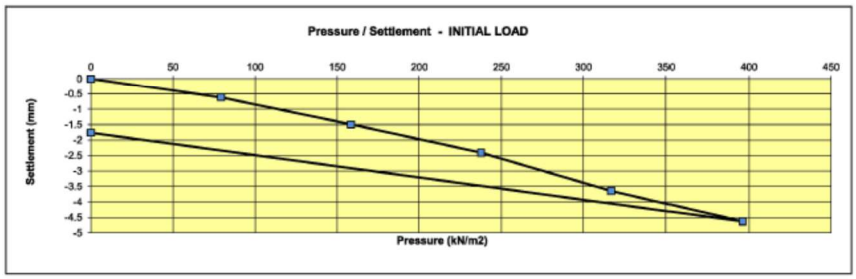
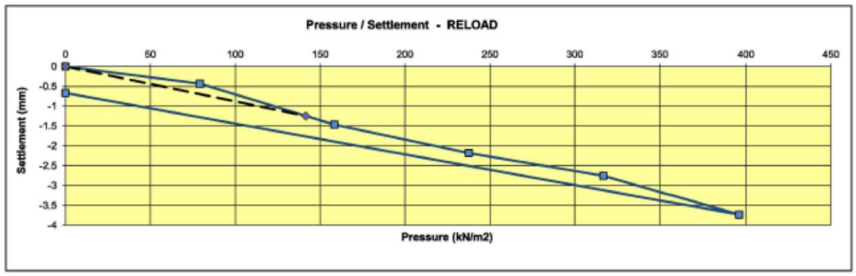
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9751**	**Site / Client Ref. No.**	PG/9/5/6 PLT 9
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 9
Date Tested / Operator	10/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	4.6



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.61
158	-1.49
238	-2.41
317	-3.65
396	-4.63
0	-1.76



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.44
158	-1.47
238	-2.18
317	-2.75
396	-3.73
0	-0.67

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	19	25	MN / m²
Modulus of subgrade reaction (k)	=	49928	51739	KN / m²/ m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	1.3		
Equivalent CBR % Value	=	**8.5**	**9.0**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan **Date:** 16/05/2019

for Testall Ltd **Authorised signatories :** D. Jordan - Laboratory Manager G.McHugh - Quality Manager

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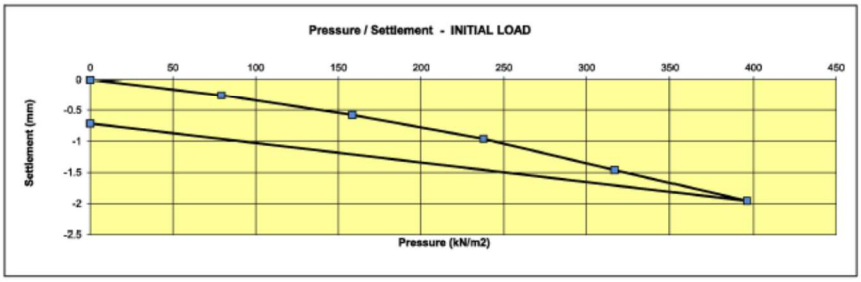
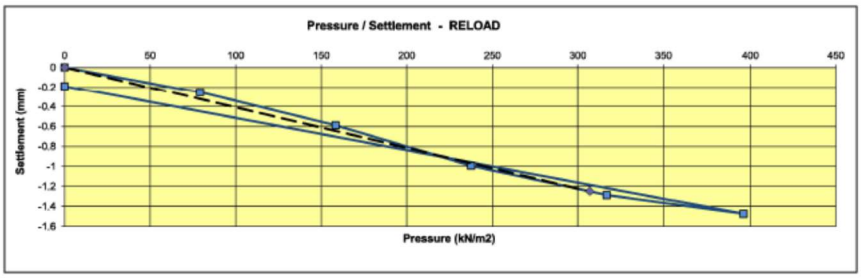
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9759**	**Site / Client Ref. No.**	PG/10/5/8 PLT 10
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 10
Date Tested / Operator	10/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	2.0



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.25
158	-0.58
238	-0.96
317	-1.46
396	-1.96
0	-0.71



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.25
158	-0.59
238	-0.99
317	-1.29
396	-1.47
0	-0.19

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	44	54	MN / m²
Modulus of subgrade reaction (k)	=	103535	112187	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=		1.2	
Equivalent CBR % Value	=	**30**	**34**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan **Date:** 16/05/2019

for Testall Ltd **Authorised signatories :** ☒ D. Jordan - Laboratory Manager ☐ G.McHugh - Quality Manager

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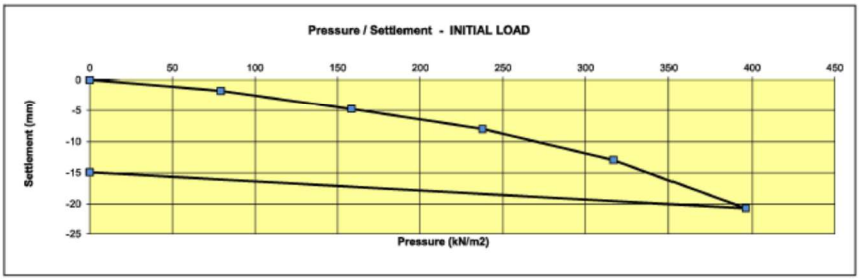
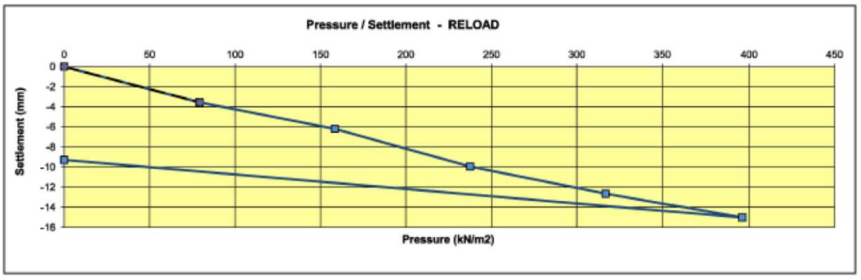
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

FRN Sample No.	**SA9760**	**Site / Client Ref. No.**	PG/10/5/9 PLT 11
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 11
Date Tested / Operator	10/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	20.7



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.76
158	-4.74
238	-7.97
317	-12.96
396	-20.69
0	-14.94



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-3.55
158	-6.19
238	-9.93
317	-12.64
396	-15.01
0	-9.28

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	4	5	MN / m²
Modulus of subgrade reaction (k)	=	20515	10217	KN / m³ / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	1.3		
Equivalent CBR % Value	=	**1.8**	**0.5**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan **Date:** 16/05/2019

for Testall Ltd **Authorised signatories :** D. Jordan - Laboratory Manager G.McHugh - Quality Manager

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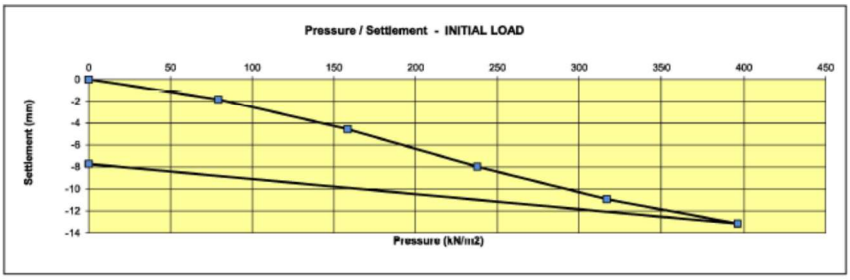
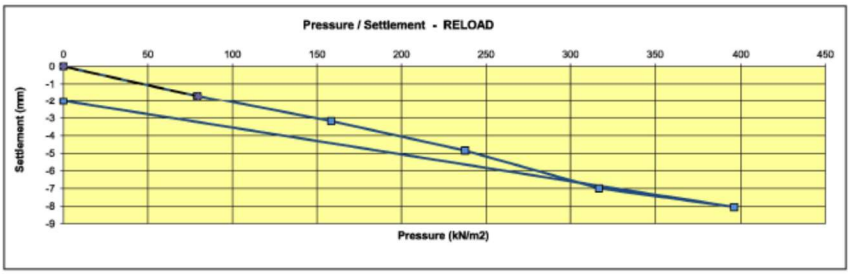
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9801**	**Site / Client Ref. No.**	PG/16/5/4 PLT 12
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 12
Date Tested / Operator	16/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	13.1



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.83
158	-4.58
238	-7.98
317	-10.93
396	-13.15
0	-7.73



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.69
158	-3.18
238	-4.85
317	-6.99
396	-8.06
0	-2.01

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	7	10	MN / m²
Modulus of subgrade reaction (k)	=	19740	21431	KN / m³ / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	1.5		
Equivalent CBR % Value in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)	=	**1.7**	**2.0**	

Remarks:

Signed: D. Jordan **Date:** 17/05/2019

for Testall Ltd **Authorised signatories :** D. Jordan - Laboratory Manager G.McHugh - Quality Manager

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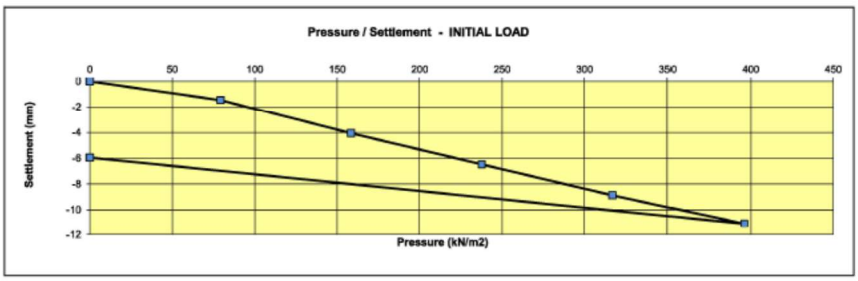
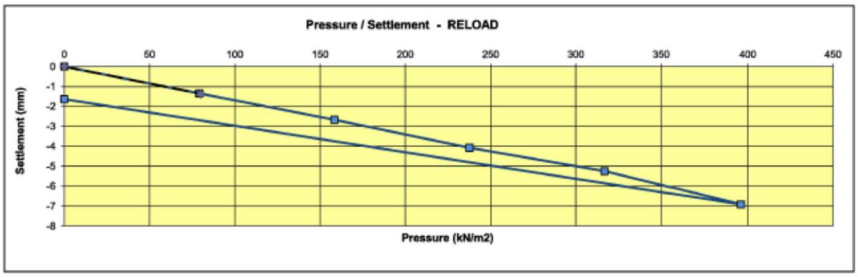
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9799**	**Site / Client Ref. No.**	PG/16/5/2 PLT 13
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 13
Date Tested / Operator	16/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	11.1



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.45
158	-4.07
238	-6.49
317	-8.89
396	-11.08
0	-5.95



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.36
158	-2.67
238	-4.07
317	-5.24
396	-6.92
0	-1.64

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	8	13	MN / m²
Modulus of subgrade reaction (k)	=	24882	26683	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	1.7		
Equivalent CBR % Value	=	**2.5**	**2.9**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan for Testall Ltd **Authorised signatories :** D. Jordan - Laboratory Manager; G.McHugh - Quality Manager **Date:** 17/05/2019

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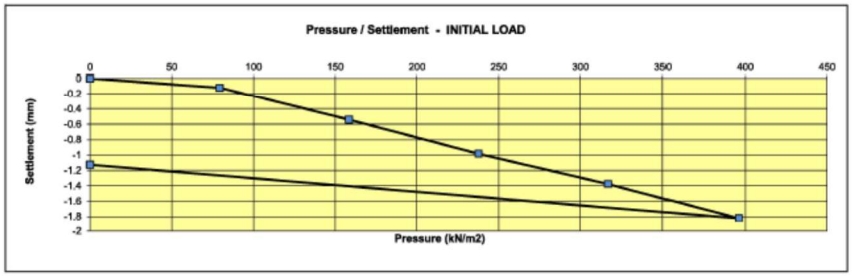
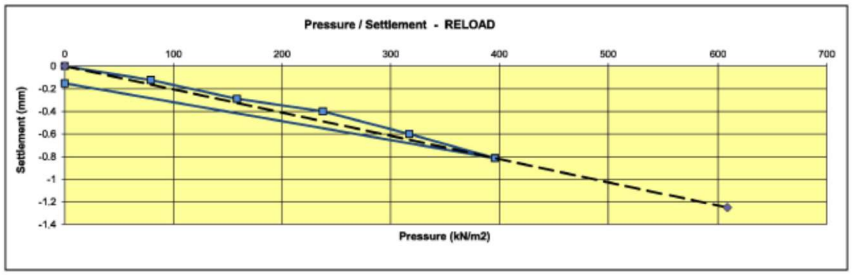
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9798**	**Site / Client Ref. No.**	PG/10/5/1 PLT 14
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 14
Date Tested / Operator	16/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	1.8



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.12
158	-0.54
238	-0.98
317	-1.38
396	-1.82
0	-1.13



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.12
158	-0.29
238	-0.40
317	-0.60
396	-0.81
0	-0.15

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	47	115	MN / m²
Modulus of subgrade reaction (k)	=	106483	222476	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	2.4		
Equivalent CBR % Value in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)	=	**31**	**113**	

Remarks:

Signed: D. Jordan **Date:** 17/05/2019

for Testall Ltd **Authorised signatories :** D. Jordan - Laboratory Manager G.McHugh - Quality Manager

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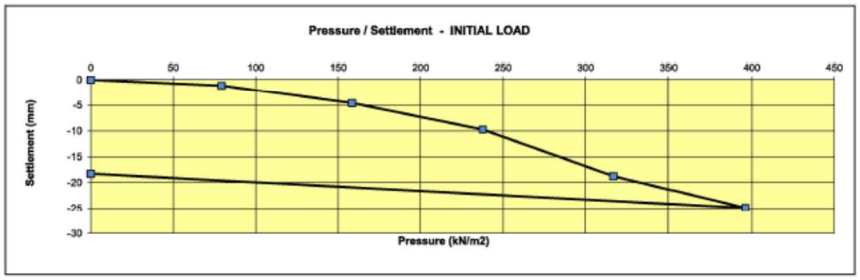
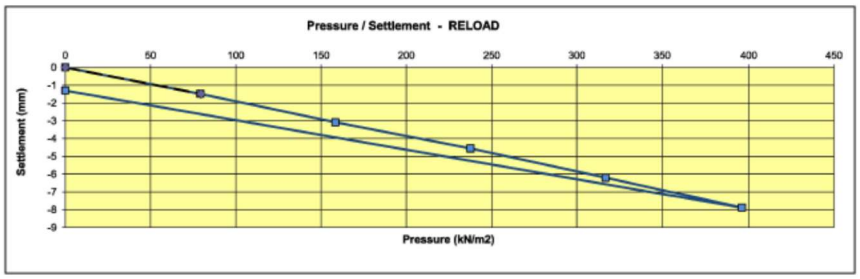
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9746**	**Site / Client Ref. No.**	PG/9/5/1 PLT 15
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 15
Date Tested / Operator	09/05/2019 PG	**Level**	OGL - 0.35m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	24.9



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.14
158	-4.60
238	-9.71
317	-18.75
396	-24.89
0	-18.29



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.48
158	-3.08
238	-4.56
317	-6.20
396	-7.88
0	-1.30

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	3	11	MN / m²
Modulus of subgrade reaction (k)	=	29899	24389	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	3.2		
Equivalent CBR % Value	=	**3.5**	**2.4**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan **Date:** 16/05/2019

for Testall Ltd **Authorised signatories :** D. Jordan - Laboratory Manager G.McHugh - Quality Manager

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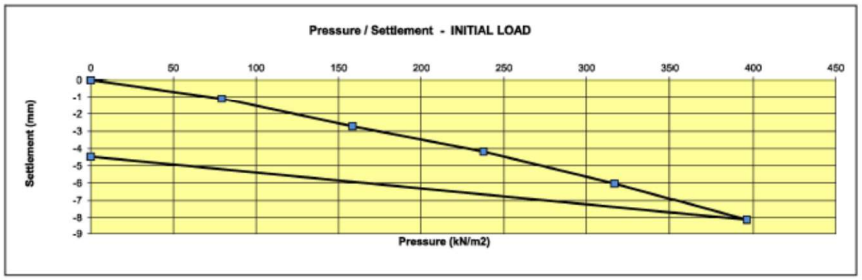
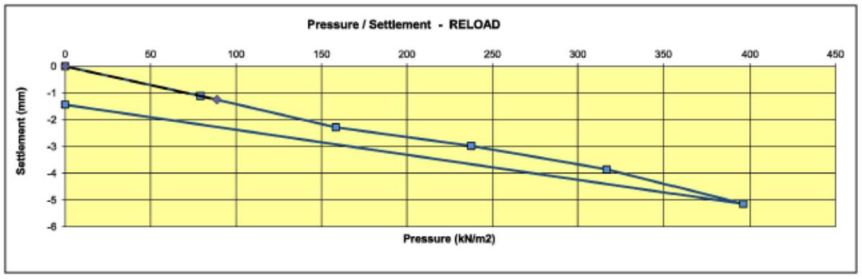
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

FRN Sample No.	**SA9748**	**Site / Client Ref. No.**	PG/9/5/3 PLT 16
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 16
Date Tested / Operator	09/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	8.1



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.09
158	-2.72
238	-4.18
317	-6.02
396	-8.11
0	-4.46



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.11
158	-2.28
238	-2.97
317	-3.85
396	-5.14
0	-1.43

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	11	18	MN / m²
Modulus of subgrade reaction (k)	=	31746	32488	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=		1.7	
Equivalent CBR % Value	=	**3.9**	**4.0**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan **Date:** 16/05/2019

for Testall Ltd **Authorised signatories :** D. Jordan - Laboratory Manager G.McHugh - Quality Manager

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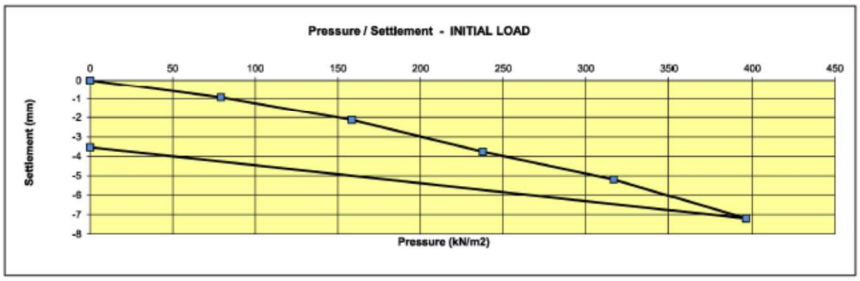
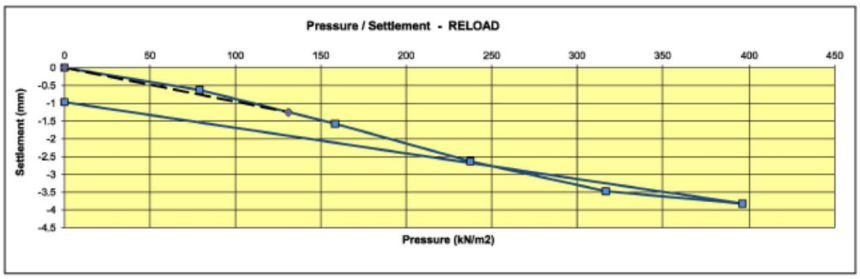
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9750 - Rev1**	**Site / Client Ref. No.**	PG/9/5/5 PLT 17
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 17
Date Tested / Operator	09/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	7.2



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.92
158	-2.13
238	-3.77
317	-5.19
396	-7.20
0	-3.55



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.63
158	-1.58
238	-2.63
317	-3.47
396	-3.82
0	-0.97

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	12	20	MN / m²
Modulus of subgrade reaction (k)	=	36789	47877	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	1.7		
Equivalent CBR % Value	=	**5.0**	**7.9**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan for Testall Ltd **Date:** 16/05/2019

Authorised signatories : D. Jordan - Laboratory Manager G.McHugh - Quality Manager

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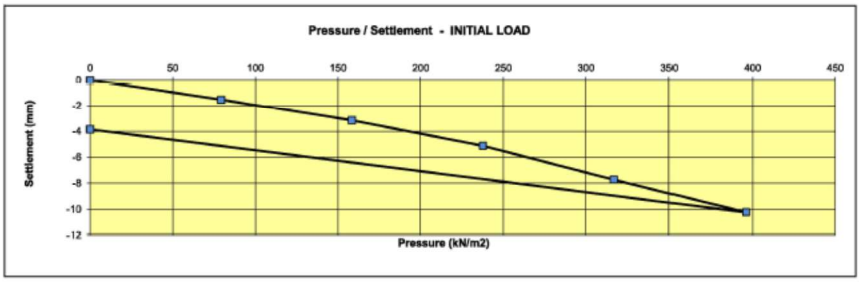
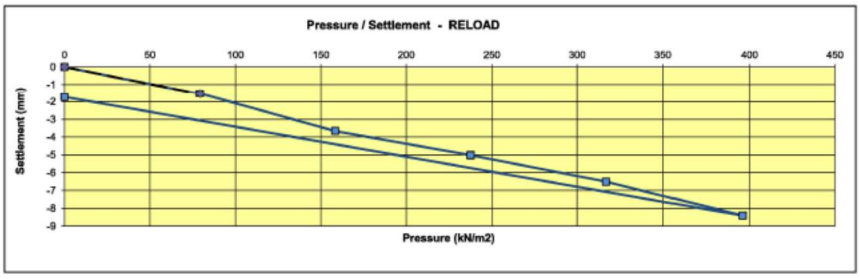
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9757**	**Site / Client Ref. No.**	PG/10/5/6 PLT 18
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 18
Date Tested / Operator	10/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	10.2



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.53
158	-3.16
238	-5.13
317	-7.72
396	-10.23
0	-3.85



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.53
158	-3.67
238	-5.01
317	-6.51
396	-8.40
0	-1.74

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	8	11	MN / m²
Modulus of subgrade reaction (k)	=	23692	23573	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	1.3		
Equivalent CBR % Value in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)	=	**2.3**	**2.3**	

Remarks:

Signed: D. Jordan **Date:** 16/05/2019

for Testall Ltd **Authorised signatories :** D. Jordan - Laboratory Manager G.McHugh - Quality Manager

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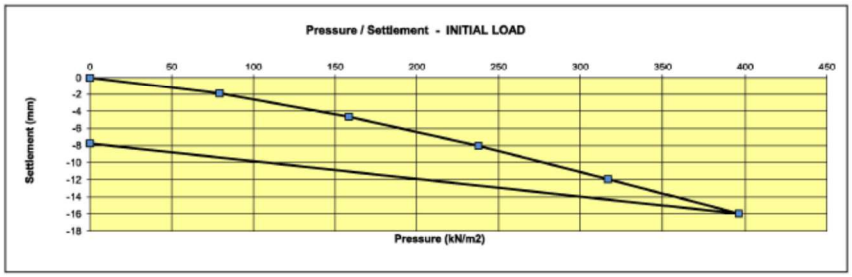
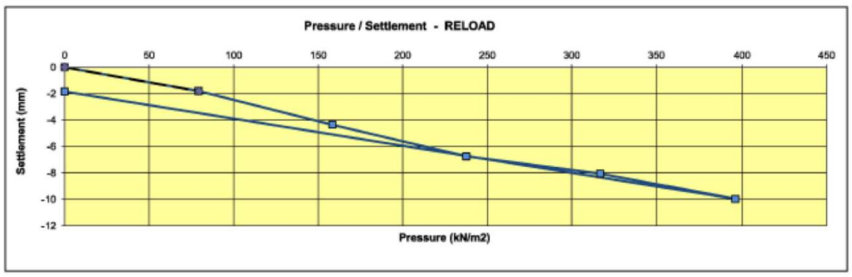
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9800**		**Site / Client Ref. No.**	PG/16/5/3	PLT 19
Supplier	Insitu		**Source**	Insitu	
Material Description	Subgrade		**Deposition**	Lissywollen, Athlone	
Chainage			**Offset**	PLT 19	
Date Tested / Operator	16/05/2019	PG	**Level**	OGL - 0.3m	
Plate Size (mm)	300		**Plate Correction factor**	0.46	(in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396		**Max Deformation (mm)**	15.9	



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.88
158	-4.63
238	-8.02
317	-11.93
396	-15.95
0	-7.75



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.80
158	-4.35
238	-6.74
317	-8.05
396	-9.96
0	-1.84

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	5	9	MN / m²
Modulus of subgrade reaction (k)	=	19241	20073	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	1.6		
Equivalent CBR % Value	=	**1.6**	**1.7**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan **Date:** 17/05/2019

for Testall Ltd **Authorised signatories :** ☒ D. Jordan - Laboratory Manager ☐ G.McHugh - Quality Manager

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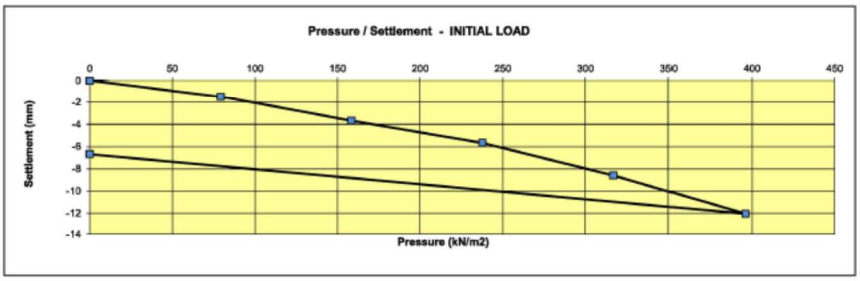
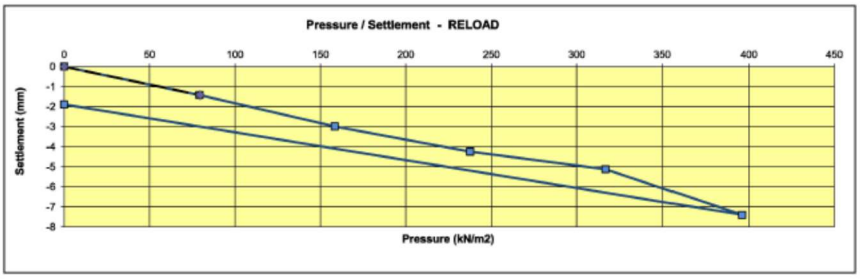
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

FRN Sample No,	**SA9755**	**Site / Client Ref, No,**	PG/10/5/4 PLT 20
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 20
Date Tested / Operator	10/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	12.1



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.48
158	-3.67
238	-5.67
317	-8.59
396	-12.05
0	-6.69



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.41
158	-2.99
238	-4.24
317	-5.11
396	-7.40
0	-1.89

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	7	13	MN / m²
Modulus of subgrade reaction (k)	=	24436	25593	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=		1.9	
Equivalent CBR % Value	=	**2.5**	**2.7**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan **Date:** 16/05/2019

for Testall Ltd **Authorised signatories :** D. Jordan - Laboratory Manager G.McHugh - Quality Manager

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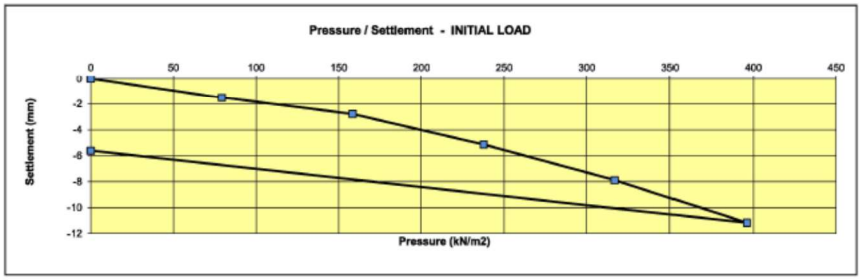
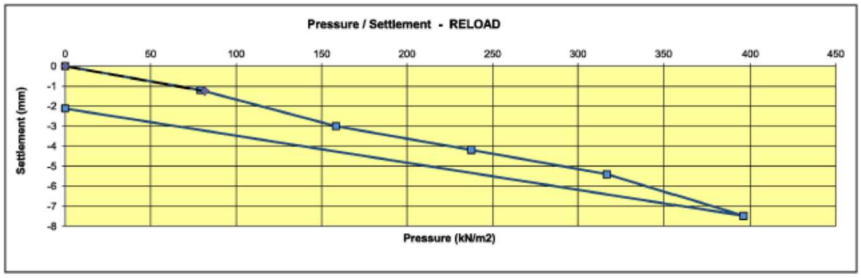
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9756 - Rev 1**	**Site / Client Ref. No.**	PG/10/5/5 PLT 21
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 21
Date Tested / Operator	10/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	11.2



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.50
158	-2.80
238	-5.16
317	-7.89
396	-11.18
0	-5.62



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.19
158	-3.00
238	-4.19
317	-5.40
396	-7.48
0	-2.11

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	8	13	MN / m²
Modulus of subgrade reaction (k)	=	24151	29858	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	1.7		
Equivalent CBR % Value	=	**2.4**	**3.5**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan **Date:** 16/05/2019

for Testall Ltd **Authorised signatories :** D. Jordan - Laboratory Manager G.McHugh - Quality Manager

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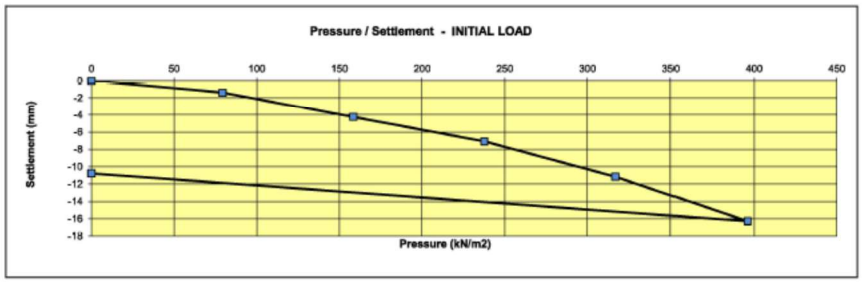
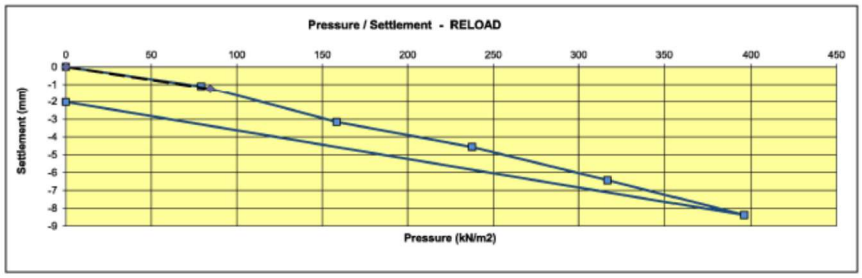
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9758**	**Site / Client Ref. No.**	PG/10/5/7 PLT 22
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 22
Date Tested / Operator	10/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	16.3



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.37
158	-4.25
238	-7.08
317	-11.17
396	-16.28
0	-10.78



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.11
158	-3.16
238	-4.57
317	-6.43
396	-8.38
0	-2.04

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	5	11	MN / m²
Modulus of subgrade reaction (k)	=	26285	30885	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	2.0		
Equivalent CBR % Value	=	**2.8**	**3.7**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan for Testall Ltd **Authorised signatories :** D. Jordan - Laboratory Manager G.McHugh - Quality Manager **Date:** 16/05/2019

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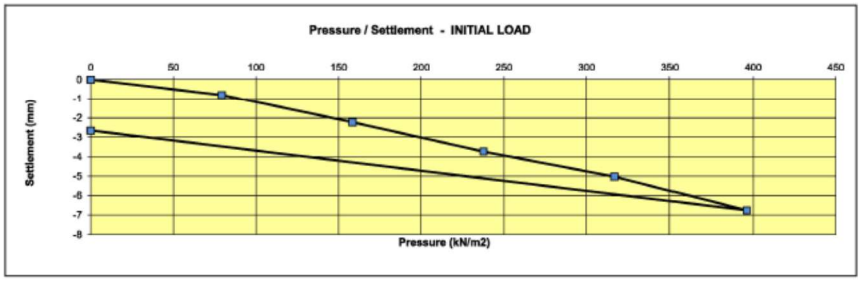
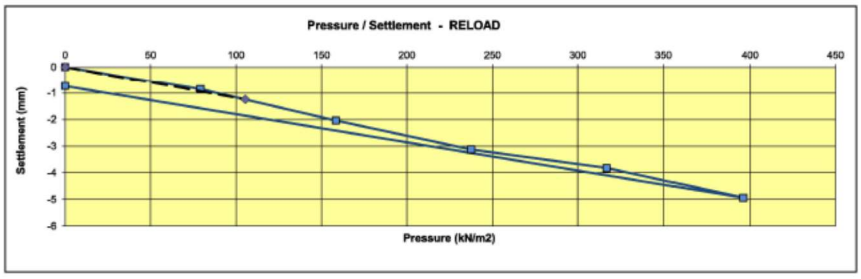
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9754**	**Site / Client Ref. No.**	PG/10/5/3 PLT 23
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 23
Date Tested / Operator	10/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 26 26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	6.8



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.80
158	-2.23
238	-3.74
317	-5.03
396	-6.76
0	-2.66



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.86
158	-2.04
238	-3.13
317	-3.82
396	-4.94
0	-0.74

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	13	18	MN / m²
Modulus of subgrade reaction (k)	=	38108	38548	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	1.4		
Equivalent CBR % Value	=	**5.3**	**5.4**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan **Date:** 16/05/2019

for Testall Ltd **Authorised signatories :** D. Jordan - Laboratory Manager G.McHugh - Quality Manager

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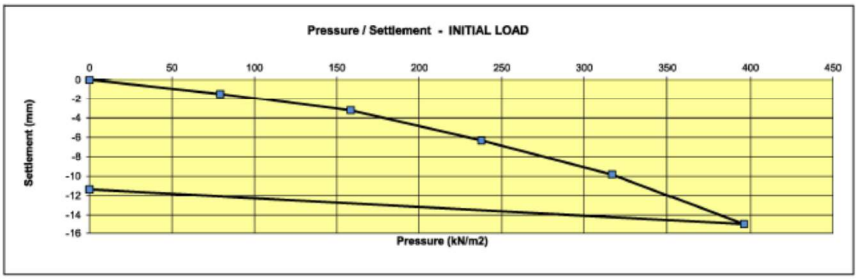
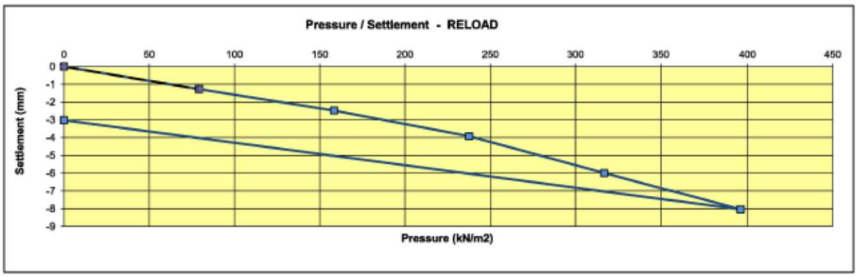
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

FRN Sample No.	**SA9753**	**Site / Client Ref. No.**	PG/10/5/2 PLT 24
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 24
Date Tested / Operator	10/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	14.9



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.46
158	-3.20
238	-6.34
317	-9.83
396	-14.93
0	-11.36



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.27
158	-2.47
238	-3.93
317	-5.99
396	-8.04
0	-3.03

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	6	12	MN / m²
Modulus of subgrade reaction (k)	=	24807	28508	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	2.0		
Equivalent CBR % Value in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)	=	**2.5**	**3.2**	

Remarks:

Signed: D. Jordan **Date:** 16/05/2019

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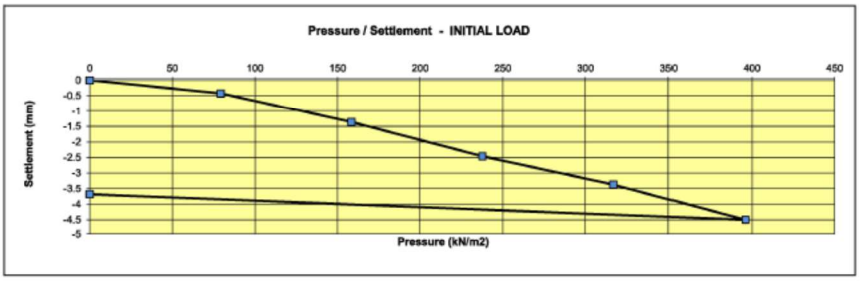
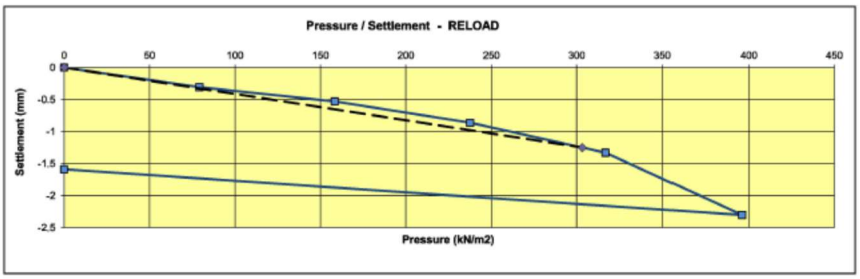
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9795**	**Site / Client Ref. No.**	PG/15/5/7 PLT 25
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 25
Date Tested / Operator	15/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	4.5



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.42
158	-1.36
238	-2.46
317	-3.38
396	-4.50
0	-3.68



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.31
158	-0.53
238	-0.86
317	-1.33
396	-2.30
0	-1.59

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	19	52	MN / m²
Modulus of subgrade reaction (k)	=	54594	110843	KN / m³ / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=		2.7	
Equivalent CBR % Value	=	**10**	**34**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan for Testall Ltd **Date:** 17/05/2019

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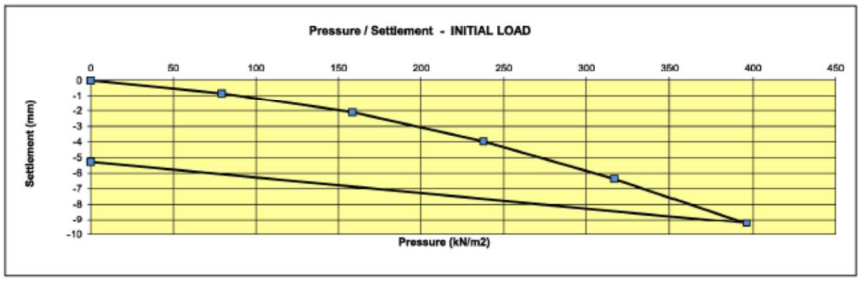
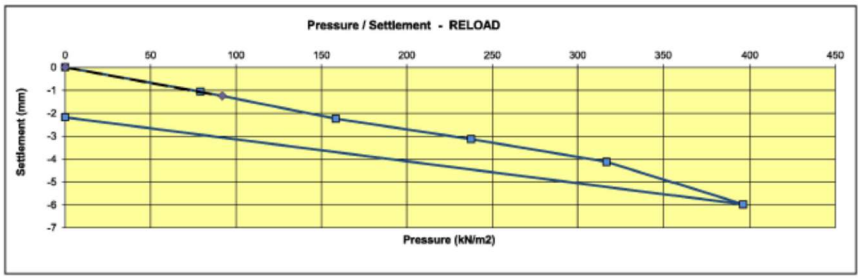
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	SA9790	**Site / Client Ref. No.**	PG/15/5/2 PLT 25A
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 25A
Date Tested / Operator	15/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25 26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	9.2



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.84
158	-2.10
238	-3.96
317	-6.37
396	-9.24
0	-5.28



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.06
158	-2.24
238	-3.14
317	-4.12
396	-5.98
0	-2.18

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	9	17	MN / m²
Modulus of subgrade reaction (k)	=	38397	33600	KN / m³ / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	1.8		
Equivalent CBR % Value	=	**5.4**	**4.3**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

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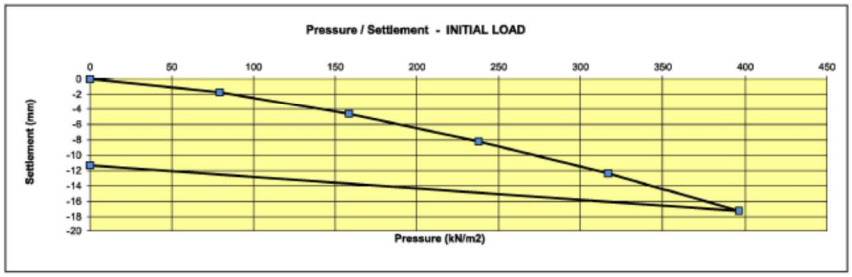
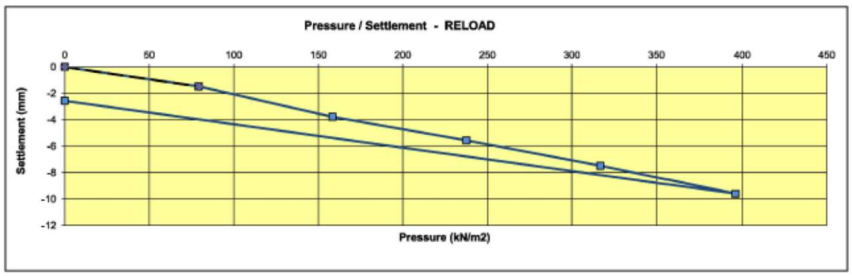
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

FRN Sample No.	**SA9794**	**Site / Client Ref. No.**	PG/15/5/6 PLT 26
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 26
Date Tested / Operator	15/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	17.2



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.73
158	-4.60
238	-8.23
317	-12.38
396	-17.23
0	-11.33



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-1.48
158	-3.78
238	-5.57
317	-7.48
396	-9.59
0	-2.56

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	5	9	MN / m²
Modulus of subgrade reaction (k)	=	20895	24429	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=		1.8	
Equivalent CBR % Value in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)	=	**1.9**	**2.5**	

Remarks:

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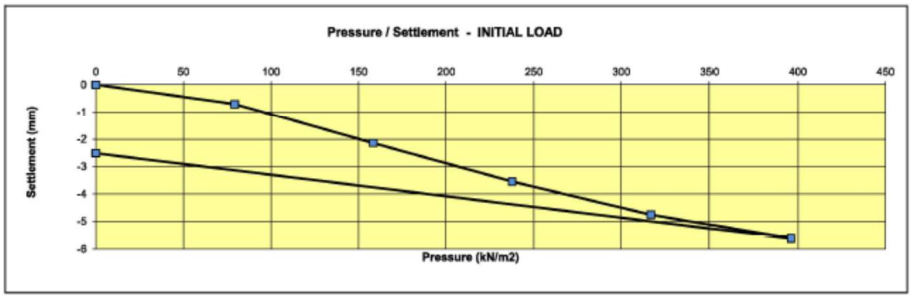
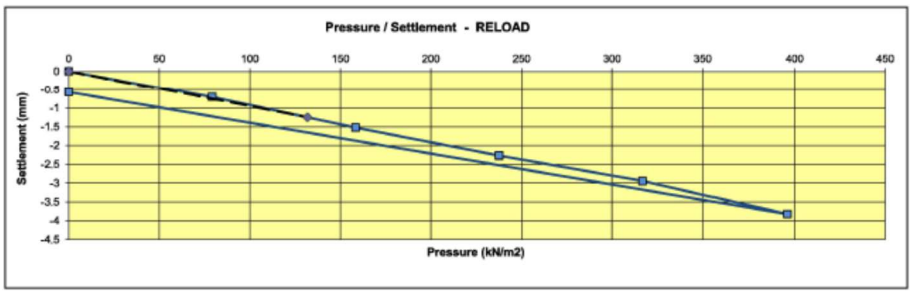
INSITU PLATE LOAD TEST REPORT - BS 1377 - 9 : 1990

Client : Ground Investigations Ireland Ltd (Roadbridge) **Contract :** Lissywollen, Athlone **Job No :** J00760

ERN Sample No.	**SA9793**	**Site / Client Ref. No.**	PG/15/5/5 PLT 27
Supplier	Insitu	**Source**	Insitu
Material Description	Subgrade	**Deposition**	Lissywollen, Athlone
Chainage		**Offset**	PLT 27
Date Tested / Operator	15/05/2019 PG	**Level**	OGL - 0.3m
Plate Size (mm)	300	**Plate Correction factor**	0.46 (in accordance with HD 25-26/10)
Max Applied Pressure (KN/m²)	396	**Max Deformation (mm)**	5.6



Initial Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.70
158	-2.15
238	-3.55
317	-4.76
396	-5.62
0	-2.52



Re-Load Cycle	
Applied Pressure (kN/m2)	Average settlement (mm)
0	0
79	-0.70
158	-1.53
238	-2.27
317	-2.94
396	-3.82
0	-0.57

		INITIAL LOAD	RELOAD	
Elastic Modulus (Ev_1 / Ev_2)	=	15	23	MN / m²
Modulus of subgrade reaction (k)	=	39917	48174	KN / m² / m
Compaction Elastic Modulus Ratio (Ev_2 / Ev_1)	=	1.5		
Equivalent CBR % Value	=	**5.7**	**8.0**	

in accordance with HD 25-26/10 in Volume 7 Section 2, Part 2A (Pavement Foundation and Design) of the of the TII DMRB (TII Publication No. DN-PAV-03021)

Remarks:

Signed: D. Jordan for Testall Ltd **Date:** 17/05/2019

Authorised signatories : D. Jordan - Laboratory Manager G.McHugh - Quality Manager

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7.0. Water

7.1 Introduction

This chapter of the EIAR comprises of an assessment of the likely impact of the proposed development on the surrounding hydrogeological environments (including flood risk, surface water drainage, foul drainage and water supply), as well as identifying proposed mitigation measures to minimize any impacts. This chapter was prepared by Shane Moynihan BEng(Hons) MSc DIC MEI of DBFL Consulting, Engineers.

The proposed site is bordered to the north by Brawny Road, Athlone Town Stadium to the west, a residential development to the south and agricultural lands to the east.

The proposed site is a Greenfield site and the development seeks to construct 576 no. residential units, childcare facilities, a community hub and all associated site and infrastructural works. It is located approximately 1km from Athlone town centre and has an area of 17.64ha.

The proposed development will also include the following associated engineering infrastructure:

- Provision of a site access point from Ballymahon roundabout via Brawny Road
- Construction of an east-west access route through the subject site from Ballymahon roundabout (on the R915) to the west of the proposed site to Garrycastle roundabout (on the R916) to the east.
- Provision of improved pedestrian and cyclist connectivity facilities to Old Rail Trail Greenway to the south.
- Facilitation of potential future pedestrian links through adjacent lands.
- Provision of internal site road network including associated footpaths & cycling infrastructure.
- Provision of surface water drainage, foul drainage and water supply infrastructure.
- Provision of public open spaces and associated public lighting, landscaping etc.

A more detailed description of the proposed development can be found in Chapter 3 of this EIAR.

7.2 Methodology

7.2.1 Source of Information

Assessment of the likely impact of the proposed development on the surrounding hydrogeological environments and flood risk included the following activities:

- Site inspection/walkover
- Review of existing topographic survey information.
- Preliminary ground investigation carried out by Ground Investigations Ireland Ltd. Report (GII, Project No. 8709-05-19, Issued 16th May 2019).
- Review of utility records obtained from Irish Water (IW).
- Review of information available on the Westmeath County Council Online Planning Applications Service.
- Review of information available on the Environmental Protection Agency (EPA) online mapping service.

- Review of Office of Public Works (OPW) National Flood Hazard Mapping and Catchment Flood Risk Assessment and Management Studies (CFRAM Studies).
- Review of information available on the Geological Survey Ireland (GSI) online mapping service.
- Draft Westmeath County Development Plan (2021 - 2027)
- Consultation with Westmeath County Council Water Services
- Consultation with Irish Water
- Submission of a Pre-Connection Enquiry Application to Irish Water
- Obtaining a Statement of Design Acceptance from Irish Water

As part of assessing the likely impact of the proposed development, surface water runoff, foul drainage and water usage calculations were carried out in accordance with the following guidelines:

- Greater Dublin Strategic Drainage Study (GDSDS)
- Method outlined in Irish Water's Pre-Connection Enquiry Application (water demand and foul drainage discharge)

7.3 Receiving Environment (Baseline Situation)

7.3.1 Hydrology

The primary hydrological feature in the vicinity of the site is the Shannon River (approx. 2km south-east of the site). The River Al is located approximately 1km to the south of the site. Refer to **Error! Reference source not found.**, **Error! Reference source not found.**, for the location of these features. A number of trial pits were excavated on site up to depths of 2.4m. No ground water was encountered within these pits.

A topographical survey of the site indicates that the western portion of the development slopes in a south westerly direction at an approximate gradient of 1 in 230. The eastern portion of the development slopes in a north easterly direction at an approximate gradient of 1 in 165.

Figure 7.1 – Site Boundary

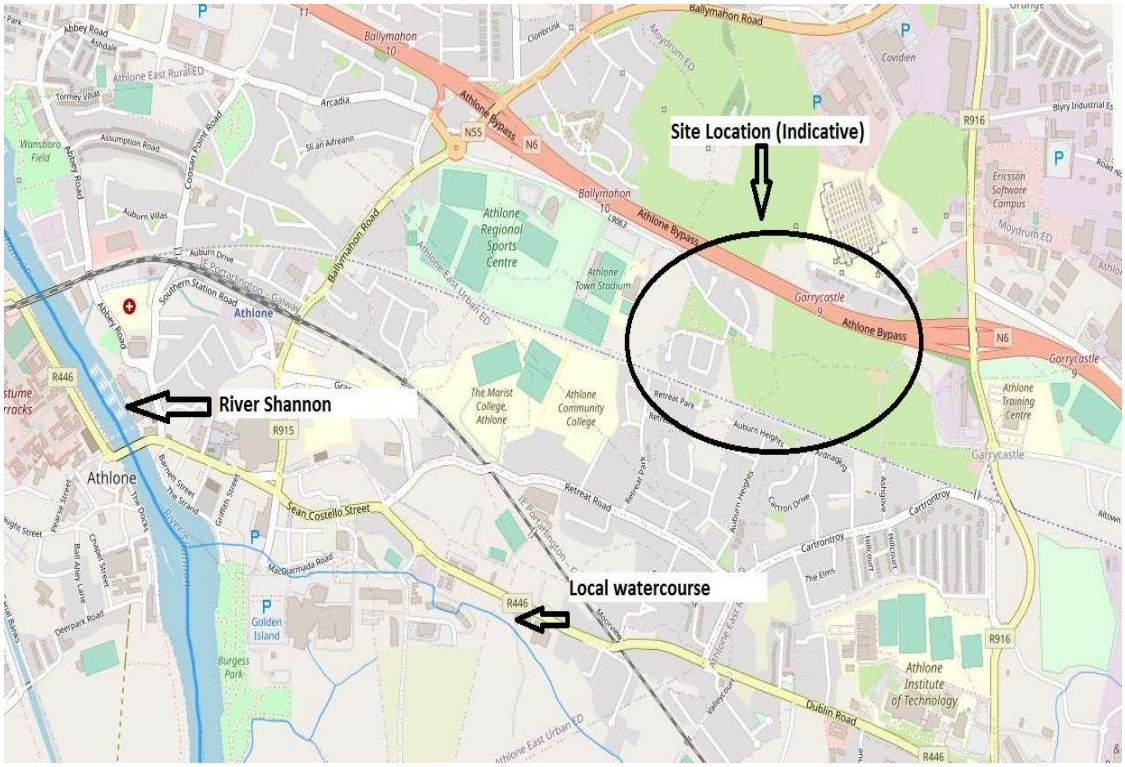


Figure7.2 – Extract from EPA Online Mapping Service

7.3.2 Hydrogeology & Geology

The Geological Survey Ireland (GSI) Online Data Services classifies the aquifer at the subject site as "Locally Important Aquifer – Bedrock which is Generally Moderately Productive in Local Zones". There is also a gravel aquifer overlaying the bedrock, which is classified as "Locally important gravel aquifer"

GSI classifies the site's groundwater vulnerability as high across the site.

Refer to Chapter 6 (Land, Soil & Geology) of this EIAR for further commentary regarding underlying geology.

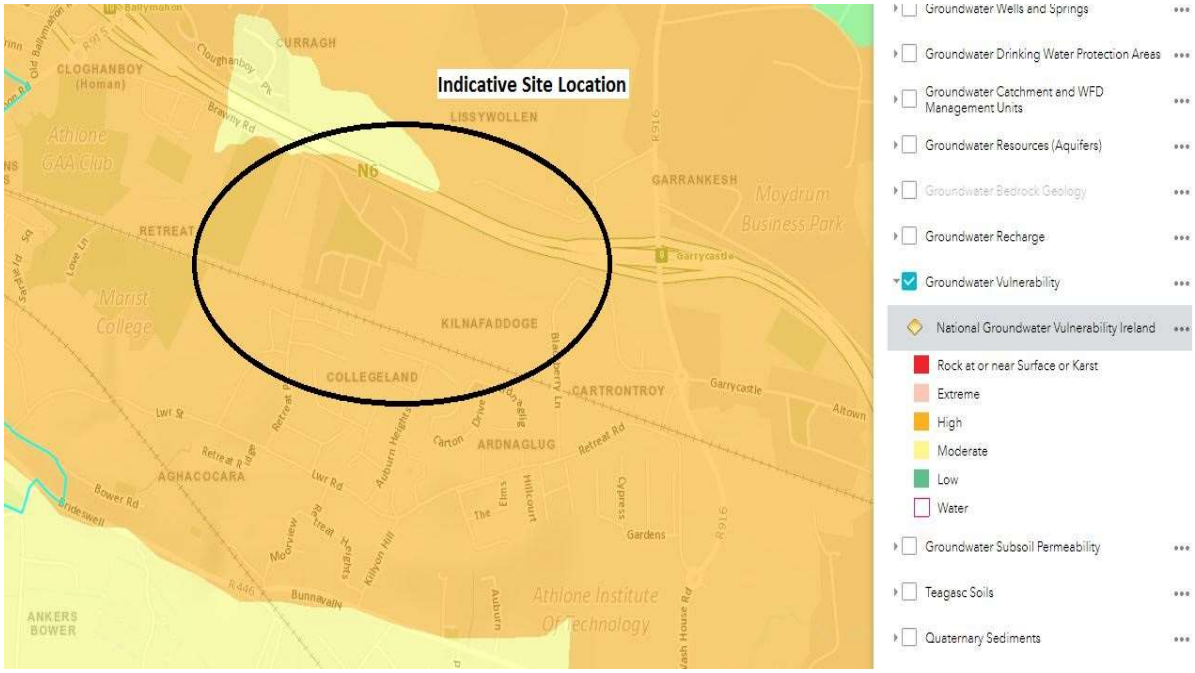


Figure 7.7 - Extract from GSI Online Mapping Service (Groundwater Vulnerability)

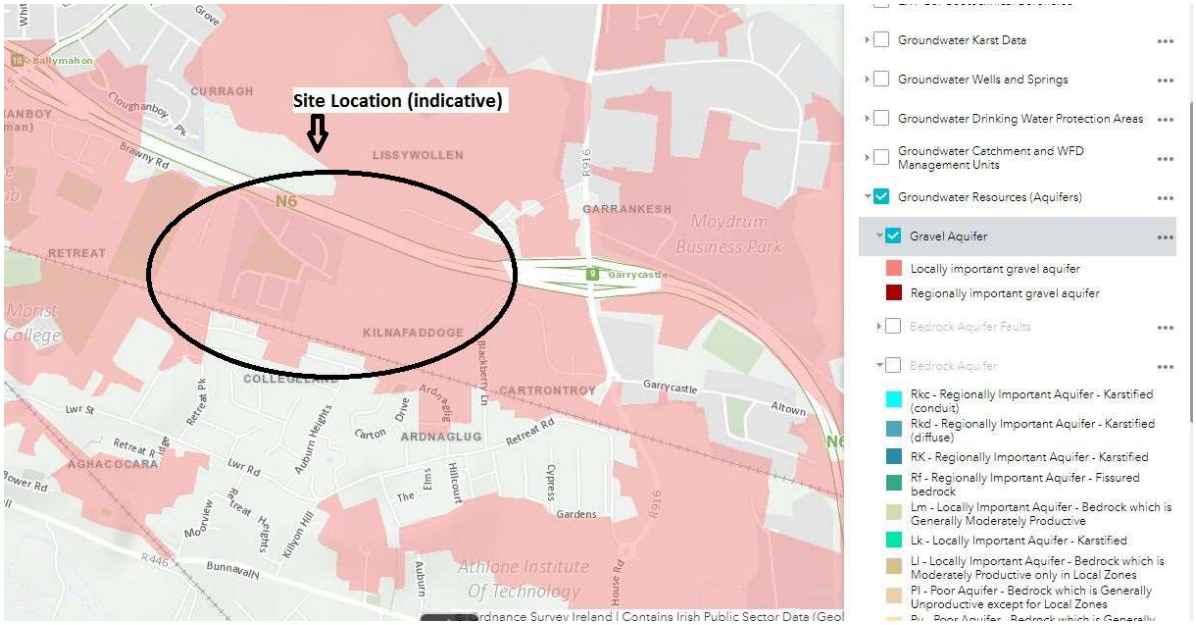


Figure 7.8 - Extract from GSI Online Mapping Service (Groundwater Aquifers - Gravel)

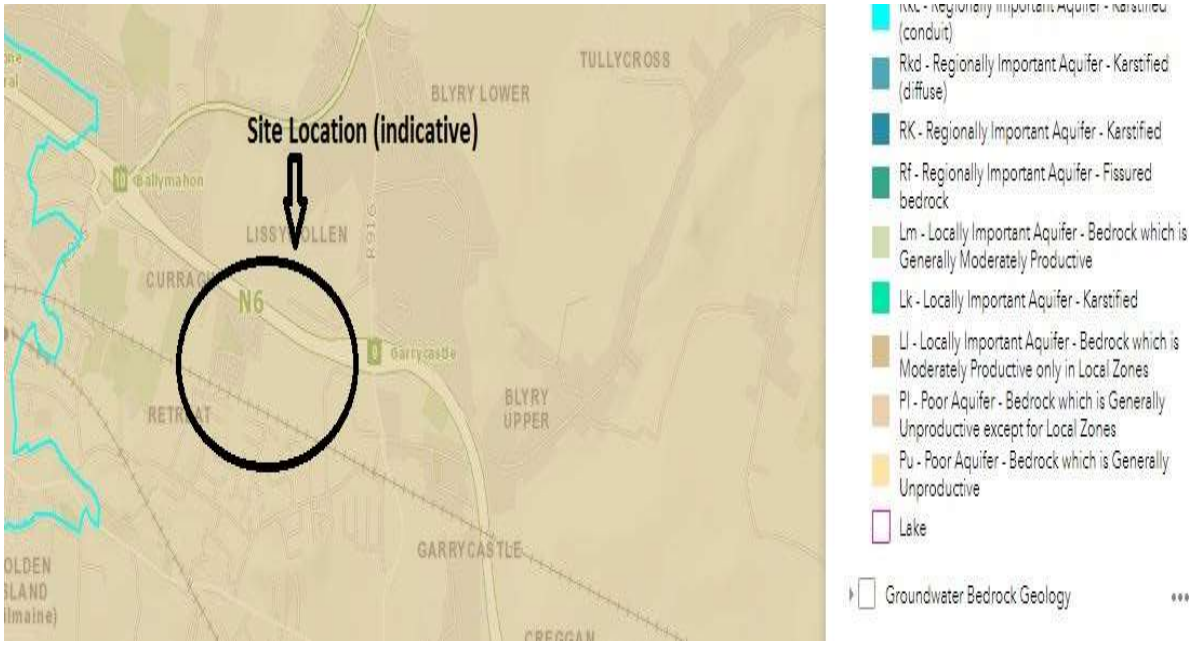


Figure 7.9 - Extract from GSI Online Mapping Service (Groundwater Aquifers - Bedrock)

7.3.3 Surface Water Quality

The site is a greenfield site and surface water currently discharges to ground. There is no surface water quality data available for the proposed development site.

7.3.4 Flood Risk

DBFL Consulting Engineers have undertaken a flood hazard assessment by reviewing information from the Office of Public Works (OPW) National Flood Hazard Mapping (www.floodinfo.ie), the Eastern CFRAM Study. This assessment has been carried out in accordance with the procedure for a "Stage 1 Flood Risk Identification" as outlined in the OPW's Guidelines for Planning Authorities – The Planning System and Flood Risk Management (November 2009).

A review of the data available on the subject site showed no sign of fluvial flood risk. Following the flood risk assessment stages it was determined that the site is within Flood Zone C as defined by the Guidelines, and therefore the residential development proposed is appropriate for the Site's flood zone category. The site is considered to have a low probability of flooding based on our review of OPW's Flood Hazard Mapping, the Eastern CFRAM Study.

In addition, the proposed drainage is designed to provide good protection against a possible pluvial flooding event up to the 100 year return period plus an allowance for climate change. Should extreme pluvial flooding occur that is in excess of the development's drainage capacity, overland flood routes have been designed to direct flood water away from the buildings in order to protect the development and residential units with lower floor levels.

Refer to DBFL's submitted Site Specific Flood Risk Assessment Report for further details.

OPW Flood Hazard Mapping

OPW's Summary Local Area Report summarises all flood events within 2.5 km of the site. Thirteen previous flood events were highlighted within 2.5 km of the site, eight of these events were recurring. None of these flood events were identified as having caused flooding within or in the immediate vicinity of the site.

Eastern CFRAM Study

As part of the EU Floods Directive, the OPW is undertaking a Catchment Flood Risk Assessment and Management (CFRAM) Study. Extracts from the Shannon CFRAM Study showing Fluvial Flood Extent are included in Appendix 8-A (Flood Hazard Information). No fluvial flooding is indicated in the vicinity of the site.

The maps are produced based on a series of nodes, which detail the modelled water level at that point. The closest modelled node to the site is located approximately 900m south of the site (Node: 01GOL01220u).

The location of this node is shown on CFRAM Drawing S2526ATN_EXFCD_F1_15

- Node: 01GOL01220u, 10% AEP + 36.36m
- Node: 01GOL01220u, 1% AEP + 36.47m
- Node: 01GOL01220u, 0.1% AEP + 36.51m
- Lowest Existing Ground Level + 42.445m (approx.)

It can be seen that the existing ground level within the site is approximately 6m above the modelled flood water levels.

The CFRAM study provided further assessment of areas identified in the Preliminary Flood Risk Assessment, undertaken in 2011, for further investigation and confirmed that the subject site is in Flood Zone C and is not affected by fluvial flooding.

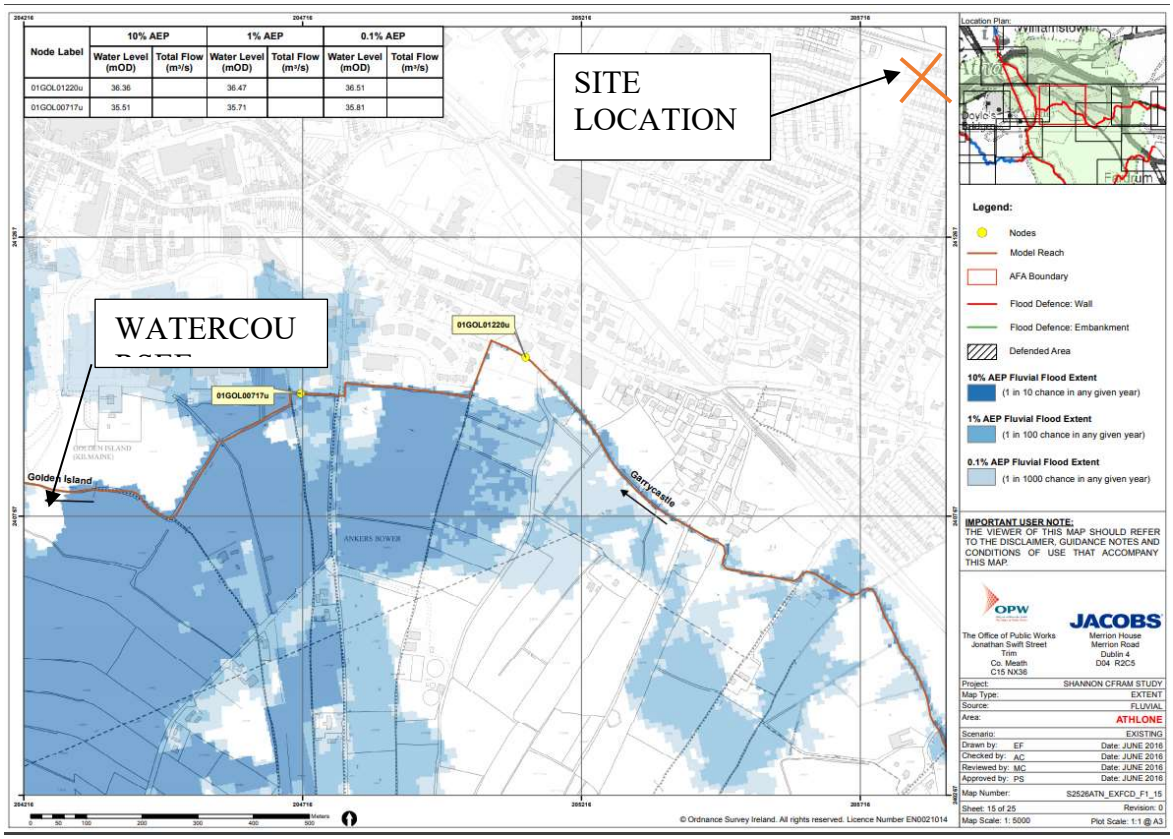


Figure 7.10 - Extract from ECFRAMS Mapping

Draft Westmeath County Development Plan (2021 - 2027)

The Draft County Development Plan was subject to a Strategic Flood Risk Assessment (SFRA), however, both Athlone and Mullingar were excluded from the SFRA of the Draft Plan as these settlements will be subject to separate Urban Area and Local Area Plans and therefore are not considered in the Draft Plan.

Refer to DBFL's submitted Site Specific Flood Risk Assessment Report for further details.

7.3.5 Surface Water Drainage

There is an existing 1350mm diameter surface water sewer traversing the proposed site, flowing from east to west. Sections of this existing sewer will be diverted to enable the development of the site. This sewer will provide a suitable surface water discharge point for the proposed development.

2 no. existing 750mm diameter surface water sewers enter the site from the north and discharge to the existing 1350mm sewer.

Historical 25" map (1888-1913) indicates the presence of a drainage ditch traversing the site and parts of this ditch appear to exist today. It is considered likely that this ditch only drained lands within the boundary of the proposed development. Regardless, it has partly been built over by residential development. Therefore, it is considered likely that much of this ditch has been made redundant by the aforementioned 1350mm surface water sewer.

7.3.6 Foul Drainage

An existing 525mm diameter foul sewer runs from east to west through the site, which outfalls towards the Old Rail Trail Greenway. This existing sewer is expected to provide a suitable foul discharge point for the development.

Athlone Wastewater Treatment Plant is located approximately 1,400m south west of the proposed development. It is considered likely that the existing 525mm diameter foul sewer ultimately discharges to this plant. It is also noted that there are two separate Irish Water projects to improve foul drainage infrastructure in Athlone increase capacity at the Athlone wastewater treatment plant.

Irish Water records indicate that there may be existing foul infrastructure located within the western portion of the site for a previous planned development – since abandoned. However, there are no records available from the Council regarding these. Further investigatory work is to be undertaken to determine the presence of this infrastructure and divert any live sewers if required.

The western catchment generally slopes south west towards the proposed outfall point while the eastern catchment generally falls in a north easterly direction. It is therefore proposed localised raising of the existing ground levels may be required in some locations in order to achieve a gravity discharge solution and provide sufficient cover over proposed foul sewers. The location of the existing 525mm diameter foul sewer is shown on Irish Water Network Plans (Figure 7.11 & 7.8, below & over, and Appendix 7-A).

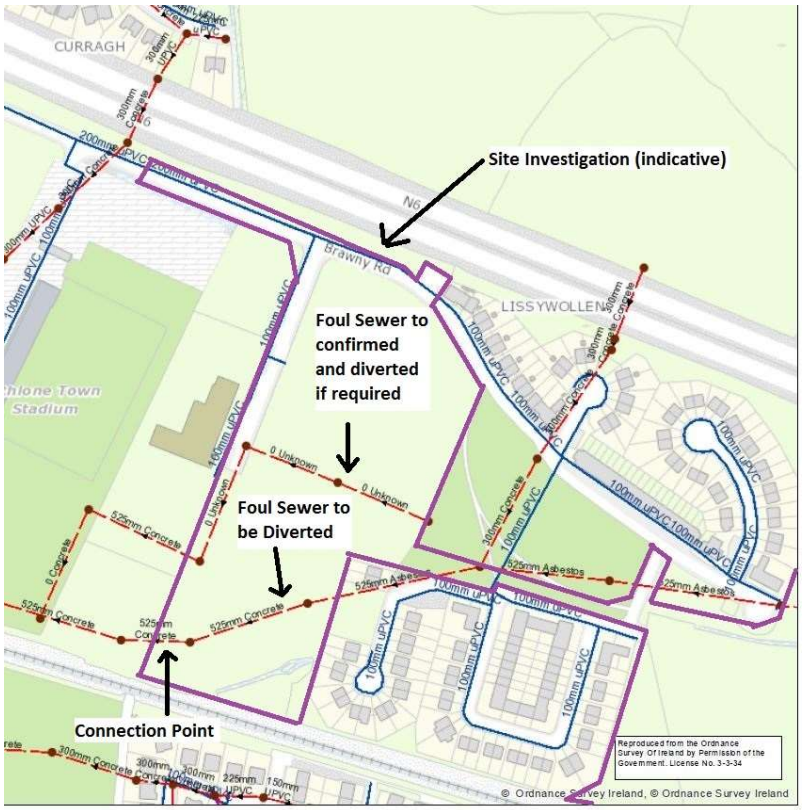


Figure 7.11 – Western Catchment Foul Network

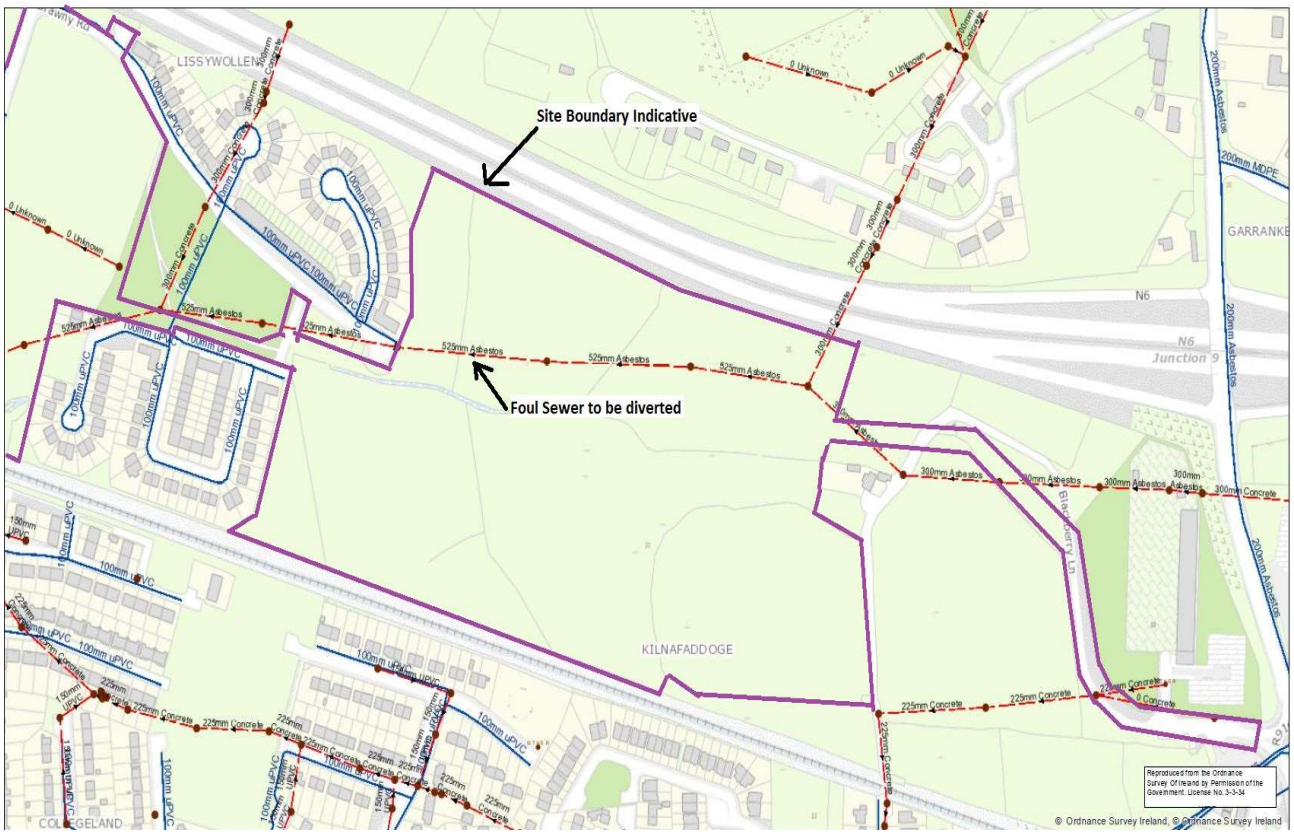


Figure 7.12 – Eastern Catchment Foul Network

Pre-connection enquiry feedback received from Irish Water states that the existing drainage network can accommodate the proposed development without upgrade. Irish Water issued a Statement of Design Acceptance for the proposed development under their Ref. CDS20004573 on 25th November 2020, stating they had no objection to the proposals submitted to them.

7.3.7 Water Supply

The locations of the existing public water mains are shown on Irish Water's Service Plan - refer to Appendix 7-A and Figure 7.11 & 8 above (watermains are indicated in blue). As can be noted above, an existing 200mm watermain is located to the west of the site in Brawney Road, which branches off into 2no. 100mm mains, and a 200mm watermain is located to the east of the site in the regional road R916.

Pre-connection enquiry feedback received from Irish Water states that the existing watermain network can accommodate the proposed development without upgrade. Irish Water issued a Statement of Design Acceptance for the proposed development under their Ref. CDS20004573 on 25th November 2020, stating they had no objection to the proposals submitted to them.

7.4 Characteristics of the Proposed Development

7.4.1 Hydrology & Geology

The primary hydrological feature in the vicinity of the site is the Shannon River (approx. 2km south-east of the site). There is also a small watercourse, River Al, located approximately 1km to the south of the site.

No groundwater was encountered in trial pits undertaken during preliminary site investigation works. Further investigatory work, including soakaway testing and further trial pits/boreholes, will be undertaken to ascertain the feasibility of discharging surface water runoff to ground via infiltration and determining the depth of any groundwater.

On the assumption of infiltration not being feasible surface water flows from the proposed development are to be attenuated to greenfield runoff rates in conjunction with implementation of SUDS strategies such as permeable paving, detention basins and installation of a Class 1 by-pass fuel / oil separator prior to discharging to the public surface water network. Refer to DBFL's Engineering Services Report (180176-DBFL-XX-XX-RP-C-0002) for full details of the proposed drainage and SUDS methodologies employed in the proposed surface water design.

Based on the above, it is not currently envisaged that the proposed development works will have any direct impact on the existing underlying hydrogeology and geology.

7.4.2 Flood Risk

The Site-Specific Flood Risk Assessment for proposed development was undertaken in accordance with the requirements of "The Planning System and Flood Risk Management, Guidelines for Planning Authorities" and its Technical Appendices.

Following the Flood Risk Assessment, it was determined that the site is located in Flood Zone C as defined by the Guidelines. It concluded that the:

- Proposed residential development is appropriate for the site's flood zone category.
- The sequential approach outlined in the Guidelines has been adhered to and that the 'Avoid' principal has been achieved.

Ground levels within the proposed site boundary are proposed to be locally raised in order to achieve a gravity discharge solution and provide sufficient cover over sewers. However, this will not result in an increased risk in flooding on neighbouring sites.

The proposed development is considered to have the required level of flood protection up to and including the 1% AEP flood event. Overland flow paths have been identified for pluvial flooding exceeding the capacity of the surface water drainage network. Refer to DBFL's Site Specific Flood Risk Assessment (180176-DBFL-XX-XX-RP-C-0001) for full details.

7.4.3 Surface Water Drainage

The proposed surface water discharge point is to the existing 1350mm sewer noted above. The site has been split into two separate catchments, which will be served by its own surface water drainage network, both discharging to the existing 1350mm trunk sewer. As mentioned above, this existing sewer traverses the site from east to west, which ultimately discharges to the south-west corner of the western catchment. Diversion of this existing sewer will be required in order to accommodate the proposed site layout. The existing 750mm diameter surface water sewers will continue to discharge to the diverted 1350mm sewer, however, the easternmost of these sewers will need to be diverted as part of the proposed development works.

Surface water runoff from the site's road network will be directed to a proposed surface water pipe network via road gullies while surface water from roofs will be routed to the proposed surface water pipe network via the porous aggregates beneath permeable paved driveways (providing an additional element of attenuation).

Surface water will pass through silt trap manholes prior to entering the attenuation system. Discharge rates from the proposed surface water drainage network will be controlled by a vortex flow control device (Hydrobrake or equivalent), associated underground attenuation tanks (Pluvial Cube or equivalent) and detention basins. Surface water discharge will also pass via a by-pass fuel / oil separator (sized in accordance with permitted discharge from the site).

Surface water calculations are based on an allowable greenfield runoff rate of 78.5l/s (20.7l/s western catchment, 57.8l/s eastern catchment) in accordance with the Greater Dublin Strategic Drainage Strategy (GDSDS). This results in a total attenuation volume for the 2 no. Surface Water Drainage Catchments of approx. 2,770m³ (810m³ western catchment, 1960m³ eastern catchment).

The surface water drainage network, attenuation storage and site levels are designed to accommodate a 100-year storm event (provision for climate change included). Floor levels of the residential units are set above the 100-year flood levels by a minimum of 0.5m. For storms in excess of a 100 year event, the development has been designed to provide overland flood routes towards the surface water drainage outfall and landscaping features. These overland flood routes also reduce the development's vulnerability to climate change.

The Proposed surface water drainage network has been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS), the Department of the Environment's Recommendations for Site Development Works for Housing Areas, the Department of the Environment's Building Regulations "Technical Guidance Document Part H Drainage and Waste Water Disposal" and BS EN 752: 2008 Drain and Sewer Systems Outside Buildings.

7.4.4 Foul Drainage

The proposed foul discharge point is to the existing 525mm diameter sewer located at the south-west corner of the western catchment. As mentioned above, an existing 525mm sewer traversing the site from east to west ultimately discharges to this point. Diversion of this existing sewer will be required in order to accommodate the proposed site layout. Raising of ground levels may also be required in localised areas, particularly in the eastern catchment, in order to enable gravity connections with acceptable levels of cover to the proposed foul drainage network.

The proposed foul drainage network will comprise of a series of main sewers 150mm/225mm diameter in size, which will serve the majority of the residential units. These will then discharge to the diverted 525mm trunk sewer. Some residential units will discharge directly to the diverted trunk sewer due to proximity. Each residential unit will be serviced by individual 100mm diameter connections in accordance with Irish Water Code of Practice.

The foul drainage network for the proposed development has been designed in accordance with the following guidance:

- Irish Water Code of Practice for Wastewater Infrastructure & Standard Details for Wastewater Infrastructure;
- Department of the Environment's Recommendations for Site Development Works for Housing Areas;
- Department of the Environment's Building Regulations "Technical Guidance Document Part H Drainage and Waste Water Disposal";
- BS EN 752: 2008 Drain and Sewer Systems Outside Buildings;
- IS EN 12056: Part 2 (2000) Gravity Drainage Systems Inside Buildings

A peak flow rate of 24.7l/s has been calculated using the EN752 method, which equates to a daily foul discharge volume of 2134m³

A BOD (Biochemical Oxygen Demand) loading (based on 60g per person per day) of 93,312g has been calculated for the proposed development as outlined in the EPA Waste Water Treatment Manual.

Pre-connection enquiry feedback received from Irish Water states that the existing drainage network can accommodate the proposed development without upgrade. Irish Water issued a Statement of Design Acceptance for the proposed development under their Ref. CDS20004573 on 25th November 2020, stating they had no objection to the proposals submitted to them.

7.4.5 Water Supply

It is proposed to form a 200mm diameter connection off the existing 200mm watermain located in the R916 and another off the 200mm watermain Brawny Road. A 200mm spine watermain will be provided along the development's arterial roads with a number of 100mm/150mm looped branch mains off this spine to service the wider development.

Individual houses will have their own 25mm connections to distribution water mains via service connections and meter / boundary boxes.

All connections, valves, hydrants, meters etc. have been design and are to be installed in accordance with Irish Water's Code of Practice / Standard Details and the Department of the Environment's Building Regulations "Technical Guidance Document Part B Fire Safety".

An average daily domestic demand of approx. 248.5m³ has been calculated as outlined in Irish Water's Pre-Connection Enquiry Application Form.

Pre-connection enquiry feedback received from Irish Water states that the existing watermain network can accommodate the proposed development without upgrade. Irish Water issued a Statement of Design Acceptance for the proposed development under their Ref. CDS20004573 on 25th November 2020, stating they had no objection to the proposals submitted to them.

7.5 Potential Impacts of the Proposed Development

7.5.1 Construction Phase

Potential impacts that may arise during the construction phase are noted below:

- Surface water runoff during the construction phase may contain increased silt levels (e.g. runoff across areas stripped of hardstanding) or become polluted by construction activities.
- Discharge of rainwater pumped from excavations may also contain increased silt levels (potential impact on existing hydrology e.g. discharge to existing open drain).
- Accidental spills and leaks associated with storage of oils and fuels, leaks from construction machinery and spillage during refuelling and maintenance contaminating the surrounding surface water and hydrogeological environments.
- Concrete runoff, particularly discharge of wash water from concrete trucks (potential impact on existing hydrology e.g. infiltration to ground).
- Discharge of vehicle wheel wash water (potential impact on existing hydrology e.g. discharge to existing surface water drainage infrastructure).
- Improper discharge of foul drainage from contractor's compound (impact on existing hydrology e.g. cross-contamination of existing surface water drainage.).
- Cross contamination of potable water supply to construction compound.

7.5.2 Operational Phase

Potential operational phase impacts are noted below:

- Accidental hydrocarbon leaks and subsequent discharge into piped surface water drainage network (e.g. along roads and in driveway areas).
- Increased impermeable surface area will reduce local ground water recharge and potentially increase surface water runoff (if not attenuated to greenfield runoff rate).
- Increased discharge to foul drainage network (Daily Foul Discharge Volume = approx. 2134m³)
- Increased potable water consumption (Average Daily Domestic Demand = approx. 248.5m³)

Implementation of the mitigation measures described under section 7.6.2 will prevent and minimize the potential impacts of this interaction.

7.5.3 'Do Nothing' Scenario

There are no predicted impacts should the proposed development not proceed.

7.6 Mitigation Measures

7.6.1 Construction Phase

The following measures are proposed during the construction phase to mitigate against risks to the surrounding hydrological environment.

- A site-specific Construction Management Plan will be developed and implemented during the construction phase. Site inductions will include reference to the procedures and best practice as outlined in the Construction Management Plan.
- Rain water pumped from excavations is to be directed to on-site settlement ponds.
- Surface water runoff from areas stripped of hardstanding and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- Weather conditions and seasonal weather variations will also be taken account of when planning stripping the site and excavations, with an objective of minimizing soil erosion.
- In order to mitigate against spillages contaminating the surrounding surface water and hydrogeological environments, all oils, fuels, paints and other chemicals shall be stored in a secure bunded hardstand area. Refuelling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any surface water inlets (where not possible to carry out such activities off site).
- Concrete batching will take place off site and wash out of concrete trucks will take place off site (at authorized concrete batching plant in full compliance with relevant planning and environmental consents).
- Discharge from any vehicle wheel wash areas is to be directed to on-site settlement ponds.
- Any groundwater pumped from excavations is to be directed to on-site settlement ponds.
- It is proposed to implement a programme for monitoring water quality at the outfall as part of the construction of this development, in agreement with the Planning Authority.
- The construction compound will include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be tankered off site to a licensed facility until a connection to the public foul drainage network has been established.
- The construction compound's potable water supply shall be protected from contamination by any construction activities or materials.

7.6.2 Operational Phase

The design of proposed site levels (roads, plaza, finished floor levels etc.) has been carried out in such a way as to replicate existing surface contours, break lines etc. as closely as reasonably practicable and avoid concentrating additional surface water flow in any particular location. However, some localised areas have been raised in order to enable gravity foul drainage and provide sufficient depth of cover. In these areas the levels have been designed to provide overland flow paths have been designed to ensure that during exceedance events, runoff is directed away from buildings to soft landscaped areas.

Following the Site Specific Flood Risk Assessment, it has been determined that the entire site / zoned developable area is located in Flood Zone C as defined by the Guidelines (i.e. proposed development is considered to have the required level of flood protection up to and including the 1% AEP flood event.)

Surface water runoff from the site will be attenuated to the greenfield runoff rate as outlined in the Greater Dublin Strategic Drainage Study (GDSDS). Surface water discharge rates will be controlled by Hydrobrake type vortex control devices in conjunction with attenuation storage.

The following methodologies are being implemented as part of a SuDS surface water treatment train approach:

- Permeable paving in driveway areas.
- Surface water runoff from roofs will be routed to the proposed surface water pipe network via the porous aggregates beneath permeable paved driveways and filter drains in rear private gardens.
- Attenuation of the 30-year return period rainfall event and below will be contained below ground and 100-year return period return period event (plus 10% climate change) within below ground storage and surface level detention basins located in public open spaces.
- Installation of hydrobrakes limiting surface water discharge from the site to greenfield runoff rates.
- Surface water discharge to pass via a Class 1 bypass fuel / oil separator (sized in accordance with permitted discharge from the site).

A contract will be entered into with a suitably qualified contractor for maintenance of the attenuation system, Hydrobrake and by-pass fuel / oil separator noted above.

No specific mitigation measures are proposed in relation to foul drainage however, all new foul drainage lines will be designed, installed and tested in accordance with Irish Water Code of Practice.

No specific mitigation measures are proposed in relation to water supply. However, all new watermain will be designed, installed and tested in accordance with the Irish Water Code of Practice.

The potential impact of climate change has been allowed for as follows;

- Pluvial flood risk - attenuation storage design allows for a 10% increase in rainfall intensities, as recommended by the GDSDS.
- Pluvial flood risk - drainage system design allows for a 10% increase in flows, as recommended by the GDSDS.
- Provision of min. freeboard (500mm) from 1% AEP as required by GDSDS (mitigation against impact of climate change).

7.7 Residual Impact of the Proposed Development

This section describes the predicted impact of the proposed development following the implementation of the remedial and mitigation measures, as set out above.

7.7.1 Construction Phase

Implementation of the measures outlined in Section 7.6.2 will ensure that the potential impacts of the proposed development on water and the hydrogeological environment do not occur during the construction phase and that any residual impacts will be negligible.

7.7.2 Operational Phase

Surface water drainage design is to be carried out in accordance with the GDSDS, and SuDS methodologies implemented as part of a treatment train approach. Foul drainage and watermain will be designed and constructed in accordance with Irish Water Code of Practice. As a result, the predicted residual impacts on the water and hydrogeological environment arising from the operational phase will be negligible.

7.7.3 Do-Nothing Scenario

There are no predicted impacts should the proposed development not proceed.

7.8 Difficulties Encountered

No difficulties were encountered while developing this report.

7.9 Monitoring Measures

Proposed monitoring during the construction and operational phase in relation to the water and hydrogeological environment are as follows:

- Adherence to Construction Management Plan.
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and vehicle wheel wash facilities.
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.).
- Monitoring of discharge from sediment retention ponds (e.g. pH, sediment content).
- During the operational phase an inspection and maintenance contract is to be implemented in relation to the proposed Class 1 fuel / oil separators, hydrobrakes, SuDS and attenuation facilities.

7.10 References

The baseline environment and the assessment of the development in this chapter was described based on the information collected from the sources mentioned in Section 7.2.1.

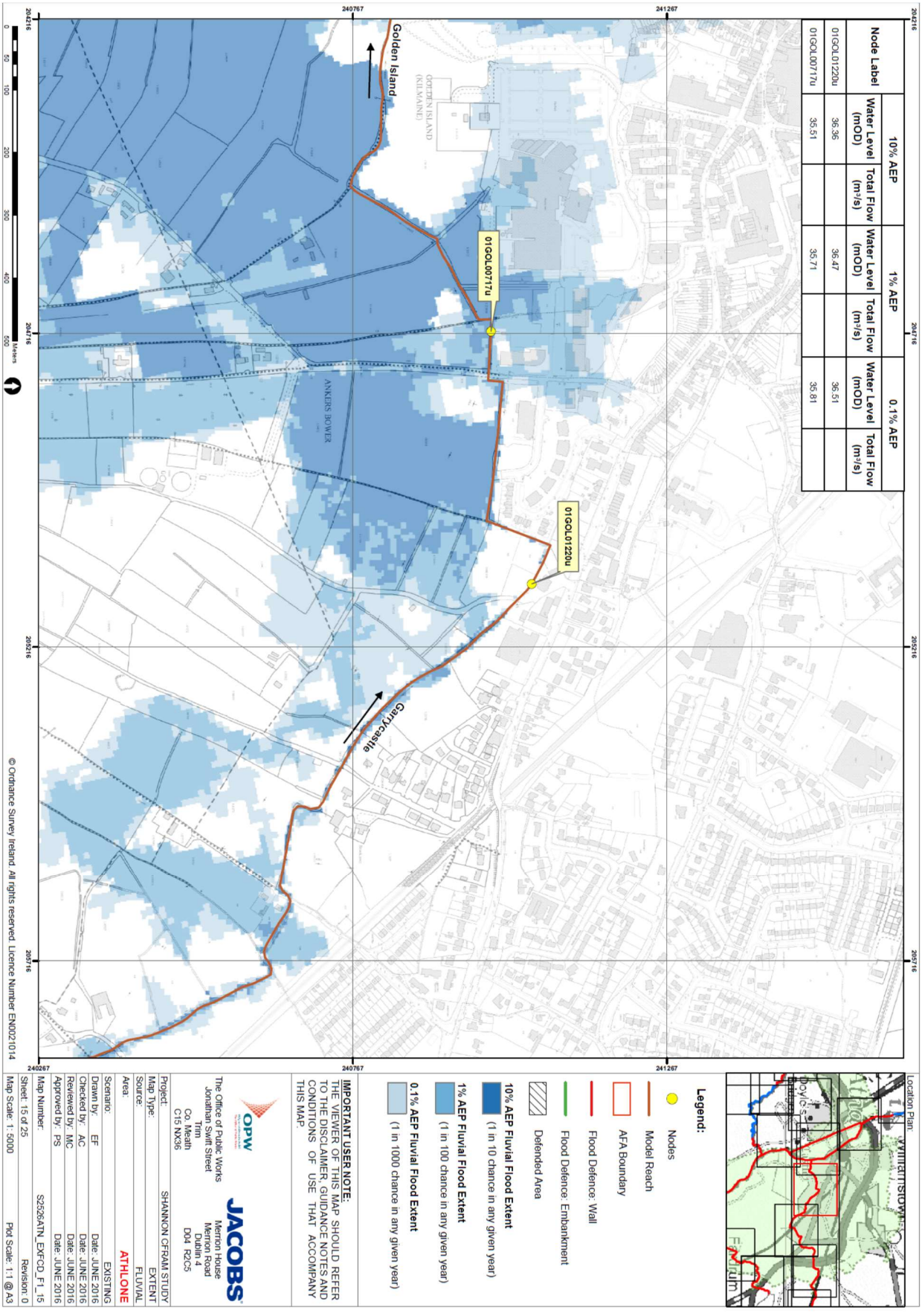
Chapter 7 Appendices

Appendix 7A – Irish Water Service Plan

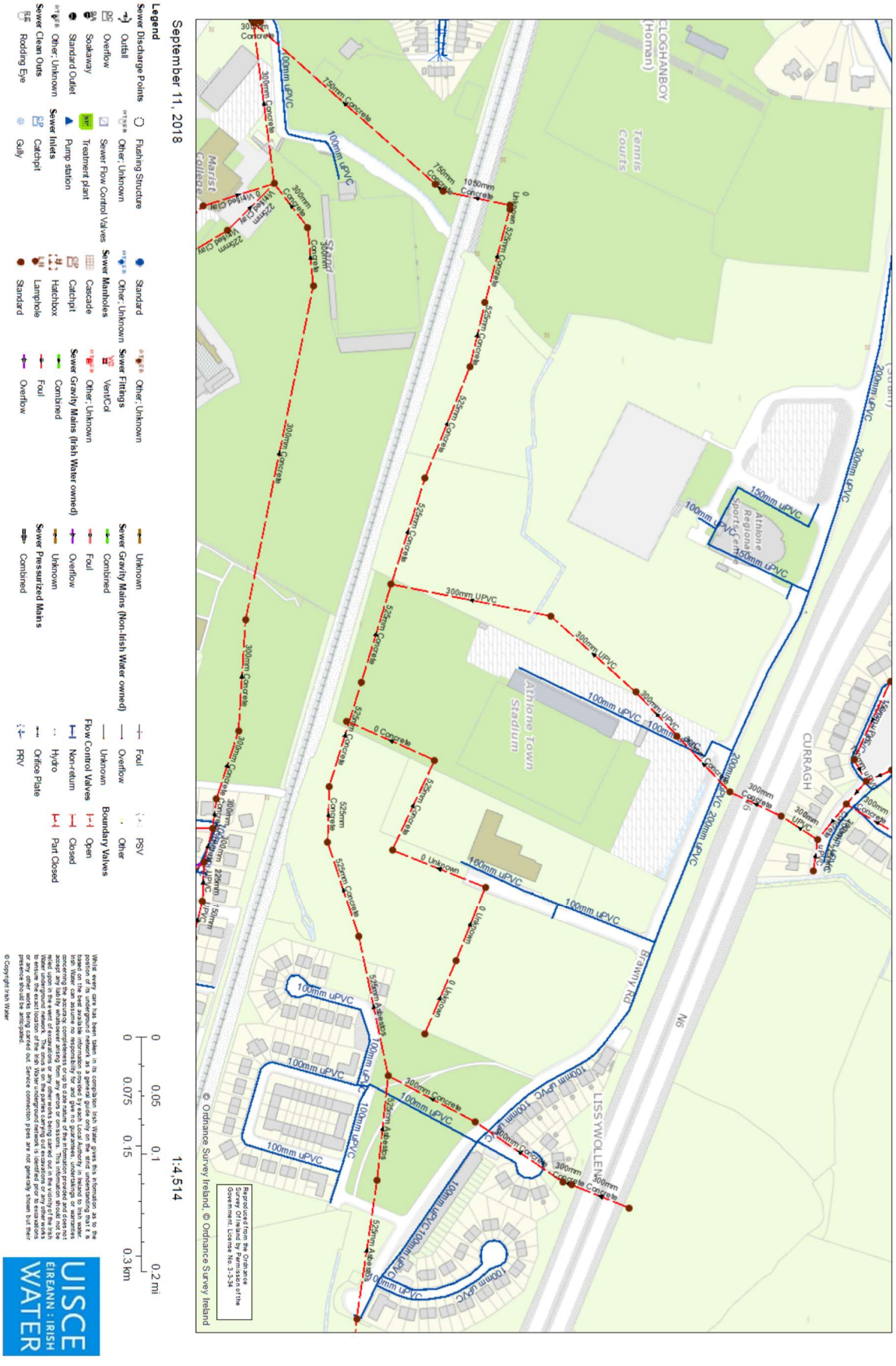
Appendix 7B – Flood Hazard Information

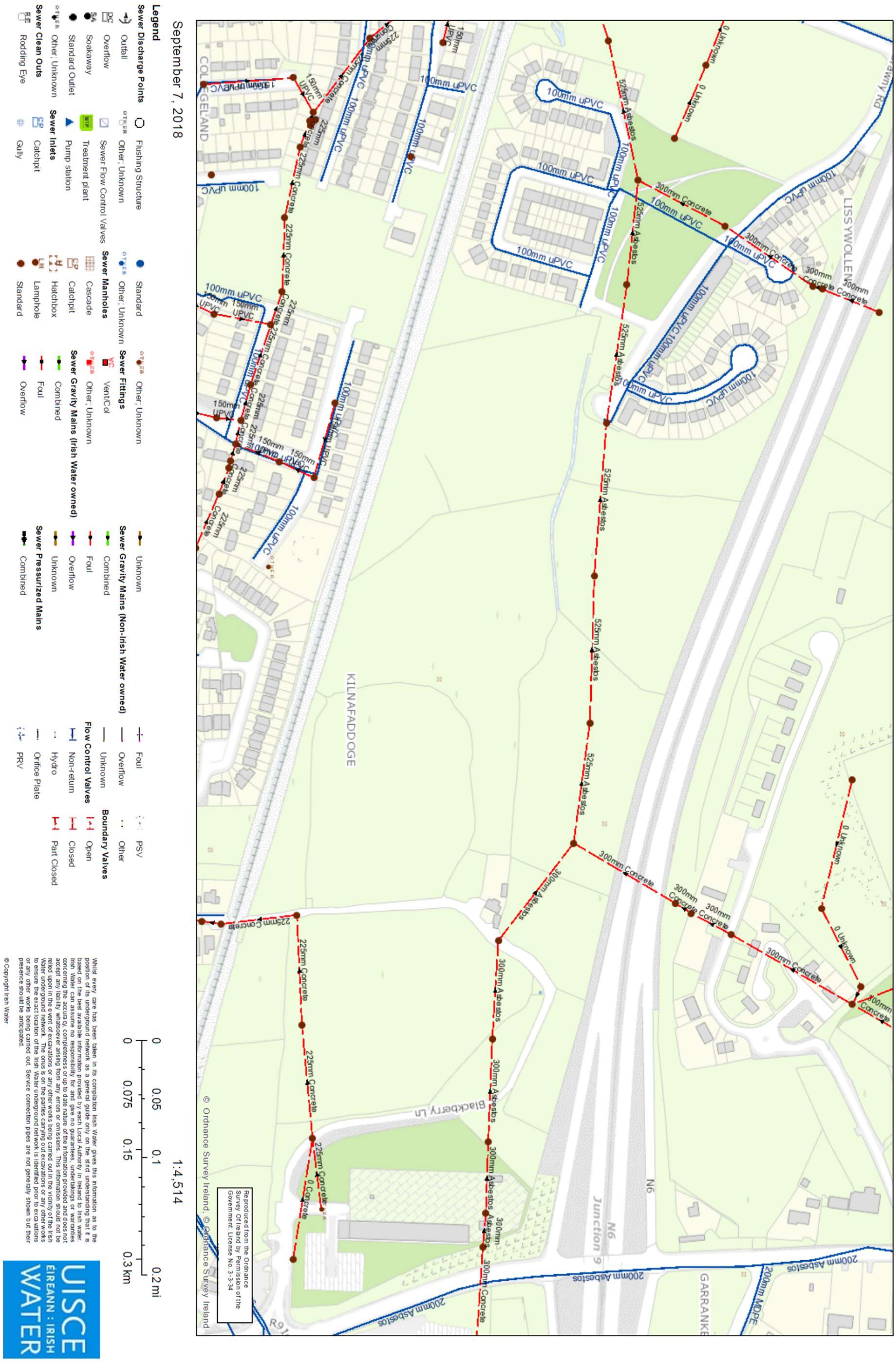
Appendix 7C – Irish Water Pre-Connection Feedback

Appendix 7A – Irish Water Service Plan



Appendix 7B – Flood Hazard Information




Irish Water Web Map
September 7, 2018
Legend
Sewer Discharge Points
Outfall
Overflow
Soakaway
Standard Outlet
Other; Unknown
Sewer Clean Outs
Rodding Eye
Flushing Structure
Other; Unknown
Sewer Flow Control Valves
Treatment plant
Pump station
Sewer Inlets
Catchpit
Gully
Standard
Other; Unknown
Sewer Manholes
Cascade
Catchpit
Hatchbox
Lamphole
Standard
Other; Unknown
Sewer Fittings
Vent/Col
Other; Unknown
Sewer Gravity Mains (Irish Water owned)
Combined
Foul
Overflow
Unknown
Sewer Gravity Mains (Non-Irish Water owned)
Combined
Foul
Overflow
Unknown
Sewer Pressurized Mains
Combined
Foul
Overflow
Unknown
Flow Control Valves
Non-return
Hydro
Orifice Plate
PRV
PSV
Other
Boundary Valves
Open
Closed
Part Closed
1:4,514
0 0.05 0.1 0.2 mi
0 0.075 0.15 0.3 km
© Copyright Irish Water
Reproduced from the Ordnance Survey Of Ireland by Permission of the Government. License No. 3-3-34
© Ordnance Survey Ireland. © Ordnance Survey Ireland
KILNAFADDOGE
LISSYWOLLEN
GARRANKEEL
COLLEGELAND
Junction 9
N6
Blackberry Ln
525mm Asbestos
300mm Concrete
300mm Asbestos
225mm Concrete
100mm uPVC
150mm uPVC
200mm Asbestos
0 Unknown
UISCE ÉIREANN : IRISH WATER

Appendix 7C – Irish Water Pre-Connection Feedback

UISCE ÉIREANN : IRISH WATER

Daniel Hodnett
DBFL Consulting Engineers
Ormond House
Ormond Quay Upper
Dublin 7
D07W7704

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

10 November 2020

Re: CDS20004573 pre-connection enquiry - Subject to contract | Contract denied

Connection for Multi/Mixed Use Development of 605 unit(s) at Residential Development At Lissywollen, Athlone, Co. Westmeath

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Residential Development At Lissywollen, Athlone, Co. Westmeath (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	OUTCOME OF PRE-CONNECTION ENQUIRY THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
Water Connection	While there are on-going supply demand issues in Athlone at present, the Water Treatment Plant upgrade works currently underway will resolve these issues and provide adequate headroom capacity for this development. The Primary Connection Point for this development should be the proposed 200mm diameter connection from the R916, on the eastern side of the development site, as shown on your Dwg. No. 180176-DBFL-CS-SP-SK-C-9100 included with your PCE. This connection should also include the bulk meter, which will be linked up with telemetry online. The Secondary Connection Point for this development should be the proposed 200mm diameter connection on Brawney Road on the western side of the proposed development site, as shown on your Dwg. No. 180176-DBFL-CS-SP-SK-C-9100. The control valve on this secondary connection main to be closed during normal

	operation. The development should include for onsite storage for the average day peak week demand rate of the commercial section for 24-hour period. This separate storage is required to supply this demand and will have a re-fill time of 12 hours.
Wastewater Connection	There is sufficient capacity at the Athlone Wastewater Treatment Plant and local wastewater network to facilitate this development. It is noted a sewer diversion is proposed under this development; accordingly please contact our diversion team on diversions@water.ie to agree the diversion requirements.
The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.	

General Notes:

1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
3) The feedback provided is subject to a Connection Agreement being signed at a later date.
4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at https://www.water.ie/connections/get-connected/
5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
6) Irish Water Connection Policy/ Charges can be found at https://www.water.ie/connections/information/connection-charges/
7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
9) To access Irish Water Maps email datarequests@water.ie
10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Peter O'Halloran from the design team on 094 90 43319 or email PeOHalloran@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,

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Yvonne Harris
Head of Customer Operations

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

Daniel Hodnett
DBFL Consulting Engineers, Ormond House
Ormond Quay Upper, Dublin 7
Dublin D07W7704

25 November 2020

Re: Design Submission for Residential Development At Lissywollen, Athlone, Co. Westmeath (the "Development")
(the "Design Submission") / Connection Reference No: CDS20004573

Dear Daniel Hodnett,

Many thanks for your recent Design Submission.

We have reviewed your proposal for the connection(s) at the Development. Based on the information provided, which included the documents outlined in Appendix A to this letter, Irish Water has no objection to your proposals.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before you can connect to our network you must sign a connection agreement with Irish Water. This can be applied for by completing the connection application form at www.water.ie/connections. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities (CRU)(https://www.cru.ie/document_group/irish-waters-water-charges-plan-2018/).

You the Customer (including any designers/contractors or other related parties appointed by you) is entirely responsible for the design and construction of all water and/or wastewater infrastructure within the Development which is necessary to facilitate connection(s) from the boundary of the Development to Irish Water's network(s) (the "**Self-Lay Works**"), as reflected in your Design Submission. Acceptance of the Design Submission by Irish Water does not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Irish Water representative:
Name: Alvaro Garcia
Email: agarcia@water.ie

Yours sincerely,

Yvonne Harris

Yvonne Harris
Head of Customer Operations

Appendix A

Document Title & Revision

180176-DBFL-CS-SP-DR-C-7041
180176-DBFL-CS-SP-DR-C-7042
180176-DBFL-FW-SP-DR-C-7021
180176-DBFL-FW-SP-DR-C-7022
180176-DBFL-FW-SP-DR-C-7023
180176-DBFL-FW-SP-DR-C-7024
180176-DBFL-WM-SP-DR-C-7031
180176-DBFL-WM-SP-DR-C-7032
180176-DBFL-XX-XX-DR-C-7051
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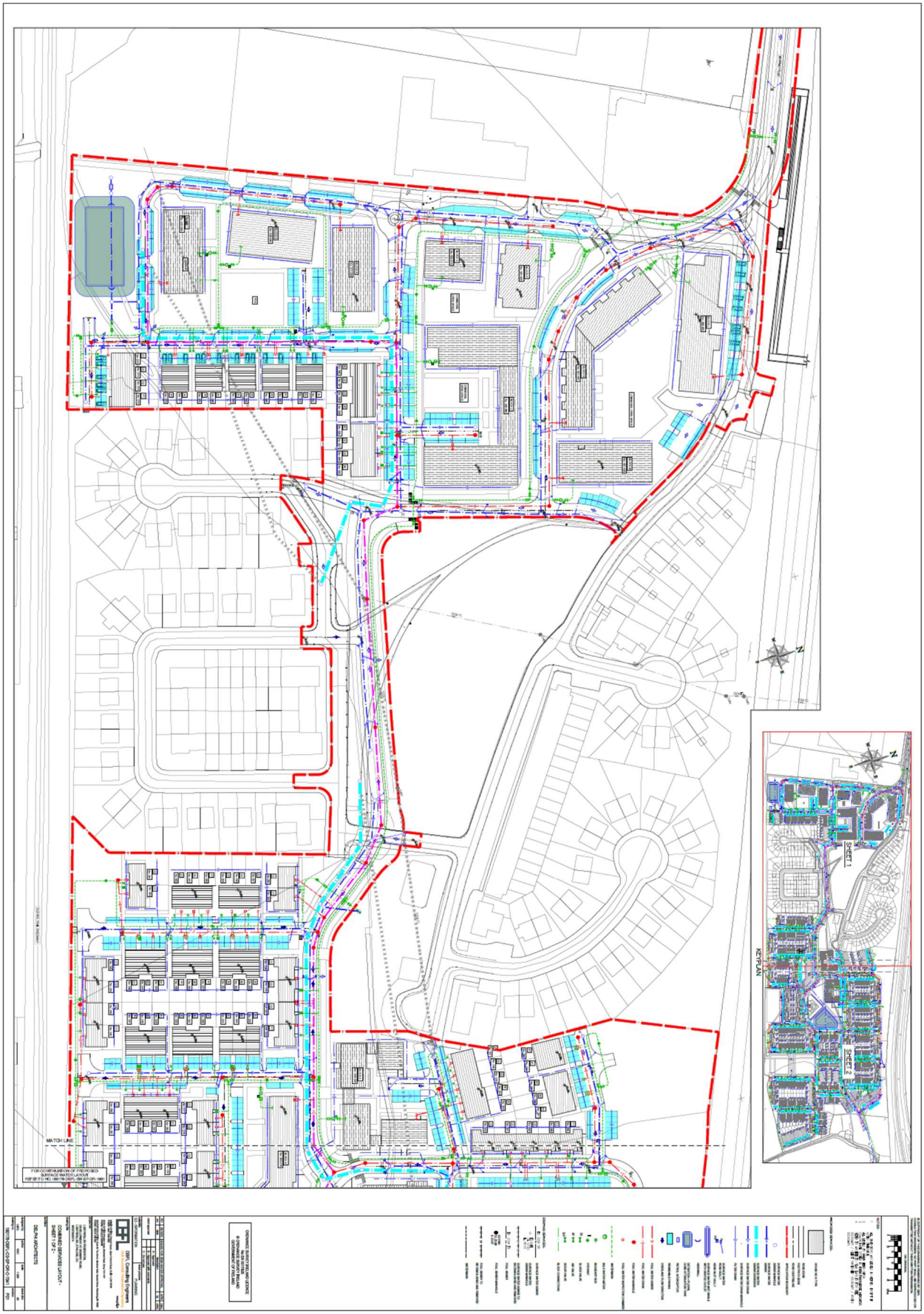
180176-DBFL-XX-XX-DR-C-7057
180176-DBFL-XX-XX-DR-C-7058
180176-DBFL-XX-XX-DR-C-7059

For further information, visit www.water.ie/connections

Notwithstanding any matters listed above, the Customer (including any appointed designers/contractors, etc.) is entirely responsible for the design and construction of the Self-Lay Works. Acceptance of the Design Submission by Irish Water will not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.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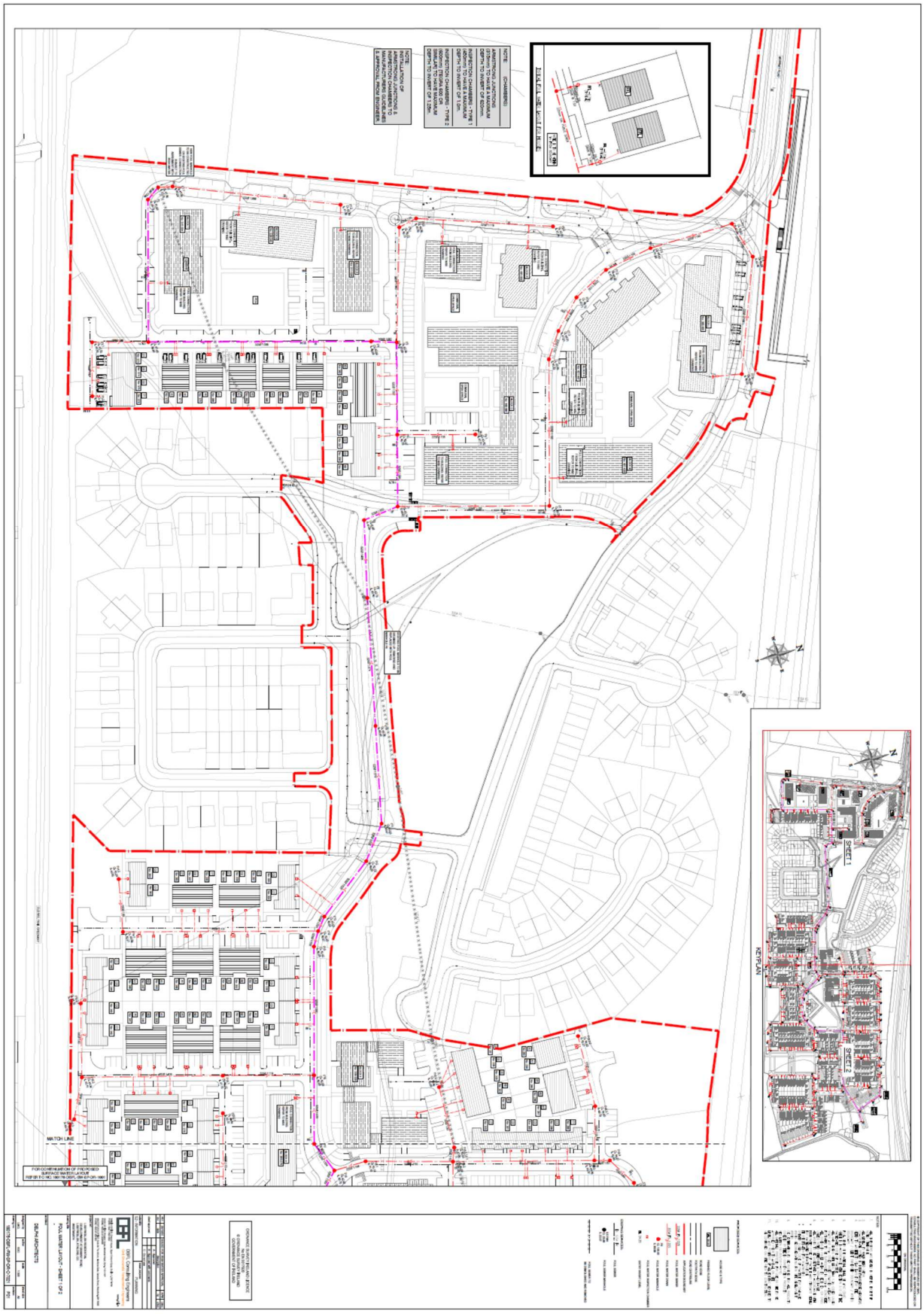
KEYPLAN


MATCH LINE
INSET A
KEY PLAN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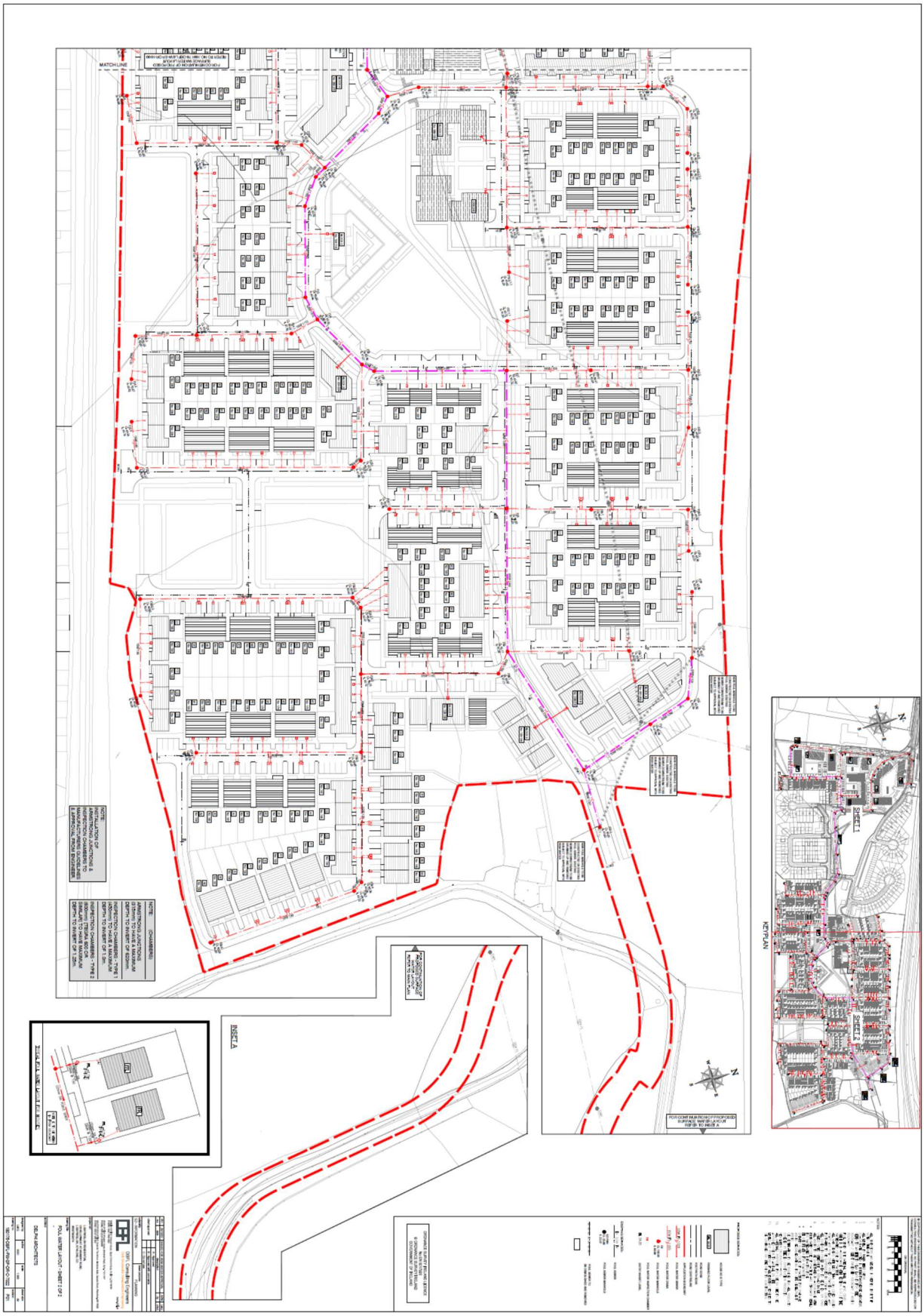
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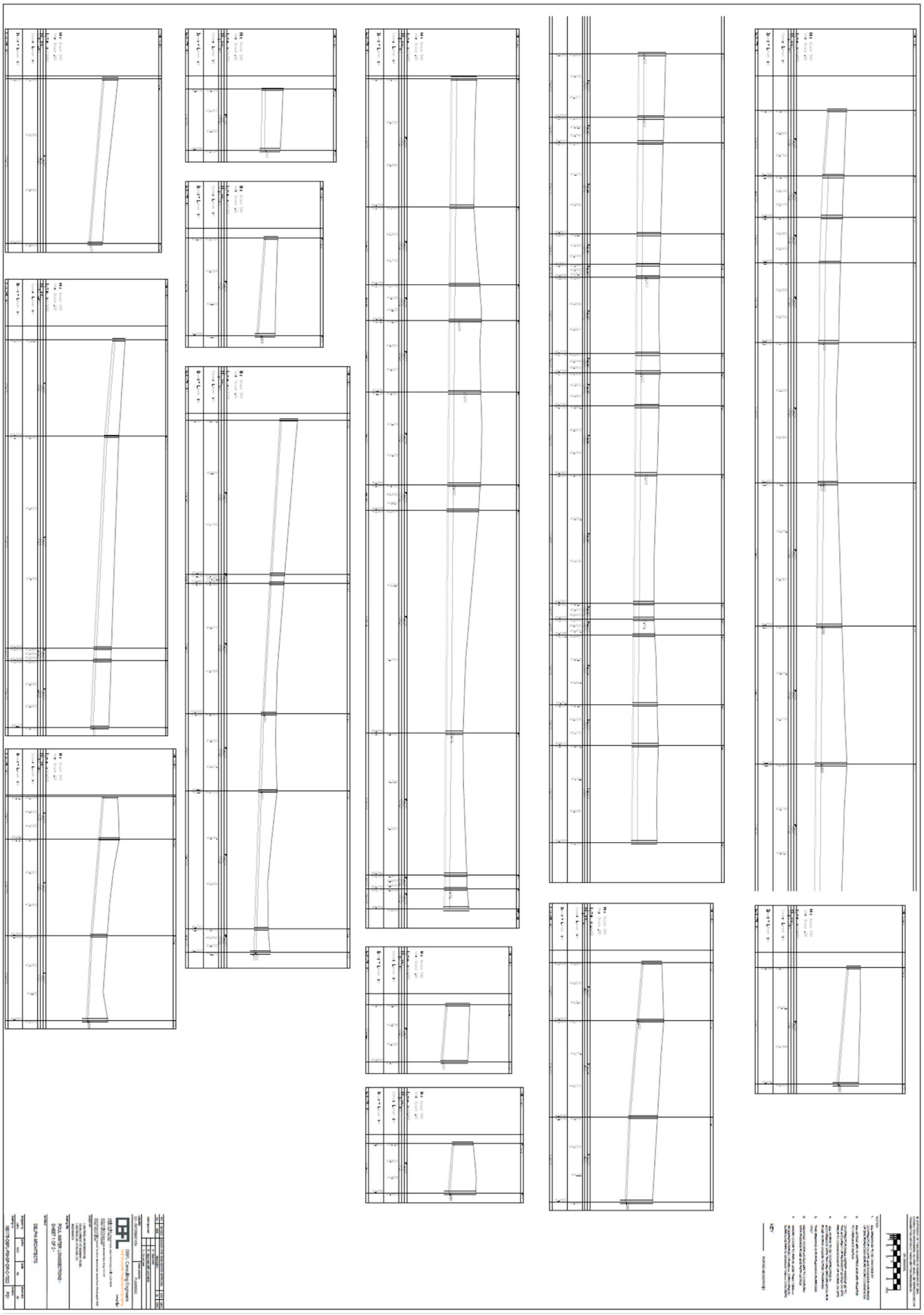

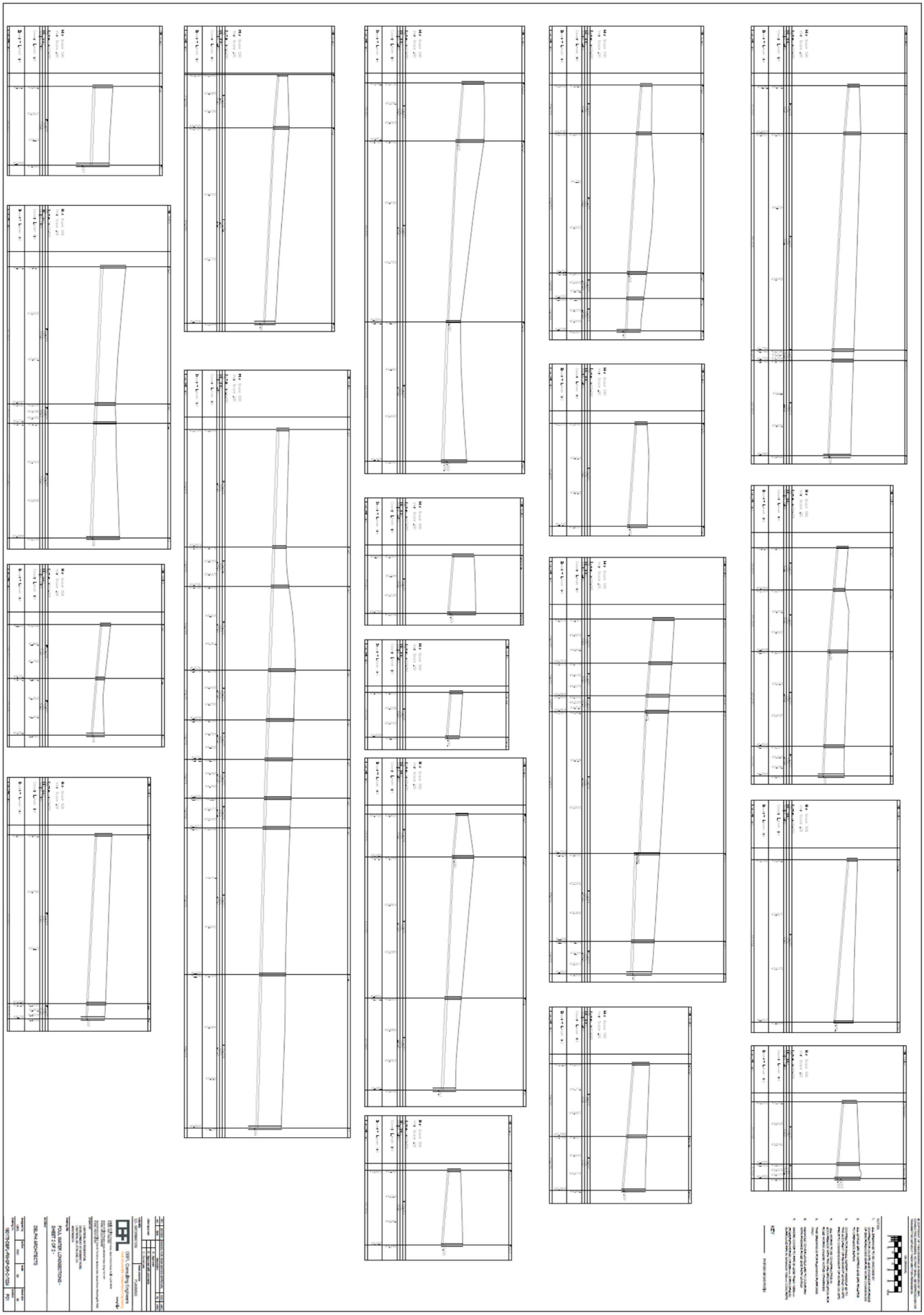

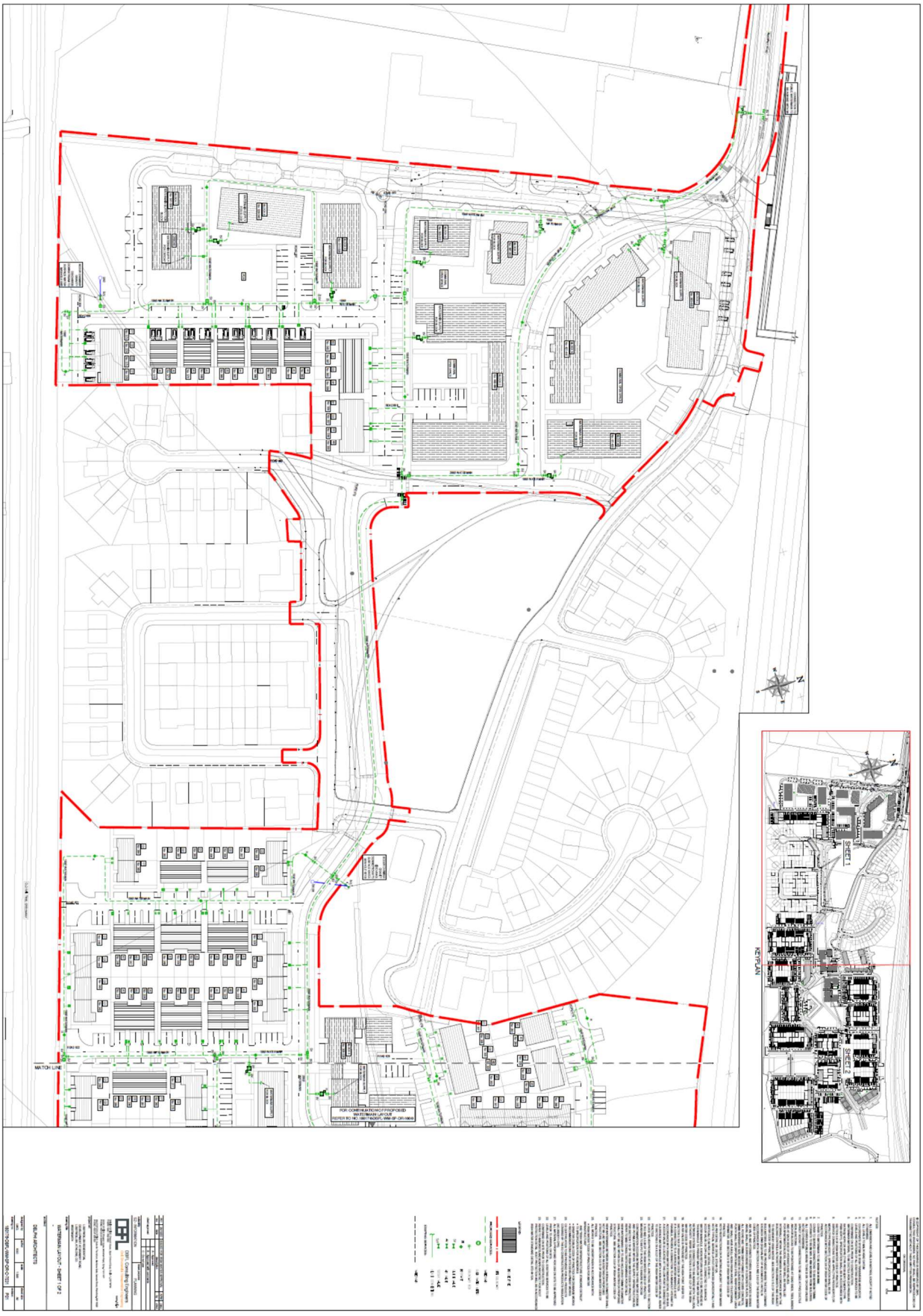
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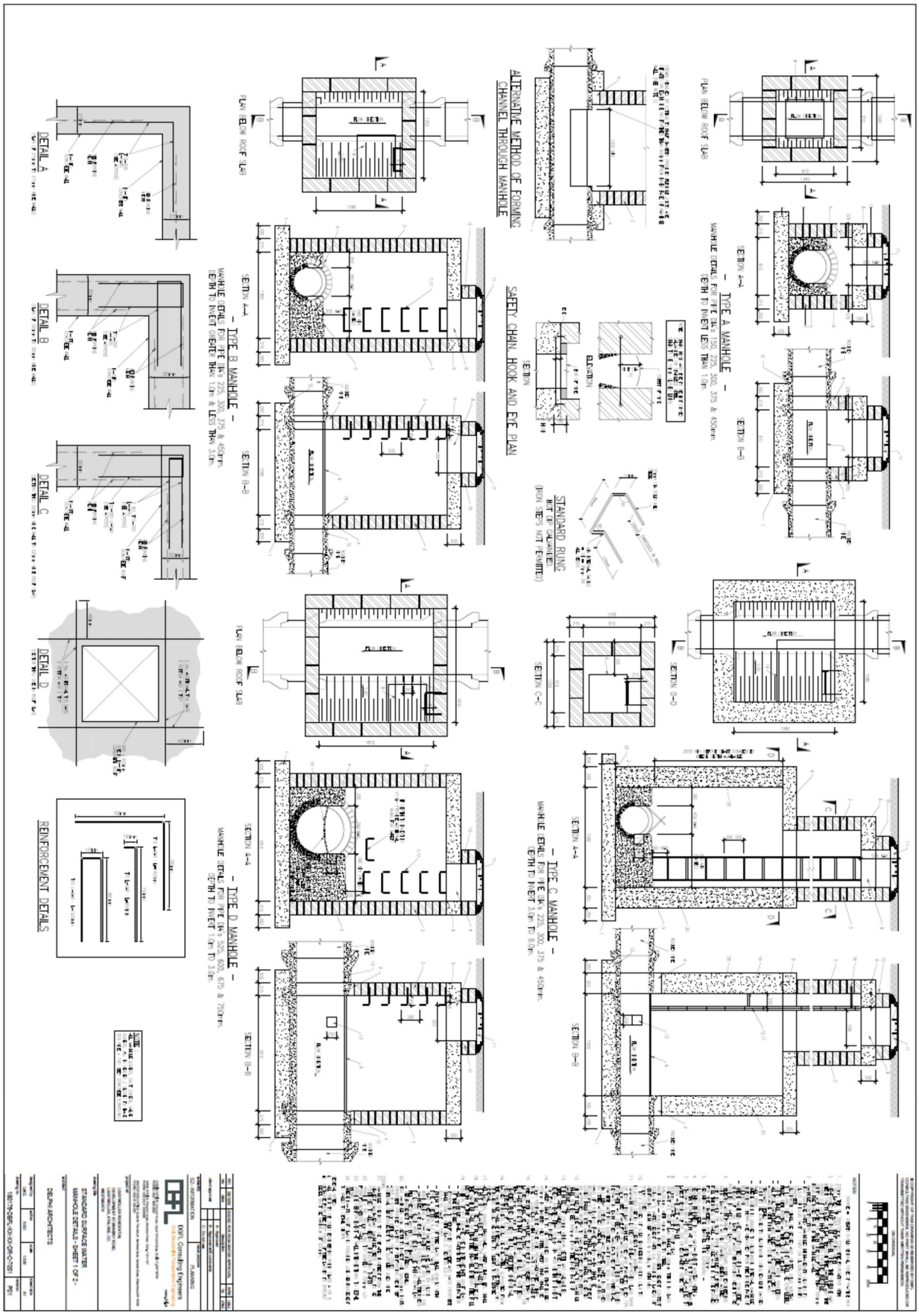
SHEET 1
SHEET 2
MATCH LINE


MATCHLINE
KEY PLAN
SHEET 1
SHEET 2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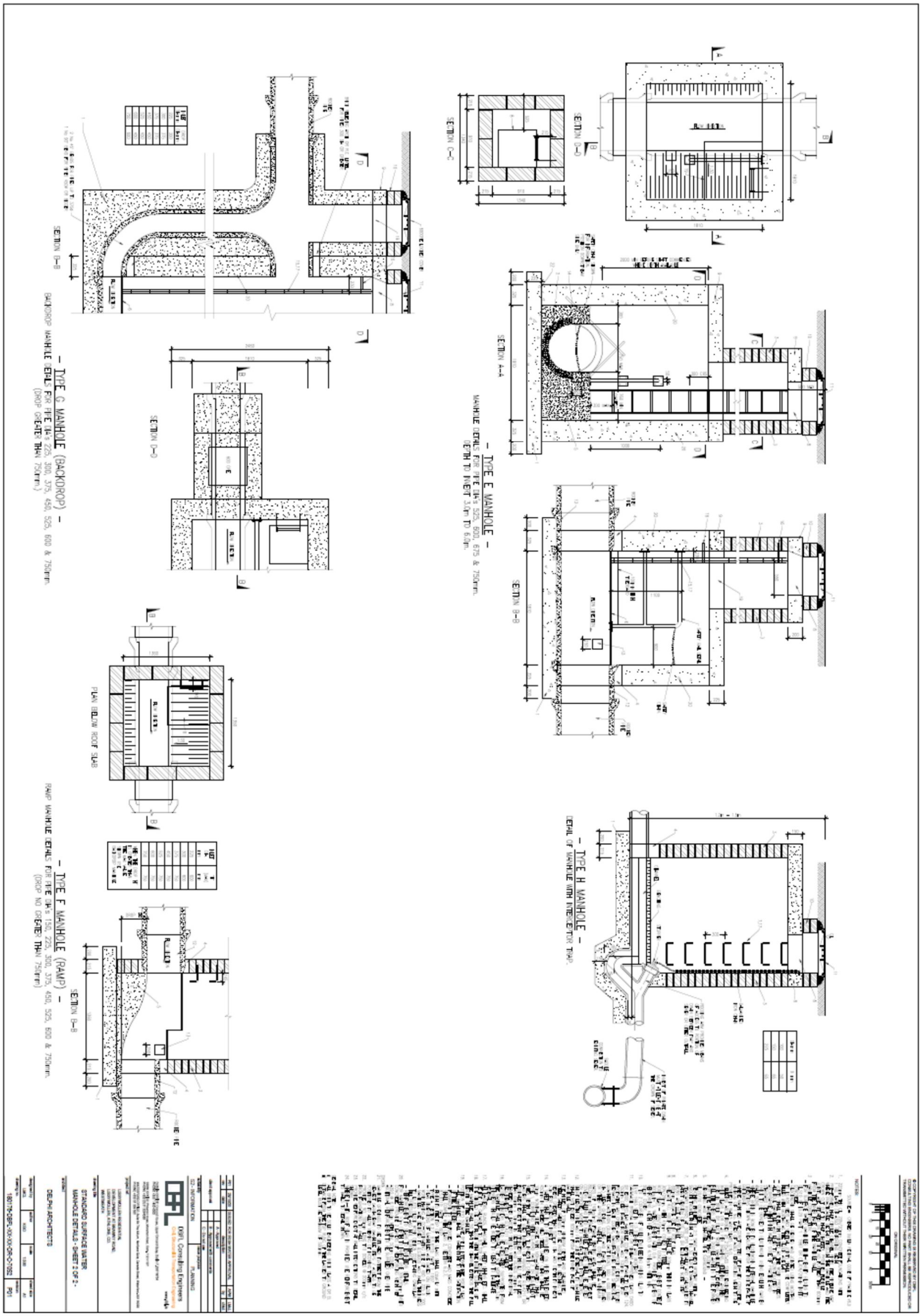
- TYPE B MANHOLE -
- TYPE C MANHOLE -
- TYPE D MANHOLE -
ALTERNATIVE METHOD OF FORMING CHANNEL THROUGH MANHOLE
SAFETY CHAIN HOOK AND EYE PLAN
STANDARD RUNG
DETAIL A
DETAIL B
DETAIL C
DETAIL D
REINFORCEMENT DETAILS
DELPHI ARCHITECTS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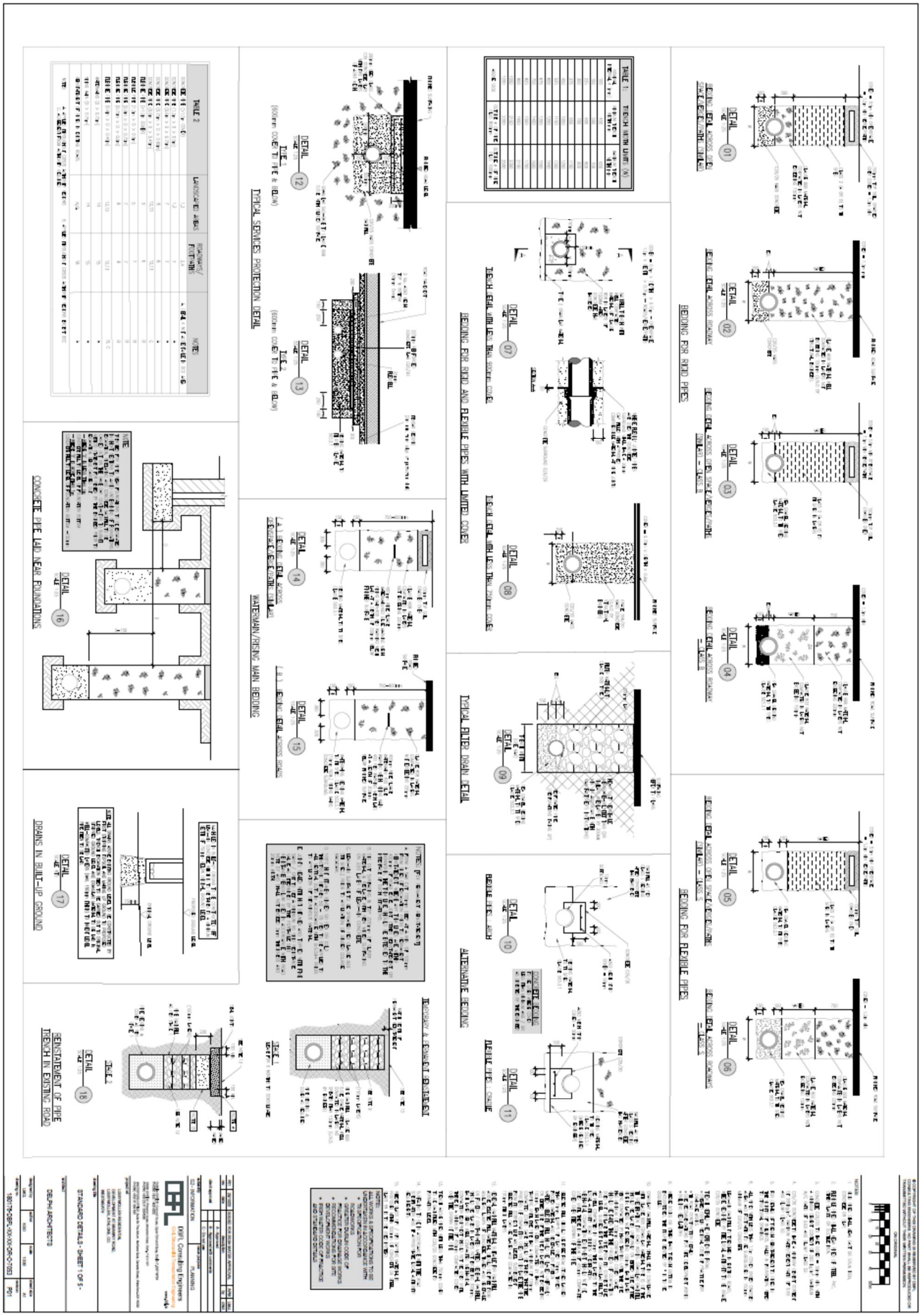
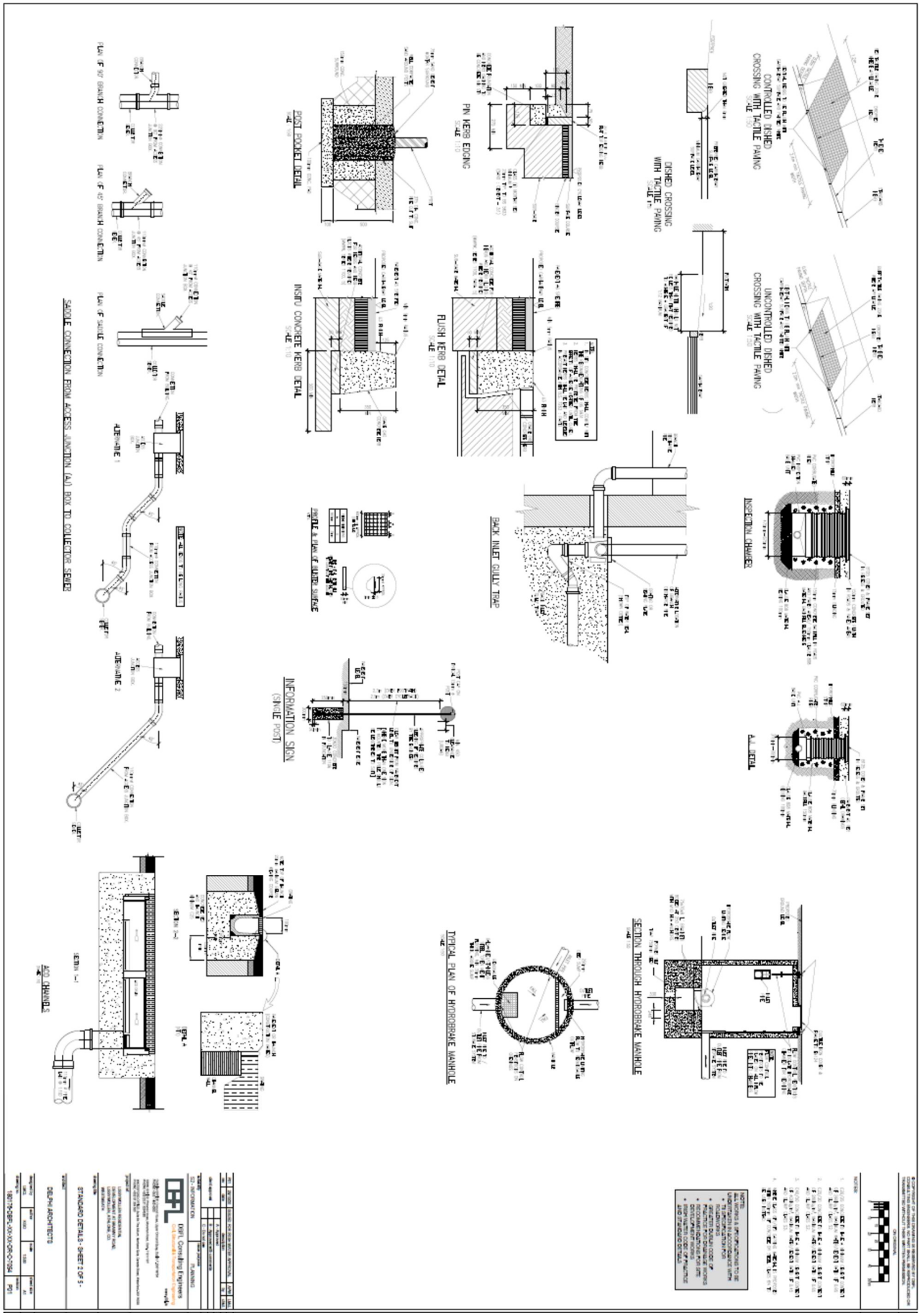
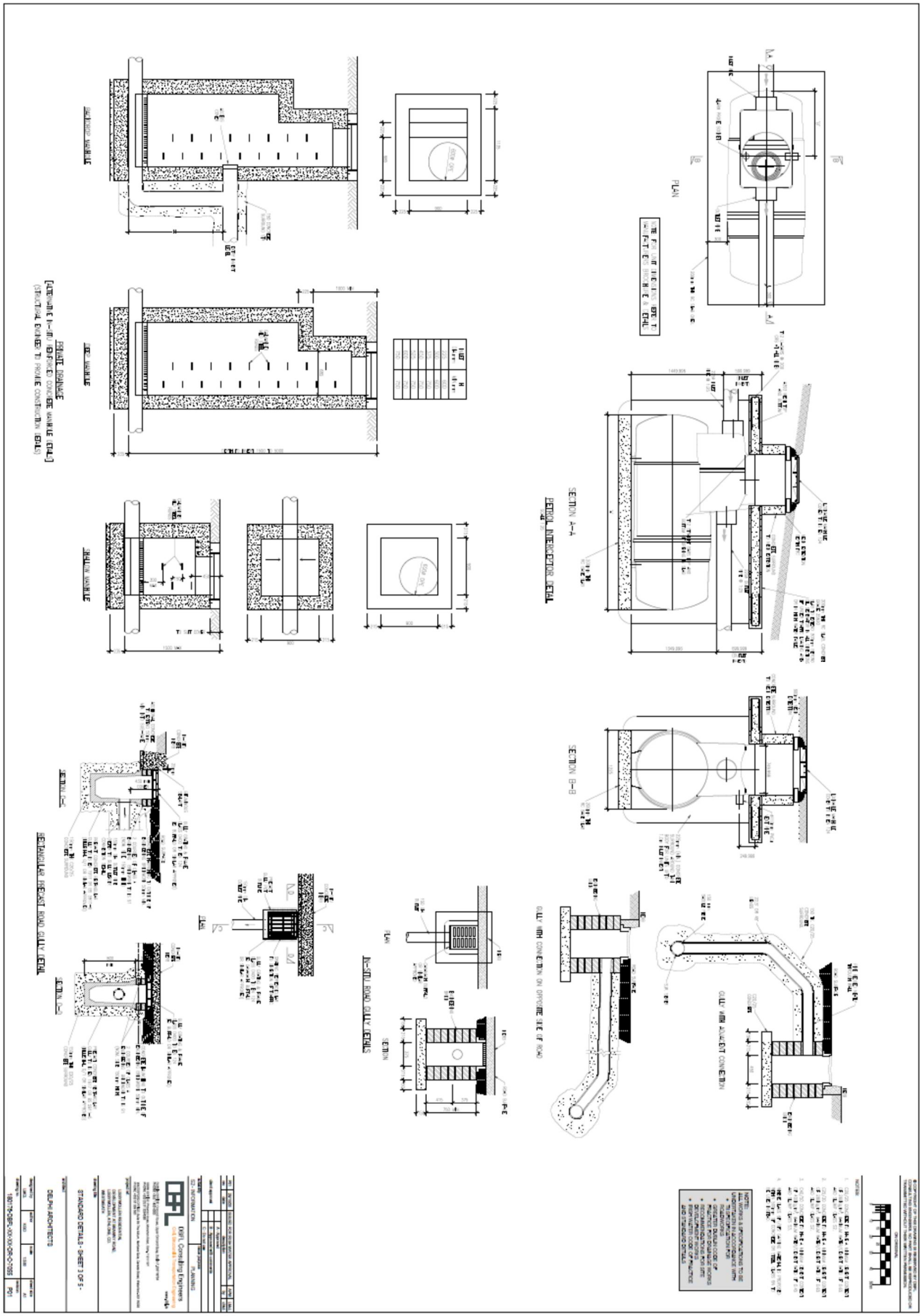
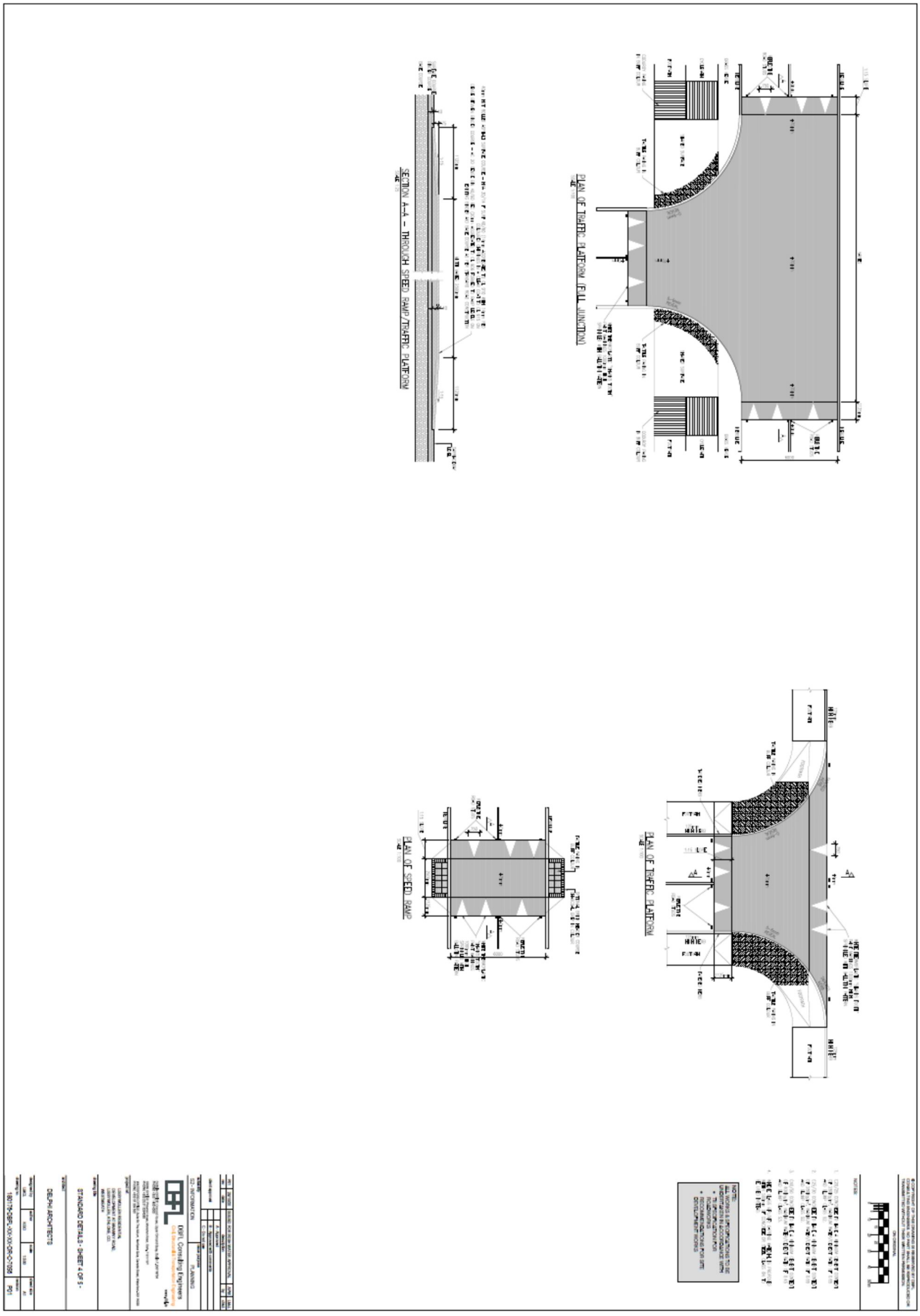
(DROP GREATER THAN 750mm)
– TYPE F MANHOLE (RAMP) –
RAMP MANHOLE DETAIL FOR PIPE DIA's 150, 225, 300, 375, 450, 525, 600 & 750mm.
(DROP NO GREATER THAN 750mm)
– TYPE E MANHOLE –
MANHOLE DETAIL FOR PIPE DIA's 525, 600, 675 & 750mm.
(DEPTH TO INVERT 3.0m TO 6.0m)
– TYPE H MANHOLE –
DETAIL OF MANHOLE WITH INVERT DEPTH 7.0m
SECTION A–A
SECTION B–B
SECTION C–C
SECTION D–D
PLAN UNDER ROOF SLAB
DELPHI ARCHITECTS
DBFL Consulting Engineers





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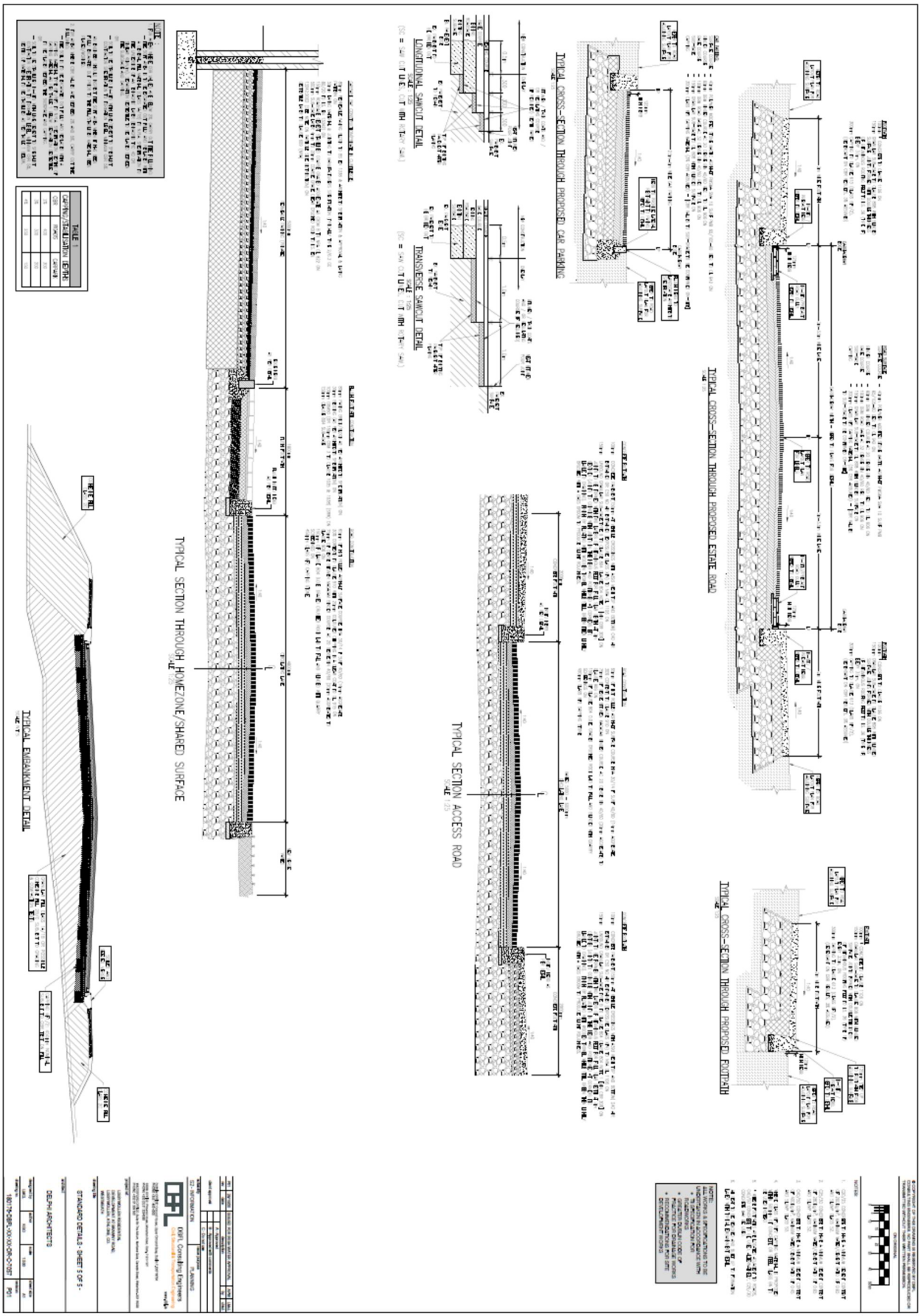
PLAN OF SPEED RAMP
PLAN OF TRAFFIC PLATFORM
STANDARD DETAILS - SHEET 4 OF 5 -
DELPHI ARCHITECTS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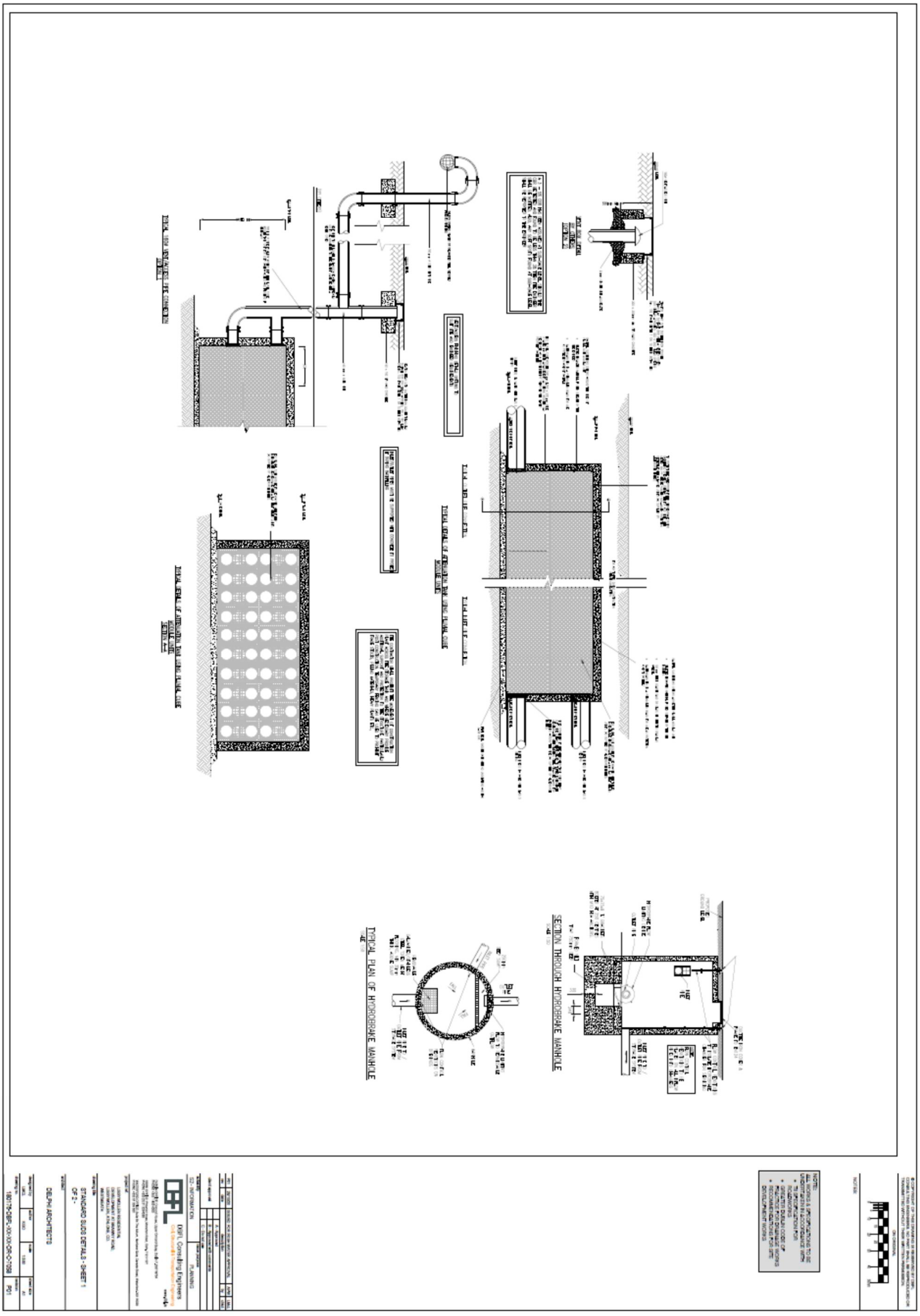
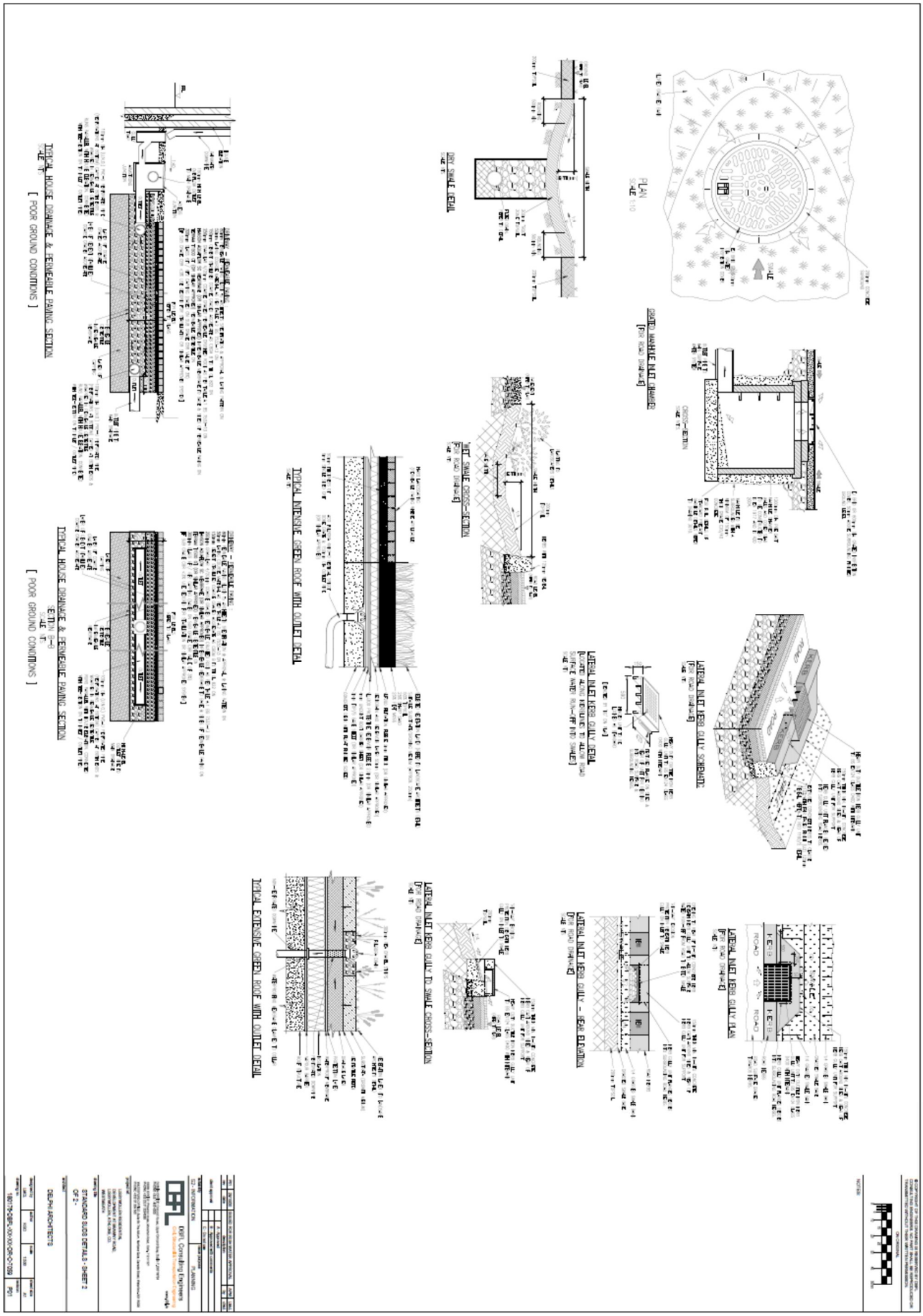
LONGITUDINAL SAWCUT DETAIL
TRANSVERSE SAWCUT DETAIL
TYPICAL CROSS-SECTION THROUGH PROPOSED ESTATE ROAD
TYPICAL SECTION THROUGH HOMEZONE/SHARED SURFACE
TYPICAL SECTION ACCESS ROAD
TYPICAL EMBANKMENT DETAIL
TYPICAL CROSS-SECTION THROUGH PROPOSED FOOTPATH
DBFL Consulting Engineers
DELPHI ARCHITECTS





8.0. Air Quality and Climate

8.1 Introduction

This chapter is divided into two parts:

- Part A – Air Quality
- Part B - Climate

This chapter has been prepared by AECOM and Part A is comprised of a road traffic and construction air quality assessment on sensitive receptors within the proposed residential development site at Lissywollen, Athlone, County Westmeath. It details the results of a study to assess the impacts and resulting effects that development generated traffic flows and traffic reassignment from new highway infrastructure would have upon local air quality. The impact from the existing road network (the N6) has also been considered to ascertain whether there is any significant impact upon future residents. The impact has been assessed at a number of key receptors within the residential development site. The main impacts during the construction phase would typically be related to the airborne dust generated by construction activities.

The purpose of this assessment is to consider the baseline air quality associated with the affected area, in light of the expected construction and operational impacts. The method addresses potential impacts arising from the development (i.e. dust during the construction phase), as well as impacts upon the development from existing sources such as the N6. The overall aim is to robustly demonstrate that all likely significant effects (beneficial or adverse) are identified, considering the sensitivity of the environment (particularly from an air quality perspective) and the magnitude of any potential impacts associated with the proposed residential development. Details of the Proposed Development can be found in Chapter 3. The Climate and Sustainability Assessment (Chapter 10) addresses the impact of the Proposed Development such as building design on climate and energy usage.

Part B of this chapter deals with the impact of the proposed development on climate. Please also note that a separate document entitled Climate/Sustainability Appraisal is submitted as part of the subject SHD planning application, which appraises the sustainability credentials of the proposed development and demonstrates that they are in line with national, regional and local planning policies – please refer to same for further detail.

The authors of this chapter are Sam Purdon BSc MSc GradCIWEM and Glenn McKay BSc MSc MCIWEM C.WEM CEnv CSci. Sam is a Graduate Environmental Consultant with AECOM and has experience in producing air quality assessments and conducting air quality monitoring, whilst also holding extensive site experience in environmental management relating to air quality issues. Glenn has over 16 years' experience of carrying out Environmental Impact Assessments for major infrastructure projects and development proposals, and in particular a range of major road projects throughout Ireland. He has acted as the air quality specialist on at least 10 major road infrastructure projects to date, most recently including Local Distributor Road 4, Abbeyland, Navan, County Meath and Athy Distributor Road, County Kildare.

Marion Delaney, Associate Director of AECOM prepared the details on climate and the aforementioned Climate/Sustainability Appraisal report.

PART A Air Quality

8.2 Legislation and Planning Policy Guidance

8.2.1 Legislation

8.2.1.1 Ambient Air Quality Standards

The Clean Air for Europe (CAFE) programme revisited the management of Air Quality within the EU and replaced the EU Framework Directive 96/62/EC (Council of European Communities, 1996), its associated Daughter Directives 1999/30/EC (Council of European Communities, 1999), 2000/69/EC (Council of European Communities, 2000), 2002/3/EC (Council of European Communities, 2002), and the Council Decision 97/101/EC (Council of European Communities, 1997) with a single legal act, the Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC (Council of European Communities, 2008).

Directive 2008/50/EC is the principal instrument for governing outdoor ambient air quality policy in the EU. It sets health and environmental objectives and emission reduction targets for the key air pollutants associated with human health and ecological impacts. It proposes to deliver the objectives in stages, and make it possible to protect EU citizens from exposure to particulate matter and ozone, and protect European ecosystems more effectively from acid rain, excess nutrient nitrogen (in the form of ammonia and nitrogen oxides, which disrupts plant communities, and leaches into fresh waters, leading in each case to a loss of biodiversity), and ozone.

This Directive is currently transposed into Irish law by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). The Regulations introduce a limit value to $PM_{2.5}$ in addition to the existing limit values for PM_{10}, NO_2 and oxides of nitrogen, sulphur dioxide, lead, ozone, carbon monoxide and benzene. These limit values are binding in the Republic of Ireland and have been set with the aim of avoiding, preventing and reducing harmful effects on human health and on the environment as a whole. Air quality limit values are an appropriate measure to use in assessing the significance of effects on air quality sensitive receptors. These limits are outlined below in Table 8.1.

Table 8.1: Limit Values of NO_2, PM_{10} and $PM_{2.5}$

	NO_2	PM_{10}	$PM_{2.5}$
Calendar Year Limit Value ($\mu g/m^3$)	40	40	25

Source: Air Quality Standards Regulations 2011

8.2.2 Planning Policy

8.2.2.1 Westmeath County Development Plan 2014-2020

The Development Plan for Westmeath County from 2014-2020 acknowledges the impact that poor air quality can have on human health and eco-systems, particularly near urban areas with major transport networks. It also outlines the reliance on the EU Framework Directive on Air Quality Assessment relating to air quality standards, with consideration also given to EPA document *Air Quality in Ireland* which is published annually, the most recent being in 2018. P-NAL2 states '*It is the policy of Westmeath County Council to promote a high standard of air quality in the country.'*

8.2.2.2 Environmental Protection Agency's Air Quality in Ireland 2018

This document summarizes the air quality in Ireland during 2018, however it does not provide an annual trend for each pollutant for the respective zones. The 2017 report is the last report that provides this information, as the report for 2019 has not been published yet. It also sets out the details of the National Ambient Air Quality Monitoring Programme (AAMP) which involves national monitoring efforts to improve forecasting, modelling and public understanding.

The main source of $PM_{2.5}$ was from home heating appliances using solid fuels. PM_{10} included sources from road transport and agriculture, with other factors such as windblown sea salt and pollen contributing to levels. EU limit values for PM_{10} and $PM_{2.5}$ was not exceeded at 26 monitoring points in 2018, however several days exceeded the WHO limit values at several stations.

Regarding Nitrogen Oxides, the main sources came from combustion processes in vehicles, more so from diesel vehicles. Other sources include non-road mobile machinery and industrial and construction activities. No exceedances of EU values were recorded out of the 17 monitoring stations for this pollutant, with near exceedance values being recorded in St. Johns Road, Dublin.

8.2.2.3 Athlone Town Development Plan 2014-2020

This Development Plan displays the same conclusions as the Westmeath County Development Plan above. The Athlone Town Development Plan acknowledges the most prominent threat to air quality in the area is emissions from road traffic. Stating that built up urban areas and major transport developments are the most sensitive areas to air quality. Attention will be given the EU Air Quality Standards, as well as any recommendations in the annually published Air Quality in Ireland Reports by the EPA.

It is the policy of the Athlone Town Council and Westmeath County Council to:

- seek to preserve and maintain air quality in accordance with best practice and relevant legislation (P-NAL2); and
- promote the preservation of best ambient air quality compatible with sustainable development (P-NAL3).

8.2.2.4 Draft Westmeath County Development Plan 2021-2027

Although a draft document, the Development Plan for Westmeath County for 2021-2027 outlines the councils aims and objectives for many aspects for development in the region. In particular, Section 10.18 addresses the objectives regarding air quality in the region. The main policy objective (CPO 10.120) is '*promote the preservation of best ambient air quality compatible with sustainable development in*

accordance with the EU Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/5/0/EC) and ensure that all air emissions associated with new developments are within Environmental Quality Standards as out in the Air Quality Standards Regulations 2011 (SI No. 180 of 201) (or any updated/superseding documents).' The document also reiterates that the current challenges faced in the region regarding air quality include:

- Transport emissions (namely NO_x, $PM_{2.5}$ and black carbon);
- Power generation that creates methane and NO emissions; and
- The burning of fossil fuels.

8.3 Methodology

8.3.1 Scope of the Assessment

In consideration of the potential for environmental and human health impacts related to emissions from the construction and operational phase of the proposed residential development, the study area needs to be defined. The main impacts during the construction phase would be related to the airborne dust generated by construction activities. These impacts have been assessed semi-quantitatively in Section 8.6 of this chapter.

In general, the potential impacts of any operational or construction related emissions would be intrinsically related to the level of exposure. Typically, receptors which are located in closest proximity to the source of the emission would be subject to the highest level of exposure. Whether or not the environmental and health impacts are likely to be significant associated with the proposed residential development, they are likely to be confined within the first 50–100m from the source emission.

On this basis, the assessment examined whether local air quality conditions would change due to emissions or influences associated with the construction and operation phases of the proposed residential development. It also considered whether any external emission sources, such as existing traffic utilising the public road network would influence local air quality conditions within the development site. Consequently, the following approach was adopted as necessary:

- characterise the baseline air quality utilising existing Environmental Protection Agency (EPA) data for the region;
- characterise the existing built environment, paying particular attention to sensitive receptors, such as residential buildings, places of worship, education and medical buildings, etc., within 100m of the proposed residential development;
- understanding the layout of the Proposed Development in relation to existing sources of emissions;
- characterise the traffic related impacts associated with the proposed residential development, as well as the existing local road network such as the N6 (i.e. changes in Annual Average Daily Traffic (AADT) distribution, speed and volume);
- determine appropriate criteria for evaluating the significance of air quality through reference to local plans and statutory documents where applicable and best practice;
- calculate potential air quality impacts using industry standardised calculation methods and assess the impact by comparing the calculated levels against the adopted criteria;
- specify ameliorative, remedial or reductive mitigation measures to control the impact associated with either the construction or operational phases of the proposed residential development; and

- demonstrate that all likely significant effects (beneficial or adverse) are identified, considering the sensitivity of the environment, the magnitude of any potential impacts associated with the proposed residential development and the proposed mitigation measures.

8.3.1.1 Operational Phase Assessment

The air quality assessment has been prepared in relation to procedures described in the publication *Land-Use Planning & Development Control: Planning For Air Quality* by the Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) (January 2017) and using the methodology detailed in *DMRB Volume 11, Section 3, Part 1 (HA 207/07) Air Quality* (May 2007) (now superseded by *LA 105 Air Quality*, however as the updated LA 105 document still refers to the DMRB Spreadsheet for Simple Assessments, the input requirements outlined in the document are still valid).

The methodology adopted for calculating local-scale pollutant concentrations has been prepared in accordance with *Appendix 4: Approach to Dispersion Modelling of the NRA 'Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes'* (Revision 1, May 2011). This Appendix provides a description of the various approaches that may be taken for dispersion modelling studies. A 'Simple' local air quality assessment utilising the DMRB Screening Model was deemed 'fit-for-purpose', based upon a consideration of NRA guidelines, complexity of the project, projected traffic volumes, baseline conditions and professional judgement.

As detailed within paragraph A4.4 (DMRB Screening Model) of Appendix 4 (Approach to Dispersion Modelling) of the NRA 'Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes' (Revision 1, May 2011), the DMRB Screening Model provides a simple and straightforward means of predicting pollutant concentrations associated with road traffic emissions. The method is not intended to provide accurate predictions of air quality, but it is a suitable approach in circumstances where the predicted environmental concentrations (i.e. ambient background + predicted concentration) lie sufficiently below the air quality standards (taken to be <90% of the standard), and where there are no complex or unusual features (e.g. grade-separated junctions, road links with gradients >2.5%), as is the case with this particular project.

Although the Proposed Residential Development would result in a change to the existing road network, traffic flows throughout the locale and proximity to receptors, these changes would not be of such a magnitude to warrant a 'Detailed' assessment. A detailed assessment should be only applied where there exists the potential to cause significant effects on environmental resources and receptors. A simple assessment is sufficient if it established confidently that the forecast environmental effect would not be a fundamental issue in the decision-making process.

The specific input requirements for a local impact assessment include:

- Input of annual mean background pollutant concentrations making use of existing air quality data;
- Selecting receptors to include relevant locations where the impact is likely to be greatest (i.e. proximal exposure to an emission source); and
- obtaining refined traffic data for 'Base Year', 'Do-Minimum' and 'Do-Something' scenarios, for the years of assessment for roads likely to be affected by the Proposed Residential Development.

The DMRB model predicts annual mean concentrations of NOx and PM10. It provides a test that is designed to establish whether a project should be subject to a more 'Detailed' air quality assessment and is intended to give a reliable answer quickly. The DMRB model uses conservative emission factors. These worst-case concentrations are then added to the existing background concentrations to give the worst-case predicted ambient concentrations. The worst-case ambient concentrations are then compared with

the relevant ambient air quality standards to assess the compliance with these standards. Pollutant concentrations estimated by this Screening Model are so conservative that it is not deemed necessary to even consider local meteorological conditions.

The DMRB Screening Model was modified in July 2007 to include the latest information at that time on emission factors, fleet composition, background concentrations, the relationship between NO_x and NO_2, and the relationships between the annual mean concentrations and the metrics specified in the air quality criteria. With the latest DMRB spreadsheet (Version 1.03c), estimates were made of annual mean concentrations of NO_x, NO_2 and PM_{10}.

The Screening Model does not however predict concentrations of $PM_{2.5}$ (though PM_{10} can be used as an indicator of estimated $PM_{2.5}$ levels). The Airborne Particles Expert Group (APEG, 1999) suggested a $PM_{2.5}$ to PM_{10} ratio of 0.8 for non-catalyst petrol vehicles, and 0.9 for all other vehicles. The DMRB database showed that non-catalyst petrol vehicles comprised only 4% of the UK vehicle fleet in 2008, gradually declining in years thereafter. It is not practicable to apply different $PM_{2.5}$ ratios to different vehicle types, but given the small number of non-catalyst petrol vehicles on the road, this is unlikely to introduce any significant error. A worst-case approach should be taken, assuming a 0.9 ratio (which is very conservative) for all vehicles is applied. To estimate $PM_{2.5}$ concentrations, the predicted road PM_{10} contribution should be factored by 0.9 and then added to the background $PM_{2.5}$ concentration. The data prior and after conversion can be viewed in Appendix 8B.

The Assessment Years chosen for the air quality assessment align with the modelled traffic data for the Traffic and Transport Assessment (Appendix 8A). The baseline year is 2019, whilst the operational years are 2021 and 2036. It is assumed that the entire development would be implemented by 2036. As part of a separate planning application, the Brawney Road (Link X) is to be extended to the R916 (Link S), and has been considered in the air quality assessment as the route would cross the Proposed Development Site. The links chosen in the assessment are shown in Appendix 8B and were deemed to present the largest risk to receptors as they are the closest sources of emissions. The location of the receptors were chosen as they represent the worst case scenario of the N6 Athlone Bypass (Link Y), as well as considering the on-slip (Link O) and off-slip (Link E), and the through-road between the Brawney Road and R916. The location of each receptor is displayed in Appendix 8A.

As background data for 2036 is not available from Defra, data was used from the latest year available (2030). Furthermore, 2025 is the latest year that can be assessed in the DMRB Screening Tool, and was therefore used for the 2036 Scenario. Inputs and outputs of the DMRB Screening Tool are displayed in Appendix 8B.

8.3.1.2 Construction Phase Assessment

The methodology adopted for assessing construction impacts has been prepared in accordance with *Appendix 8: Assessment of Construction Impacts of the NRA 'Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes'* (Revision 1, May 2011). The potential impacts of construction works have been semi-quantitatively assessed using this method.

Dust is defined as all particulate matter up to 75µm (microns) in diameter and comprising both suspended and deposited dust, whereas PM_{10} is a mass fraction of airborne particles of diameter of 10 microns or less. The health impacts associated with dust include eye, nose and throat irritation in addition to the nuisance caused by deposition on cars, windows and property. Dust and PM_{10} emissions arise from a number of sources, so both construction activities and emissions from vehicles associated with the construction site need to be considered.

For identifying the likely distance from the proposed residential development that dust impacts may be experienced, the criteria listed in Table 9.2 have been used, which are drawn from professional experience of many different types of project, discussions with practitioners in the field, and published reports. Together with a consideration of the scale and duration of construction activities close to sensitive receptors, these criteria form the basis of the evaluation of significance and severity of effects.

Table 8.2: Assessment Criteria for Dust and PM_{10} from Construction Activities

Source		Potential distance for Significant Effects (distance from source)		
Scale	**Description**	**Soiling**	**PM_{10}**	**Vegetation Effects**
Major	Large construction sites, with high use of haul routes	100m	25m	25m
Moderate	Moderate construction sites, with moderate use of haul routes	50m	15m	15m
Minor	Minor construction sites, with limited use of haul routes	25m	10m	10m

Source: Appendix 8: Assessment of Construction Impacts of the NRA 'Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes' (Revision 1, May 2011)

8.3.2 Assessment of Predicted Impacts and Residual Effects (Significance of Effects)

Predicted impacts arising from the proposed residential development have been identified, magnitude of impact described, and an assessment of the level of significance for each effect determined. Impacts associated with the proposed residential development may or may not result in significant effects on the environment, depending on the sensitivity of the resource or receptor and potentially other factors.

The determination of the significance of effects is a key stage in the environmental impact assessment process. In general, impact significance has been defined using a combination of the sensitivity (e.g. High, Medium or Low) of the environmental feature, and the magnitude of impact (e.g. small, medium, large) where appropriate. The criteria for assessing sensitivity and magnitude level have been defined below.

8.3.2.1 Sensitivity (or Value)

If the receptor is the facade of a residential building, then it should be assumed that any member of the general public could be present within the building including the elderly, infants or other vulnerable groups. No distinction should be made between the sensitivity of dwellings, hospitals, schools, etc. and all should be considered as being of equal sensitivity for the purposes of the assessment. The receptors were chosen for the assessment (East Receptor and West Receptor) are located adjacent the main pollution source in the area (the N6 Athlone Bypass), and would represent a worst-case scenario from any changes in the air quality on the site of the Proposed Development.

8.3.2.2 Assessing the Significance of Effects

It is not sufficient to assess the size and probability of possible impacts: their significance should also be assessed. The significance of the effect is formulated as a function of the receptor or resource's environmental value (or sensitivity) and the magnitude of project impact (change). In other words, significance criteria are used to report the effect of the impact.

As detailed within the EPUK and IAQM document '*Development Control: Planning For Air Quality (*January 2017*)*', it is recommended an approach to defining the magnitude of changes and describing air quality impacts at specific receptors, as set out in Table 8.3. The Air Quality Assessment Levels used are those stipulated in Table 8.3.

Table 8.3: Magnitude of Impact for changes in Annual Mean NO_2, $PM_{2.5}$ and PM_{10} concentrations at a receptor

Long term average concentration at receptor in assessment year	% change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Source: Land-Use Planning and Development Control: Planning for Air Quality (January 2017)

8.4 Baseline Conditions

The application site is located at Lissywollen to the east of Athlone Town and is currently in usage as agricultural (arable) land split across three individual field's which are divided by vegetation-lined boundaries. The site is also contained by a vegetation-lined boundary with the exception of the fenced boundaries with the existing dwellings at Brawney Close and Brawney Square, and Athlone Football Club.

To the north, the site is largely contained by the N6 Athlone Bypass, a dual lane carriageway that provides access to Athlone and major transport routes to the east and west of Athlone. Beyond this, land is used for residential purposes including Blackberry Lane and agriculture.

To the east, the site is largely contained by the R916 and commercial properties with carparking and outdoor storage areas. Beyond the commercial premises, is residential properties including Greycastle Cottages.

To the south, the site is largely contained by a greenway (the Old Rail Trail Greenway), followed by a large residential area which contains a range of semi-detached dwellings. There is also a green open space located to the south which serves the residential area. Athlone Community College is also located to the south-west of the site.

To the west, the site is largely contained by Athlone Town Football Club Stadium, with areas of potential brownfield located around the stadium. Beyond the stadium, further open green spaces associated with recreational activities are present, including the grounds of Athlone GAA Club and a playground.

The N6 Athlone Bypass is expected to be the most significant emission source for any receptor within or nearby the site due to the high volume and speed of passing traffic.

8.4.1 Trends in Air Quality

Ambient air quality monitoring is the responsibility of the Environmental Protection Agency (EPA), with air quality assessment by local authorities informed by the national air quality monitoring network. Under the provisions of the EPA Act 1992, the EPA has overall responsibility for the co-ordination of ambient air quality monitoring in Ireland in accordance with EU and national legislation. The most recent annual report on air quality '*Air Quality in Ireland 2019 – Key Indicators of Ambient Air Quality'* (EPA, 2020), details the range and scope of monitoring undertaken throughout Ireland.

The Air Quality Framework Directive requires that Member States divide their territory into zones for the assessment and management of air quality. The zones adopted in Ireland are shown in EPA's Online Map Viewer. The study area is classified as being within Zone C (which includes other cities and large towns including Athlone).

The air quality in each zone is assessed and classified with respect to upper and lower assessment thresholds, based on the measurements over the previous five years. Upper and lower assessment thresholds are prescribed in the legislation for each pollutant. The number of monitoring locations required is dependent on population size and whether ambient air quality concentrations exceed the upper assessment threshold, are between the upper and lower assessment thresholds, or are below the lower assessment threshold. Long-term monitoring data has been used to determine background concentrations for the key pollutants in the study area. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

When ambient levels are deemed to be below the lower assessment threshold, modelling or objective estimation techniques alone may be used to assess ambient air quality.

8.4.3.1 Pollutants of Concern

Nitrogen Oxides (NO_x)

Nitrogen Oxides (NO_x) comprise nitric oxide (NO) and nitrogen dioxide (NO_2). The majority of NO_x emitted from vehicles is in the form of NO, which is oxidised in air to produce NO_2. The conversion of NO to NO_2 takes place via reactions with chemically active species, such as ozone.

Elevated NO_2 exposure can lead to health impacts, including respiratory-related issues and liver impacts. NO_2 concentrations are closely associated with traffic volumes. As a result, sensitive individuals including asthmatics, elderly people and children are more susceptible to NO_2 exposure closer to heavily trafficked roads.

Elevated NOx concentrations impact on ecosystems, contributing to the acidification and eutrophication of soils and water, which can lead to changes in species diversity. NO_x also acts as a precursor to ozone and particulates formation. It can also damage buildings.

The Irish government has adopted two air quality standards for nitrogen dioxide (NO_2):

- an annual mean concentration of 40µg/m^3; and
- a 1-hour mean concentration of 200µg/m^3, to be exceeded no more than 18 times per year.

With reference to the '*Air Quality in Ireland 2017 – Indicators of Ambient Air Quality'* (EPA, 2018), NO_2 concentrations were monitored at 14 locations across Ireland in 2017 and the graphs clearly display any trends in the change of NO_2 values (although not the most recent report). NO_2 values for all monitoring sites in Ireland were below the annual limit value in 2014, as shown on Plate 8.1 and well below the annual limit value for Zone C. The *Air Quality in Ireland 2019* (EPA, 2020) report summarises the measurements of the current monitoring programme in Ireland for 2019, stating there was only one exceedance in annual limit values for NO_2- located at St. John's Road West in Dublin (43µg/m^3).

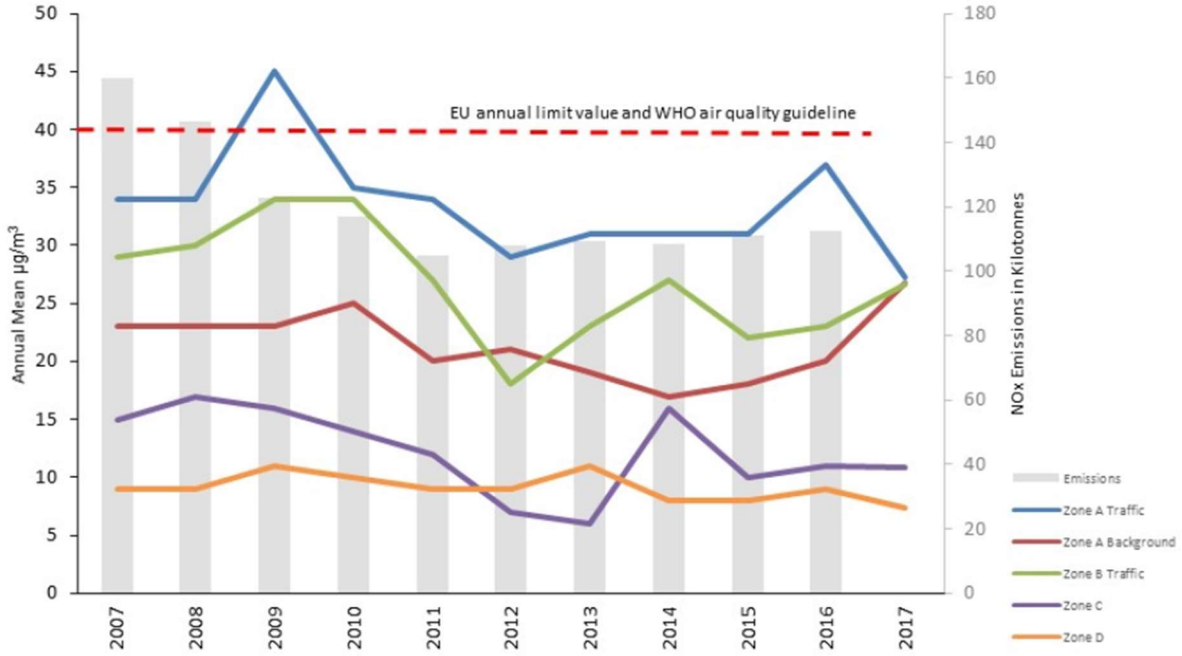


Fig. 8.1: Trend in NO_2 concentrations for zones in Ireland 2007-2017 (Source: EPA,2018)

Fig. 8.1 also shows the trend for NO_x across Ireland for the period 2007 to 2017. Levels across all zones of Ireland have experienced a decrease until 2012, with signs of a slight increasing trend in the years 2013 - 2017. The reason for the decrease in NO_2 concentrations from 2007 to 2012 could partly be due to meteorological conditions, as well as a decrease in traffic numbers. Cold and dry, or warm and dry, periods of weather with stable airflows lead to a build-up of pollutants such as NO_2.

Particulate Matter (PM_{10})

Particulate matter is composed of a wide range of materials arising from a variety of sources, and is typically assessed as total suspended particulates, or as a mass size fraction. The European air quality standards have historically adopted the PM_{10} standard for the assessment of fine particulate matter. This expresses particulate concentrations as the total mass size fraction at or below an aerodynamic diameter of 10µm. Particles of this size have the greatest likelihood of reaching the lung. Elevated levels of PM_{10} can cause cardiovascular disease, lung diseases, heart attacks and arrhythmias.

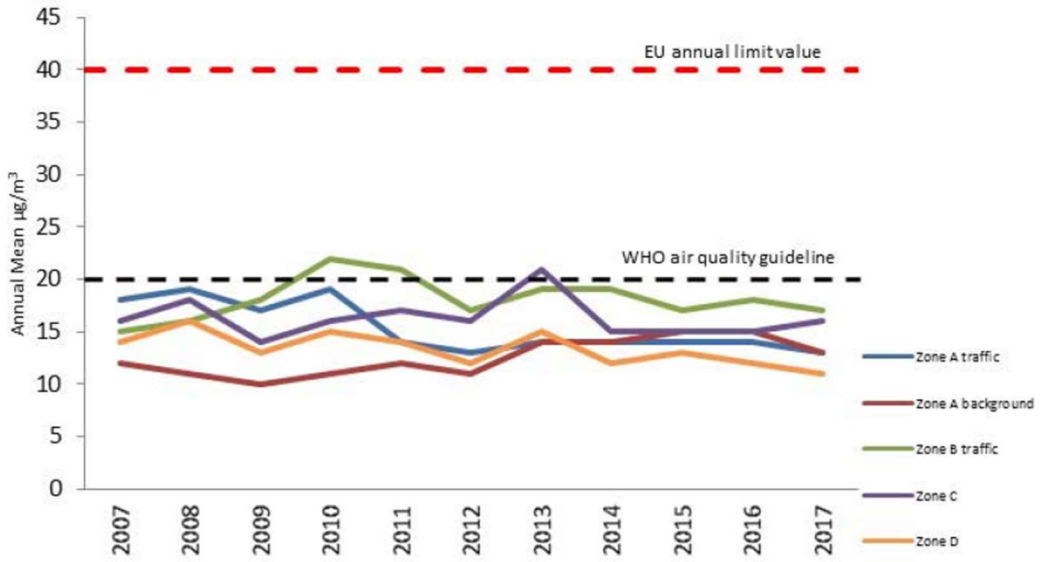


Fig. 8.2: Trend in annual mean PM_{10} concentrations for zones in Ireland 2007 – 2017 (Source: EPA, 2018).

The Irish government adopted two Air Quality Standards for PM_{10}, to be achieved by the end of 2004:

- an annual mean concentration of 40µg/m³ (gravimetric); and
- a 24-hour mean concentration of 50µg/m³ (gravimetric) to be exceeded no more than 35 times per year.

With reference to the '*Air Quality in Ireland 2017 – Indicators of Ambient Air Quality'* (EPA, 2018), PM_{10} was monitored at 15 stations across Ireland in 2017. Mean concentrations are below the annual limit value of 40µg/m³ as shown on Fig. 8.2. The *Air Quality in Ireland 2019* (EPA, 2020) report summarises the measurements of the current monitoring programme in Ireland for 2019, stating there were no exceedances in annual limit values for PM_{10} over the 30 monitoring stations.

Plate 8.2 also depicts the trend in PM_{10} annual mean concentration from 2007 to 2017. In cities, traffic emissions are the main source of PM_{10}, while in smaller towns or those areas not connected to the natural gas grid, emissions from residential solid fuel combustion dominate. The air quality in cities benefits from increased use of gas in place of solid fuel, and a ban on the use of bituminous coal, with the result that levels of PM_{10} are similar across all zones. Despite large differences in population number, Zone D has similar PM_{10} concentrations compared to Zone A. This is most likely due to residential solid fuel emissions in Zone D, which in this zone are a more significant source than traffic emissions.

Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ is defined as particulate matter with a diameter of less than 2.5µm. This fraction is often described as the fine fraction of PM_{10}. This fraction can be further divided into primary and secondary $PM_{2.5}$. The former refers to particles arising directly from combustion sources, predominantly road traffic.

Secondary particles are those formed by chemical reactions in the atmosphere following the emission of precursor gases. These are largely composed of sulphates and nitrates. There are theoretical and toxicological arguments, which suggest that $PM_{2.5}$ contains the most toxic component of particulate matter.

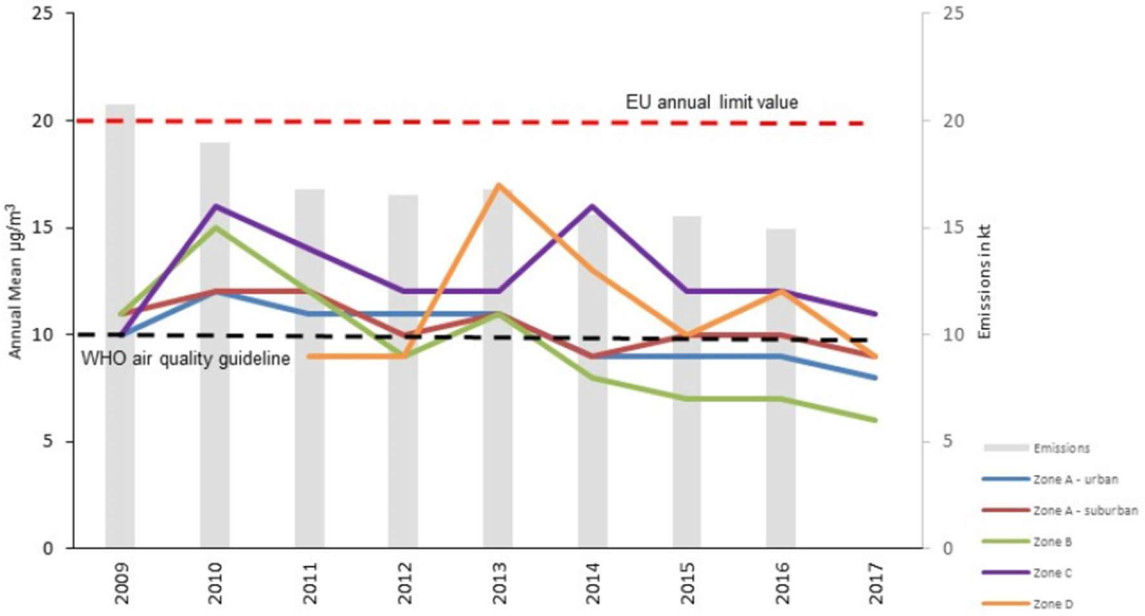


Fig. 8.3: Trend in annual mean $PM_{2.5}$ concentrations 2007 – 2017 (Source: EPA, 2018)

With reference to the '*Air Quality in Ireland 2017 –Indicators of Ambient Air Quality'* (EPA, 2018), $PM_{2.5}$ was monitored at 9 stations from 2007 to 2017. Levels in Ireland are below both the Stage One and Stage Two limit values of 25 and 20µg/m^3, as shown on Fig. 8.3. The *Air Quality in Ireland 2019* (EPA, 2020) report summarises the measurements of the current monitoring programme in Ireland for 2019, stating there were no exceedances in annual limit values for $PM_{2.5}$ over the 30 monitoring stations.

To date, $PM_{2.5}$ levels in Ireland have been below the EU limit value (25ug/m^3). Trend analysis of historic data at sites containing $PM_{2.5}$ show a fluctuation with a slight decrease from 2014 onwards. This fluctuation could be due to a number of different sources, given the variety of sources that contribute. As the economy continues to recover, increased emissions are expected from the commercial, industrial, and agriculture sectors. Under the National Emissions Reduction Target (NERT) set for each country by the European Commission, Ireland's obligation is to decrease $PM_{2.5}$ concentrations by 10% by 2020. The timely implementation of sectoral emission reduction polices will be key to achieving this target.

Construction Dust

Dust is defined as all particulate matter up to 75µm in diameter and comprising both suspended and deposited dust, whereas PM_{10} is a mass fraction of airborne particles of diameter of 10 microns or less. The health impacts associated with dust include eye, nose and throat irritation in addition to the nuisance caused by deposition on cars, windows and property. Dust and PM_{10} emissions arise from a number of sources, so both construction activities and emissions from vehicles associated with the construction site need to be considered.

8.5 Background Conditions

As per the methodology described within Appendix 11: Derivation of Regional Background Concentrations for the NO_x:NO_2 model of the NRA in '*Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes'* (Revision 1, May 2011), it has been assumed that the regional background concentrations in Ireland are characterised by a local authority in Northern Ireland. This approach has the advantage that concentrations in future years will be automatically calculated within the model. Background pollutant concentrations for nitrogen dioxide, PM_{10} and $PM_{2.5}$ used in this assessment were sourced from Defra projected background maps (Defra, 2020). Concentrations for the selected 1x1km grid square for all assessment years are shown in Table 8.4.

Table 8.4: Background annual mean pollutant concentrations (in µg/m³) suburban area near a major transport route

2019 (µg/m³)				2021 (µg/m³)				2030 (µg/m³)			
NO_2	PM_{10}	$PM_{2.5}$	NO_x	NO_2	PM_{10}	$PM_{2.5}$	NO_x	NO_2	PM_{10}	$PM_{2.5}$	NO_x
10.02	12.54	8.28	13.12	9.24	12.16	7.97	12.03	7.14	11.46	7.38	9.15

Source: Defra projected background maps from comparable Northern Irish Craigavon Local Authority (IGR: 301500,354500).

Baseline conditions for current year 2019, as well as future operational year 2021 have been predicted at the closest receptors to the N6 (to represent a worst-case scenario for impacts upon human health), to allow for comparison between the future operational and do-nothing scenarios. As mentioned previously, the background data only provides a projection up until the year 2030, therefore this data was used for the 2036 assessment. The predicted pollutant concentrations for the 2019 Base Year scenario are displayed in Table 8.5.

Table 8.5:Current (2019) Base Year scenario predicted pollutant concentrations at the closest potential receptor to the N6.

Year	Predicted Annual Mean Concentration (µg/m³)		
	NO_2	PM_{10}	$PM_{2.5}$
2019 East Receptor	17.69	14.61	10.14
2019 West Receptor	17.54	14.57	10.11

Under 'Base Year' (2019) conditions, all airborne contaminants screened at the closest potential receptor to the N6 fall well below the Air Quality Standard Limit Values for the protection of human health. They also fall below the lower assessment thresholds for all pollutants of concern.

8.6 Predicted Impacts

The potential air quality impacts associated with the proposed residential development on and from its environs must be considered for the following phases:

- Do-Minimum and Do-Something Phases; and
- Construction Phase.

8.6.1 Operation Phase Impacts

During the operational phase of the proposed residential development, there would be different sources of potential emissions which would have potential air quality impacts. The primary sources of emissions which are deemed long-term and have been considered in this assessment are additional vehicular traffic on public roads which would have local air quality impacts.

8.6.1.1 Local Air Quality Impacts

Pollution concentrations at representative residential receptors in close proximity to the N6 and the inner connection road to the R916 has been undertaken to predict what the impact upon local air quality would be as a result of the existing and additional vehicular traffic on public roads as a result of the Proposed Development in the year of operation (2021 and 2036). These are presented in Tables 8.6 – 8.8 over.

Table 8.6: Operational Year annual mean pollutant concentrations for NO_2 at the representative residential receptors including the percentage change of air quality

Receptor	Do-Minimum (µg/m³)	Do-Something (µg/m³)	% of Air Quality Assessment Level	% Change	Magnitude of Change
2021 East Receptor	16.91	17.07	43	1	Negligible
2021 West Receptor	16.91	16.92	42	0	Negligible
2036 East Receptor	16.09	16.14	40	0	Negligible
2036 West Receptor	15.91	15.95	40	0	Negligible

Table 8.7: Operational Year annual mean pollutant concentrations for PM_{10} at the representative residential receptors including the percentage change of air quality.

Receptor	Do-Minimum (µg/m³)	Do-Something (µg/m³)	% of Air Quality Assessment Level	% Change	Magnitude of Change
2021 East Receptor	14.23	14.27	36	0	Negligible
2021 West Receptor	14.23	14.23	36	0	Negligible
2036 East Receptor	13.82	13.84	35	0	Negligible
2036 West Receptor	13.77	13.78	34	0	Negligible

Table 8.8: Operational Year annual mean pollutant concentrations for $PM_{2.5}$ at the representative residential receptors including the percentage change of air quality.

Receptor	Do-Minimum (µg/m³)	Do-Something (µg/m³)	% of Air Quality Assessment Level	% Change	Magnitude of Change
2021 East Receptor	9.8	9.84	39	0	Negligible
2021 West Receptor	9.8	9.8	39	0	Negligible
2036 East Receptor	9.43	9.45	38	0	Negligible
2036 West Receptor	9.39	9.4	38	0	Negligible

The predicted pollutant concentrations in the Operational Years for the representative residential receptors indicate that there would be no exceedances of pollutant limit values at any receptor. All airborne contaminants screened at the various receptor locations would fall well below the Air Quality Standard Limit Values for the protection of human health. They also fall below the lower assessment thresholds for all pollutants of concern.

On this basis, any changes in emissions associated with the existing and additional vehicular traffic on public roads would be negligible in terms of both increases and decreases in exposure to airborne pollutants. As the predicted total concentration at each receptor is predicted to be well below the Air Quality Standard Limit Values for the protection of human health, and the receptors are predicted to experience a negligible change in pollutant concentration due to the proposed development.

8.6.2 Construction Phase Impacts

There are a small number of existing commercial and residential properties adjacent to and in the vicinity of the proposed residential development site, which have the potential to be affected by construction activities. Those activities which have the potential to give rise to dust emissions are as follows:

- site preparation and establishment;
- earthworks;
- materials handling, including:
- transfer to and from trucks/lorries;
- material spills during transportation and handling;
- storage / stockpiling / use of cement or other fine particulate; and
- cutting, grinding and drilling processes.

The potential for a construction site to impact sensitive receptors is dependent on many factors, including:

- location of the building site;
- proximity of sensitive receptors;
- nature, location and size of stockpiles, and length of time they are on-site;
- occurrence and scale of dust generating activities;
- necessity for on-site concrete crusher or cement batcher;
- number and type of vehicles and plant required on-site;
- potential for dirt or mud to be made airborne through vehicle movements; and
- weather conditions.

For identifying the likely distance from the proposed residential development site that dust impacts may be experienced, the criteria listed in Table 8.2 have been used, which are drawn from professional experience of many different types of project, discussions with practitioners in the field and published reports. Together with a consideration of the scale and duration of construction activities close to sensitive receptors, these criteria form the basis of the evaluation of significance and severity of effects.

With consideration to the nature and duration of the construction process and proximity of local sensitive receptors, the site, for the purpose of this assessment, has been categorised as Moderate scale in line with the criteria described in Table 8.2.

The impact of construction on nuisance dust and particulates therefore has the potential to be significant in terms of soiling for a distance of up to 50m from the site boundary, and for PM_{10} for up to 15m. Therefore, particular care would need to be taken during dust-generating activities in close proximity to sensitive receptors.

On this basis, the construction phasing for the proposed development has been developed to ensure that the sensitive receptors (that is residents around Brawney Road; the single dwelling to the west of ESB Networks; users of Athlone Town Football Club; Old Rail Trail Greenway users and residents to the south of the greenway) would not be immediately proximal to the vast majority of the initial proposed works.

For those sensitive residential properties located in the vicinity of Brawney Drive and adjacent to the site boundary (<50m), the main proximal works would involve establishing the houses and gardens. Such works have the potential to give rise to significant quantities of dust and particulates if mitigation measures are not adhered to.

8.7 Mitigation Measures

In conformance with P-NAL2 and P-NAL3 of the Athlone Town Development Plan 2014-2020, any activities associated with construction of the residential development, which are likely to give rise to dust emissions (e.g. construction activities, extractive industry) shall make suitable arrangements, and take precautionary measures, to suppress and control dust arising from the activity or the handling and transportation of materials. The deposition of dust on surrounding lands, or spillage onto public roads shall be prevented at all times. This would be particularly applicable to:

- residents around Brawney Road;
- the single dwelling to the west of ESB Networks;
- users of Athlone Town Football Club;
- Old Rail Trail Greenway users; and
- residents to the south of the greenway.

Negative air quality impacts can come from many sources during construction. Mitigation measures (as described below) would be required so that construction works are carried out in such a manner that emissions of dust and other pollutants are limited, and that best practicable means are employed to minimise disruption, risks to human health, and to avoid unnecessary impacts on sensitive ecological habitats.

No mitigation or monitoring is proposed as part of the Operational Phase of the Proposed Development due to negligible impacts outlined in Section 8.6.

8.7.1 Site-Specific Measures

The Contractor will be required to implement measures to minimise the amount of dust and emissions (including odour) produced during the Works. There will be a Duty of Care on the Contractor to ensure that dust-raising activities are located away from sensitive receptors (i.e. residents around Brawney Road) as much as feasibly possible and duration kept to a minimum when in proximity to a receptor.

The Contractor shall prepare an Air Quality Management Plan (AQMP) and incorporate the relevant mitigation measures outlined below within; reflecting the requirements of best practicable means and level of risk. This shall be included as part of the CEMP.

The most important aspect of the AQMP is:

- the assignment of responsibility for dust and emissions (including odour) management to an individual member of the Contractor's staff (i.e. CEMP-C);
- training staff to understand the importance of the issue; and
- communication (i.e. with residents around Brawney Road during works that may give rise to dust emissions).

Regular site inspections shall be undertaken to monitor compliance with the AQMP; record inspection results, and make an inspection log available to the relevant authorities/environmental bodies and the Employer's Project Manager when requested.

8.7.2 Vehicle and Plant Emissions

Emissions to the atmosphere, in terms of gaseous and particulate pollutants from vehicles and plant used on-site, should be controlled and limited, as far as reasonably practicable, using measures and appropriate control techniques as listed below:

- the engines of all vehicles and plant on-site should not be left running unnecessarily (i.e. idling) to minimise exhaust emissions (and noise);
- vehicles and plant should be low emission, and fitted with catalysts, diesel particulate filters or similar devices. Ultra-low sulphur fuels should be used in plant and vehicles;
- plant, equipment and emission control apparatus shall be selected to minimise the engine exhaust emissions, taking into consideration economic constraints and practicability;
- vehicles and plant should be in good working order and certified where applicable, with servicing completed in line with manufacturer's recommendations. Records of servicing should be maintained and visual checks carried out to ensure that black smoke is not emitted at times other than at ignition;
- plant should be situated and operated away from sensitive receptors (i.e. residents around Brawney Road) where possible;
- the use of diesel or petrol-powered generators should be minimised where possible, with mains electricity of battery powered equipment used as an alternative (where feasible);
- vehicle / plant exhausts should be directed away from the ground to minimise risk of re-suspension of ground dust, where reasonably practicable; and
- maximise energy efficiency, which may include using alternative modes of transport, maximising vehicle utilisation by ensuring full loading and efficient routing.

8.7.3 Control of Dust

The Contractor should take all necessary measures to minimise disturbance caused by dust. Excavation and earthworks can be a potential source of dust if they are not properly controlled, especially in dry and windy weather and thus should be avoided at these times if practicable.

Activities which have the potential to generate dust should be subject to a risk assessment, taking into account proximity to sensitive receptors, sensitive core activities associated with the operation of the airport and duration. This will allow appropriate mitigation and management techniques to be implemented.

Visual inspections should be undertaken regularly when dust-raising activities are occurring. Inspections should take into account prevailing meteorological conditions, and results shall be recorded and

maintained. These inspections should take place at least daily, and should determine the effectiveness of the applied mitigation and management techniques.

Measures to minimise the amount of dust produced might include for example, dampening haul roads and stockpiles, keeping roads clean, and using covers to minimise dust blow from lorries. Appropriate measures should reflect the nature of the construction activity (type, dust source points, construction operation periods and time of year) as well as ameliorating conditions (such as prevailing wind directions and speeds, typical precipitation and the dampening effect of retained soil moisture). Possible methods of reducing and controlling dust emissions during construction are listed in Table 8.9.

Table 8.9: Dust Control Measures which can be implemented on site

Activity	Possible Dust Control Methods
Soil handling and storage	Restrict the duration of the activity. Seal and seed storage mound surfaces as soon as is practicable. Protect surfaces from winds until disturbed areas are sealed and stable.
Overburden handling	Protect exposed material from wind (by keeping material within voids or protecting them by topographical features). Spray exposed surfaces of mounds regularly to maintain surface moisture unless mound surface has formed a crust after rainfall or is grassed. Minimise handling.
Drilling	Use dust-extraction equipment such as filters, on exhaust air emissions from drill rigs.
Loading/unloading	Reduce drop heights wherever practicable. Protect activities from wind.
Material Storage	Dampen material. Protect from wind and store under cover. Screen material to remove dusty fractions prior to external storage.
Transport by conveyor within site (if applicable)	Protect by use of wind and roof boards. Shelter transfer points from wind. Use scrapers to clean belts, with collection of scrapings for disposal. Minimise drop heights and protect from wind. Use water sprays.
Transport by vehicle within and off-site	Restrict vehicle speed. Water unsurfaced roads and paved roads. Wheel or body wash at an appropriate distance from site entrance. This should always be within the site, and the roadway from the washing facility to the highway should be hard-surfaced. Load and unload in areas protected from wind. Minimise drop heights. Sheet or cover loaded vehicles. Use water sprays/spray curtains to moisten material. Sweep/wash paved roads. Use paved roads where practicable.

8.8 Cumulative Impacts

During construction, it is unlikely there will be any cumulative impacts together with other existing and approved projects if mitigation as outlined in Section 8.7 is followed stringently on the site. A search of *Westmeath County Council Planning Application Map Viewer* found no approved developments that could potentially give rise to further emissions that could impact future residents.

8.9 Residual Impacts

The predicted total concentration at each receptor is predicted to be well below the Air Quality Standard Limit Values for the protection of human health (less than 75% of the AQAL), and the receptors are predicted to experience a negligible change in pollutant concentration due to the proposed development. As such, it is expected the effect on receptors from local air quality to be Not Significant.

Considering the sensitivity of surrounding land uses, proximity to the works and the ameliorative, remedial or reductive mitigation measures described in Section 8.7, the construction related impacts of the residential development are likely to be Not Significant.

The impact of the emissions from the Proposed Development on climate and energy usage can be found in Chapter 10.

PART B – Climate

8.10 Introduction

Climate change presents a unique challenge for Ireland economy, environment and society. This Section assesses the potential climate related impacts associated with the proposed Lissywollen Strategic Housing Development (SHD).

Ireland is a party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, which together provide an international legal framework for addressing climate change.

In December 2015, an ambitious new legally binding, global agreement on climate change was agreed in Paris. The Paris Agreement aims to restrict global temperature rise to well below 2°C above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5°C. It aims to increase global ability to adapt to the adverse impacts of climate change and to foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten sustainable food production. It also seeks to achieve a balance between anthropogenic emissions by sources, and removals by sinks, of greenhouse gases in the second half of this century.

The first Irish National Mitigation Plan[16] represents an initial step to set us on a pathway to achieve the level of decarbonisation required. It is a whole-of-Government Plan, reflecting in particular the central roles of the key Ministers responsible for the sectors covered by the Plan – Electricity Generation, the Built Environment, Transport and Agriculture, as well as drawing on the perspectives and responsibilities of a range of other Government Departments.

The measures that will be implemented through the plan will lay foundations for transitioning Ireland to a low carbon, climate resilient and environmentally sustainable economy by 2050. To support this ongoing work, the Plan also includes over 100 individual actions for various Ministers and public bodies to take forward.

Emissions reduction measures and actions set out in this National Mitigation Plan are aligned with and build upon commitments made in the 2015 Energy White Paper. The Paper will be guided by the following strategic objectives:

- policy will contribute to reductions in Ireland's greenhouse gas emissions and enhancement of sinks in a manner that achieves the optimum benefits at least cost;
- a stable and predictable policy and regulatory framework will be underpinned by rigorous analysis and appraisal, supported by strong research and analytical capacity;
- the Government will pursue investment, innovation and enterprise opportunities towards building a competitive, low carbon, climate-resilient and environmentally sustainable economy; and
- the citizen and communities will be at the centre of the transition.

[16] https://www.dccae.gov.ie/en-ie/climate-action/topics/national-mitigation-plan/Pages/default.aspx

8.11 Methodology

In Ireland some sectors have independently begun the process of identifying key vulnerabilities for their activities. The report by the Irish Academy of Engineering, Ireland at Risk Critical Infrastructure – Adaptation for Climate Change (The Irish Academy of Engineering, 2009) and the report by the Heritage Council and Fáilte Ireland (the National Tourism Development Authority), Climate Change, Heritage and Tourism, Implications for Ireland's Coast and Inland Waterways (ed. Kelly and Stack, 2009) are examples of initiatives of this kind.

Other research work on adaptation in specific sectors has been carried out or commissioned by other Government Departments / bodies such as the OPW, CoFoRD (programme of competitive forest research for development research programme, etc. (e.g. CLIMADAPT).

A National Climate Change Vulnerability Scoping Study (Sweeney and Coll, 2012) was undertaken to identify first generation vulnerabilities for Ireland based on a sensitivity analysis across key sectors. The analysis identified a clustering of impacts and their importance in relation to an assessment of likely resilience by sector. The assessment methodology used was an impacts-first, science-first classical approach. The priority sectors identified are:

- biodiversity and fisheries;
- water resources and the built coastal environment; and
- forestry and agriculture.

As each sector develops its sectoral adaptation plan (under the Climate Action and Low Carbon Development Act 2015), detailed vulnerability and risk analysis will be required. Some preliminary work has been undertaken on costing the impacts of climate change in Ireland. This is now being supported by more detailed analysis of the current and future costs of flood risk management.

The implementation of adaptation is being supported by the development of a suite of guidelines, tools and approaches. These include the Local Authority Adaptation Strategy Development Guidelines and the Irish climate information platform “Climate Ireland”, which includes data, information, tools and approaches for local level adaptation decision making. Work is ongoing to develop sectoral decision-making tools and supports.

There are no specific tools developed for assessing climate change for the strategic housing. The Climate Change and Major Project guidelines on how to make vulnerable investments resilient to climate change provide methodology for undertaking a vulnerability and risk assessment.

Climate change adaptation and mitigation are to be integrated in the preparation and approval of planned development. Adaptation seeks to ensure adequate resilience of development to the adverse impacts of climate change, based on vulnerability. Mitigation seeks to reduce the emission of greenhouse gases.

8.12 Vulnerability

Ireland's unique position on Europe's north-western extremity increases its relative vulnerability to precipitation extremes and wind-driven rain[17]. These are significant considerations for building and construction activities which should incorporate climate change contingencies into design specifications. In particular winter wind driven rain is likely to become a more important issue due to expected increases in wind speeds and rain[18]. Rainfall will become more seasonal with wetter winters and dryer, more overcast, summers. More extreme rainfall or precipitation events will occur, changing the current pattern of 'low duration, low intensity'. The likelihood of inland flooding will increase as a result.

Due to projected increases in these parameters, double-leaf housing construction should be used in most cases. Exterior materials specifications and maintenance requirements may require reassessment[19]. Flooding has been identified as the most significant risk facing Ireland today, with both likelihood and impact being given a rating of 4 out of 5 ('likely' and 'high impact'). Recent floods in many ways have been the most exceptional on record; both in scale and extent reaching record levels, including the River Shannon that significantly exceeded the highest levels previously recorded over a period of more than 100 years.

The aim of the vulnerability assessment is to identify the relevant climate hazards for the development at the proposed location. Adaptation through project options, appraisal, and planning will depend on the assessed project vulnerability and risk.

Timescale for the project vulnerability and risk assessment shall correspond to the lifespan of the project. During the lifespan, there could be significant changes in frequency and intensity of weather events due to climate change, which should be taken into account.

The scale for assessing the likelihood of a climate hazard is presented in **Error! Reference source not found.**. The output of the likelihood analysis is an estimation of the likelihood for each of the essential climate variables and hazards.

Table 8.10 Scale of Likelihood of Climate Hazard

Term	Qualitative	Quantitative
Rare	Highly unlikely to occur	5%
Unlikely	Unlikely to occur	20%
Moderate	As likely to Occur	50%
Likely	Likely to Occur	80%
Almost certain	Very likely to occur	95%

Generally all projects will emit greenhouse gas (GHG) emissions to atmosphere during the construction, operational and decommissioning phases. Direct GHG emissions may be caused by operational activities, and project decommissioning. Indirect GHG emissions may be due to increased demand for energy and indirect GHG activities. Indirect GHG activities are linked to the implementation of the proposed project and may include transport, office space heating of buildings or loss of habitats that provide carbon sequestration, (e.g. through land-use change).

[17] Co-ordination, Communication and Adaptation for Climate Change in Ireland: an Integrated Approach (COCOADAPT)
[18] Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways
[19] Climate Impact Screening

The significance of project's GHG emissions should be based on its net impact, which may be positive or negative. Where GHG emissions cannot be avoided, the significance of a project's emissions shall be reduced by mitigation or project design. Where GHG emissions remain significant but cannot be reduced further approaches to compensate project emissions should be considered.

Currently in Ireland, there is no set methodology to evaluate significance criteria or a defined threshold for GHG emissions for strategic housing. Due to the inconsistencies between the different methods and their assumptions for assessment, there is no single agreed method by which to assess a project carbon budget. The method of assessment varies according to the type and scale of the development.

Due to a lack of guidelines and an established methodology, the assessment of significance of the GHG emissions is based on whether the development's GHG emissions cumulatively represent a considerable contribution to the global atmosphere and whether the development as continued or extended will replace existing development that would have a higher GHG profile.

Where the GHG emissions cannot be avoided, the mitigation should aim to reduce the development emissions at all stages.

8.13 Baseline Environment

8.13.1 Regional Context

Observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising sea level are unequivocal evidence of warming of the climate system globally. Global mean temperature has increased by 0.8°C compared with pre-industrial times for land and oceans, and by 1.0°C for land alone. Most of the observed increase in global average temperatures is very likely due to increases in anthropogenic greenhouse gas concentrations.

In future years, landmasses are expected to warm more than the oceans, and northern, middle and high latitudes. Despite possible reductions in average summer precipitation over much of Europe, precipitation amounts exceeding the 95th percentile are very likely in many areas; thus, episodes of severe flooding may become more frequent despite the general trend towards drier summer conditions. In an ensemble-based approach using outputs from 20 global climate models (GCMs), the Mediterranean, north-east and north-west Europe are identified as warming hot spots but with regional and seasonal variations in the pattern and amplitude of warming.

Ireland has a typical maritime climate, with relatively mild and moist winters and cool, cloudy summers. The prevailing winds are south-westerly in direction. The climate is influenced by warm maritime air associated with the Gulf Stream which has the effect of moderating the climate, and results in high average annual humidity across the country. The area of least precipitation is along the eastern seaboard of the country, in the rain shadow of the Leinster uplands.

Mean seasonal temperature will change across Ireland. A number of studies have applied selected IPCC Special Reports on Emissions Scenarios (SRESs) to model climatic changes across Ireland at a regional scale. Despite the different methods and scenario combinations used, there is agreement in projected changes in temperature for Ireland. However, there are more disparities in the magnitude and sign for the precipitation changes projected for the island. **Error! Reference source not found.** summarises climate impact projections for Ireland, estimates of projections confidence are derived from published projection data from the Local Authority Adaptation Strategy Development Guidelines.

Table 8.11 – Climate Impacts Projections: 30 year overview[20]

Variable	Summary	Confidence	Projected Changes
Sea Levels Rise	Strong increase	High	Projections of sea level rise to 2100 suggest a global increase in the range of 0.09 - 0.88m with a mean value of 0.48m. For 2050, it is reasonable to assume a sea level rise in the region of 25cm above present levels. It should be noted that due to a limited understanding of some important effects that contribute to rates of increase, these estimates of sea level rise may prove optimistic, and estimates of up to 4-6 m have been projected by some models.
Storm surge	Strong increase	Medium	An increase in the number of intense cyclones and associated strong winds are expected over the north - east Atlantic. By the 2050s, storm surge heights in the range of 50-100cm are expected to increase in frequency for all coastal areas with exception of the southern coast.
Costal Erosion	Moderate increase	Low	Currently approximately 20% of Ireland's coastline is at risk of costal erosion, particularly areas of the south and east coast and also in isolated areas on the west coast. Rates of increase will be determined by local circumstances; however, it is expected that areas of the south-west are likely to experience the largest increase.
Cold Snaps/ Frost (winter/night)	Moderate decrease	High	By mid-century, minimum temperatures during winter are projected to increase by ~2°C in the southeast and ~2.9°C in the north. This change will result in fewer frost days and milder nigh-time temperatures.
Heatwaves	Strong increase (summer)	High	Seven significant heatwaves (defined as 5+ days@>25°C) have been recorded in Ireland over the past 30 years, resulting in approximately 300 excess deaths. By mid-century, a projected increase in summer maximum daily temperature of approximately 20°C will likely intensify heatwaves, with maximum temperatures increasing and heatwave duration lengthening.
Dry Spells	Strong increase (summer)	Medium	There have been seven periods of insignificant rainfall in Ireland in the past 40 years. Of these, the events of 1976 and 1995 were the most severe, averaging 52 and 40 days in duration respectively across Irish rainfall stations. An approximate 20% decrease in summer precipitation in many areas is strongly indicated under a high emissions scenario. This decrease is likely to result in progressively longer periods without significant rainfall, posing potentially severe challenges to water sensitive sectors and regions.

[20] Local Authority Adaptation Strategy Development Guideline, EPA 2016

Extreme Rainfall	Strong increase (winter)	Low	Heavy precipitation days (in which more than 20mm of rainfalls) are likely to increase in frequency in winter. By the 2050s an increase in the number of heavy precipitation days of around 20% above the level of 1981-2000 is projected under both low- medium and high emissions scenarios. This may have serious consequences for flood risk in sensitive catchments.
Flooding	Moderate increase (winter)	Low	An Irish Reference Network of hydrometric stations has been established to assess signals of climate charge in Irish hydrology. This network has detected an increasing trend in high river flows since 2000. Projections of future flows are beset by uncertainty at the catchment scale, but a broad signal of wetter winters and drier summers is evident across a number of independent studies.
Wind Speed	Minor increase (winter)	Medium	Observed wind speed over Ireland has not changed significantly in recent times, but it is anticipated that the distribution of wind will alter slightly in future, with winters marginally winder and summers marginally less so. Though the average wind speed is anticipated to change in only a minor way over the coming decades, the frequency of extreme windstorms is expected to increase due to alternations in the origin and track of tropical cyclones.

8.13.2 Local Context

The closest weather station to the application site and are considered representative of conditions experienced at the application site is that at Mullingar, which is located approximately 24km to north-east of the Proposed Development application site.

The moderating influence of the Atlantic Ocean is felt throughout Ireland. The annual mean temperature for different areas in Ireland varies between mountainous regions, lowlands and the coast. Mean daily maximum temperatures are typically between 7.4°C to 19.2°C and mean daily minimum temperatures are typically between 2.2°C to 11.1°C for the area surrounding Mullingar.

Table 8.12 - Mullingar 1979–2008 averages

Temperature (°C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
mean daily max	7.4	7.9	9.8	12.1	14.9	17.3	19.2	18.9	16.7	13.2	9.9	7.9
mean daily min	1.5	1.5	2.8	4.1	6.3	9.2	11.1	10.8	8.9	6.2	3.5	2.2
mean temperature	4.5	4.7	6.3	8.1	10.6	13.2	15.2	14.8	12.8	9.7	6.7	5.0

The east of Ireland, which is sheltered from Atlantic frontal systems, is sunnier than the west. The sunniest months are May and June. The mean daily duration recording of sunshine for the area is 3.6 hours. December is the dullest month, with 1.6 hours of mean daily duration. May is the sunniest month, with 5.8 hours of mean daily duration, explained largely by its long days and finer weather.

For the period 1979-2008, mean monthly total for year rate of precipitation was 941.3 mm / year at Mullingar, with winter months receiving the heaviest amounts, refer to Table *8.13*8.13:

Table 8.13:Average Precipitation Mullingar 1979–2008 averages

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
mean monthly total	91.7	72.0	78.3	62.1	68.7	70.5	61.8	80.8	73.8	102.1	82.4	97.1	941.3
greatest daily total	30.3	24.7	29.5	27.6	26.1	52.9	26.6	58.2	42.1	48.8	43.7	38.8	58.2

Results from the synoptic meteorological station at Mullingar over a ten-year period indicate that the predominant wind direction is from the south-western quadrant. A windrose for the wind data recorded at Mullingar is presented in Figure *8.4*8.4.

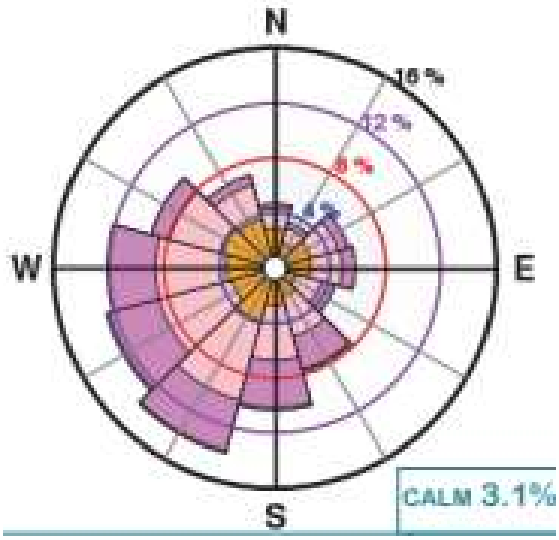


Figure 8.4 - Windrose for Mullingar https://www.met.ie/climate-ireland/SummaryClimAvgs.pdf

8.14 Potential Impact of the Proposed Project

The building sector has high energy demand which includes the energy used during construction, embodied energy of materials used and in addition there is energy demand of the buildings once occupied. During the construction process waste is generated and efforts to reduce and recycle waste need to be incorporated. Changes in climate are being observed and these impacts are expected to continue and intensify into the future. DBFL's Flood Risk Assessment includes attenuation measures for no flooding for 1 in 100 years (plus 10% climate change) event. Energy demand of the occupied buildings can contribute to the climate change as at present majority of generated energy comes from carbon-based fuels. Carbon footprint of the occupiers can be based on the commuting and consumption patterns. Extreme weather patterns can pose higher risk of flooding which can cause high economical damage and disruption to the community. The flood risk deems the site to be outside the 1,000 year flood events (Zone C).

8.14.1 Impact Statement - Adaptation Options

The proposed development design includes measures to reduce carbon footprint of the buildings. High level of insulation and high performance glazing will reduce the heating demand on the plant and on site produced renewable energy will further decrease the energy demand. The foregoing section 8.10 provides description of Energy Efficiency, CO_2 emissions and resilience to climate change which serve actions to reduce the energy requirements of the building. The OPW website www.floodinfo.ie/ indicates that the Lissywollen site was within the area assessed as part of the Flood Risk Management Plan for the Shannon Upper and Lower River basin. In addition as part of the EU Floods Directive, the OPW is undertaking a Catchment Flood Risk Assessment and Management (CFRAM) Study countrywide. Many of these maps are available" on the CFRAM and OPW websites. In reviewing the mapping, it can be noted that the Proposed Development site falls entirely outside the 0.1% Annual Exceedance Probability (AEP) event (1 in 1,000 year). It can be concluded that the proposed development is located within flood zone C.

Site levels will be designed such that overland flow caused by any flooding from the site drainage system, or from surface water that fails to enter the site drainage system in extreme events, will not flood buildings, driveways or footpaths. Surface water is designed to remain within the bounds of roadway reservations.

The site drainage network has been modelled so no flooding occurs throughout the site for the design return period of 1 in 100 years (plus 10% climate change), and is considered to exceed the requirements of the GDSDS for a 1 in 30-year return period surcharge check.

In addition the attenuation system has been sized for a 1 in 100 year return period and it is designed using the current rainfall depth values available from Met Eireann including 10% increase for the effects of climate change.

Mitigation measures at areas at risk of flooding in a 1 in 100 year event will consist of designing overland flows to direct any floodwater away from buildings, either keeping it within the carriageway or directing the surface water to designated green areas within the site. The finished floor levels for all buildings in the vicinity are designed to be above the surcharged level for any manhole in danger of flooding. Furthermore, finished floor levels for all buildings will be a minimum of 500mm above the maximum flood levels in nearby surface water attenuation systems.

If petrol interceptors are not adequately cleaned and maintained, there is a risk that they would become a throttle and cause flooding upstream.

During flood events, access and egress would need to be maintained and overland flow routes and extents would need to be carefully planned. All habitable spaces are located more than 500mm above the top water levels for attenuation systems for the 1 in 100 year event and are at no perceivable risks of flooding.

Proposed mitigation measures to address residual flood risks are summarised below:

1. The proposed drainage system including the detention basins to be maintained on a regular basis to reduce the risk of a blockage. A maintenance contract for the petrol interceptor will be entered into with a specialist maintenance company.
2. The drainage network is designed in accordance with the recommendations of the GDSDS and provides attenuated outlets and associated storage up to the 100 year event. The drainage network for the site has been designed to ensure that it can accommodate the 1 in 100 year rainfall event in surcharged conditions.
3. Overland flow routes for pluvial events should not be built on or become blocked off. Overland flow routes should be designed to direct water to compatible development areas and to other open space areas away from dwellings.
4. At detailed design stage, the location of all dropped kerbs and side inlet gullies to be fully reviewed to ensure all overland flow paths are not impeded.
5. Sustainable Urban Infrastructure: the development will include SUDS features e.g. permeable paving, swales, filter drains etc. incorporating interception and storage.

8.14.2 Behavioural Measures – Soft Actions for the Occupied Building

The way people use energy in the home, at work and in commuting between the two places, has the potential to save up to 20% of total energy consumption.

While public knowledge and awareness is rapidly improving in recent years many households are still unaware of the large ecological footprint that they have on the environment and how to easily save resources and prevent waste. Soft actions will aim to inform the building occupants on effective strategies to use less resources, efficient appliances, efficient use of their heating/hot water controls and efficient transport/ commuting.

8.14.3 Construction Phase

Details of the construction period and what measures will be adopted and used is covered by a separate document 'Construction And Demolition Waste Management Plan' which is included in this planning application by Alanna Roadbride Developments Ltd. This document is intended to set a clear path and philosophy for the future nominated contractor in drawing up their own final strategy for Construction and Demolition Waste Management Plan.

The site is inland and deemed to be within Flood Zone C, i.e. outside the 1,000 year flood events. The sequential approach recommended by "The Planning System and Flood Risk Management Guidelines for Planning Authorities" has been complied with for the subject site as it is within Flood Zone C.

The adaptation options outlined in the flood risk assessment should be implemented by the main contractor and after building handover by future management company. The management company will

be responsible to develop a final implementation plan, a monitoring routine and a schedule of evaluation and review.

8.15 Development Vulnerability

The aim of the vulnerability assessment is to identify the relevant climate hazards for the project at the foreseen location.

8.15.1 Construction Phase

The likelihood analysis of the proposed development during construction phase to climate hazards is presented in Table ***8.15*** 8.15. The climate change impact on the Proposed Development has been assessed to be moderate affected by extreme rainfall, flash (pluvial) flood, storms, and winds. Based on the predicted climate change impacts for this location the Proposed Development during construction phase would be unlikely affected to cold spells, landslides and snow. The Proposed Development during construction phase would not be affected by flood, heat, drought, wildlife fires and freeze–thaw damage. The Proposed Development would not be affected by rising sea level during construction phase.

Table 8.15 - Analysis of Likelihood of Climate Hazards during Construction Phase

	Extreme rainfall, flash flood	Flood	Heat	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze –thaw damage	Rising sea levels
Rare		✓	✓	✓	✓				✓	✓
Unlikely							✓	✓		
Moderate	✓					✓				
Likely										
Almost certain										

Table 8.16 shows the climate hazard impact analysis of the proposed development construction phase. Major impacts on health and safety, the environment and financial areas, moderate impacts on asset damage and engineering, operational, social and reputation areas are identified based on the projected change climate impacts.

Table 8.16 - Climate Hazard Impact Analysis

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
Asset damage, engineering, operational			✓		
Safety and Health				✓	
Environment				✓	
Social			✓		
Financial				✓	

Error! Reference source not found. below assesses the sensitivity of the project construction phase to climate hazard. It was assessed that site assets, energy inputs and transport links are of high sensitivity to extreme rainfall, flood, flash floods, storms and winds; water inputs will be highly sensitive to droughts. On site assets will be medium sensitive to cold spells and snow and freeze – thaw damage. Transport links will be medium sensitive to cold spells and snow.

Table 8.17 - Sensitivity of the project construction phase to climate hazard

	Extreme rainfall, flash flood	Flood	Heath	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze – thaw damage	Rising sea levels
On site assets	High	Low	Low	Low	Low	High	Low	Medium	Medium	Low
Inputs - Water	Low	Low	Low	High	Low	Low	Low	Low	Low	Low
Inputs - Energy	High	Low	Low	Low	Low	High	Low	Low	Low	Low
Transport Links	High	Low	Low	Low	Low	High	Low	Medium	Low	Low

In Table 8.18, the exposure of the project construction phase to current climate hazards was assessed. In the current climate as the construction activities will be carried out short term. The exposure of the project extreme rainfall, flood, flash flood, storms and winds has been assessed to be medium.

Table 8.18 - Exposure of the Project during construction phase to Climate Hazards without Mitigation

	Extreme rainfall, flash flood	Flood	Heat	Drought	Wildlife Fires	Storms and Winds	Landslides	Cold Spells and Snow	Freeze – thaw damage	Rising sea levels
Current Climate	Medium	Low	Low	Low	Low	Medium	Low	Low	Low	Low

Error! Reference source not found. shows the vulnerability analysis of the project during construction phase to climate hazards; it combines the sensitivity and the exposure analysis. The Proposed Development was assessed to be most sensitive to extreme rainfall, flash flood, storms, and winds.

Table 8.19 - Vulnerability Analysis of Project to Climate Hazards

Sensitivity	Exposure (current & future climate)		
	Low	Medium	High
Low	Rising sea levels, Flood, Landslides, Freeze –thaw damage, Drought, Heat, Wildlife Fires		
Medium		Cold Spells and Snow	
High			Extreme Rainfall, Flash Flood, Storms and Winds

Based on the development vulnerability assessment, measures to improve the resilience of the project during construction phase to extreme rainfall, flash (pluvial) flood, storms, and winds are required.

8.15.2 Operational Phase

Detailed development vulnerability assessment for the proposed project is presented below. The likelihood analysis of the proposed development to climate hazards is presented in Table 8.20.

The proposed development has been assessed to be almost certain affected by extreme rainfall, flash (pluvial) flood, storms, and winds and heat. The Proposed Development would be likely affected by drought. The proposed development would be unlikely affected to cold spells, landslides and snow. The proposed development would not be affected by flood, wildlife fires and freeze–thaw damage. The proposed development will not be affected by rising sea level.

Table 8.20 - Analysis of Likelihood of Climate Hazards

	Extreme rainfall, flash flood	Flood	Heath	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze – thaw damage	Rising sea levels
Inputs - Water	Low	Low	Low	High	Low	Low	Low	Low	Low	Low
Inputs - Energy	High	Low	Low	Low	Low	High	Low	Low	Low	Low
Transport Links	High	Low	Low	Low	Low	High	Low	Medium	Low	Low

Table 8.21 shows the climate hazard impact analysis of the proposed development. It was assessed that climate hazards will have major impacts on health and safety, the environment, moderate impact social areas.

Table 8.21 – Climate Hazard Impact Analysis

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
Safety and Health				✓	
Environment				✓	
Social			✓		

Table 8.22 - below assesses the sensitivity of the project to climate hazard. It was assessed that the project energy inputs and transport links are of high sensitivity to extreme rainfall, flood, flash floods, storms and winds; water inputs will be highly sensitive to droughts. Transport links will be medium sensitive to cold spells and snow.

Table 8.22 -Sensitivity of Project to Climate Hazards

	Extreme rainfall, flash flood	Flood	Heath	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze –thaw damage	Rising sea levels
Inputs - Water	Low	Low	Low	High	Low	Low	Low	Low	Low	Low
Inputs - Energy	High	Low	Low	Low	Low	High	Low	Low	Low	Low
Transport Links	High	Low	Low	Low	Low	High	Low	Medium	Low	Low

In Table 8.23, the exposure of the project to climate hazards was assessed. In the current climate, the exposure of the project extreme rainfall, flood, flash flood, storms and winds has been assessed to be medium. The project was assessed to have high exposure to rainfall, flash flood, storms, winds and heat in future.

Table 8.23 - Name of Table Exposure of the Development to Climate Hazards without Mitigation

	Extreme rainfall, flash flood	Flood	Heat	Drought	Wildlife Fires	Storms and Winds	Landslides	Cold Spells and Snow	Freeze – thaw damage	Rising sea levels
Current Climate	Medium	Low	Low	Low	Low	Medium	Low	Low	Low	Low
Future Climate	High	Low	High	Low	Low	High	Low	Low	Low	Low

Table shows the vulnerability analysis of the project to climate hazards; it combines the sensitivity and the exposure analysis. The project was assessed to be most sensitive to extreme rainfall, flash flood, storms, winds and heat.

Table 8.24 - Vulnerability Analysis of Project to Climate Hazards

Sensitivity	Exposure (current & future climate)		
	Low	Medium	High
Low	Rising sea levels, Flood, Landslides, Freeze – thaw damage, Wildlife Fires		
Medium		Cold Spells and Snow Drought	
High			Extreme Rainfall, Flash Flood, Storms and Winds Heat

Based on the development vulnerability assessment, measures to improve the resilience of the Proposed Development to extreme rainfall, flash (pluvial) flood, storms, and winds heat are required.

Mitigation is designed to increase the resilience of the development, or wider environmental receptors, to climate change and focuses on increasing capacity to absorb climate related shocks.

In the context of climate change, measures to increase the adaptive capacity of the proposed development and disaster risk reduction strategies can be developed with a view to reducing vulnerability and increasing the resilience of the Proposed Development. Significant incidents related to the climate change that affect operation of the proposed strategic housing development should be recorded for future analysis.

Based on a development vulnerability assessment measures to improve the resilience of the project to extreme rainfall, flash flood, storms, and winds are required. Table 8.25 details specific mitigation measures for the proposed development relating to climate change adaptation.

Table 8.25 – Mitigation Measures Related to Climate Change Adaptation

Main concerns related to:	Proposed alternatives or mitigation measures
Construction phase	
Extreme Rainfall, Flash Flood	Mitigation measure will consider changes / flexibility in construction / operations that allow for rising water levels and groundwater levels based on the masterplan design.
	Mitigation measure will consider design of provide adequate surface water drainage during construction phase based on the masterplan design.
Risk Reduction Mechanism	Mitigation measure will consider secure insurance for damage of assets / site incidents based on the masterplan design.
Storms and Winds	Mitigation measure will ensure construction activities can withstand increases in high winds and storms based on the masterplan design.
	Mitigation measure will ensure the choice of equipment is weather efficient based on the masterplan design.
Other concerns based on the design	In this section the mitigation measures will be considered on the design in the masterplan layout.
Operational phase	
Extreme Rainfall, Flash Flood	Mitigation measure will consider changes / flexibility in construction / operations that allow for rising water levels and groundwater levels based on the masterplan design.
	Mitigation measure will consider design of provide adequate surface water drainage during construction phase based on the masterplan design.
Storms and Winds	Mitigation measure will ensure design can withstand increases in high winds and storms based on the masterplan design.
Heat	Mitigation measure will ensure building design for ventilation and cooling based on the masterplan design.
	Mitigation measure will ensure design of outdoor spaces to reduce urban heat island effect based on the masterplan design.
Drought	Mitigation measure will ensure design for droughts emergency based on the masterplan design.
Other concerns based on the design	In this section the mitigation measures will be considered on the design in the masterplan layout.

8.15.3 Future Reduction of GHG Emissions

A set of indicators shall be developed to assess project preparedness for adaptation against climate change. Provision shall be made for a periodic review of plans and the allocation of reporting responsibilities for a regime to measure and evaluate progress on adaptation. This can be carried out by the property management company or resident association. This process shall include regular feedback and/or updates from the implementation efforts.

8.16 Do Nothing Scenario

There are no predicted impacts should the proposed development not proceed.

8.17 Difficulties Encountered

No difficulties were encountered while developing this report.

8.18 References

Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011).
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Westmeath County Council (2014) *Athlone Town Development Plan 2014-2020.*
Westmeath County Council (2020) *Draft Westmeath County Development Plan 2021-2027.*

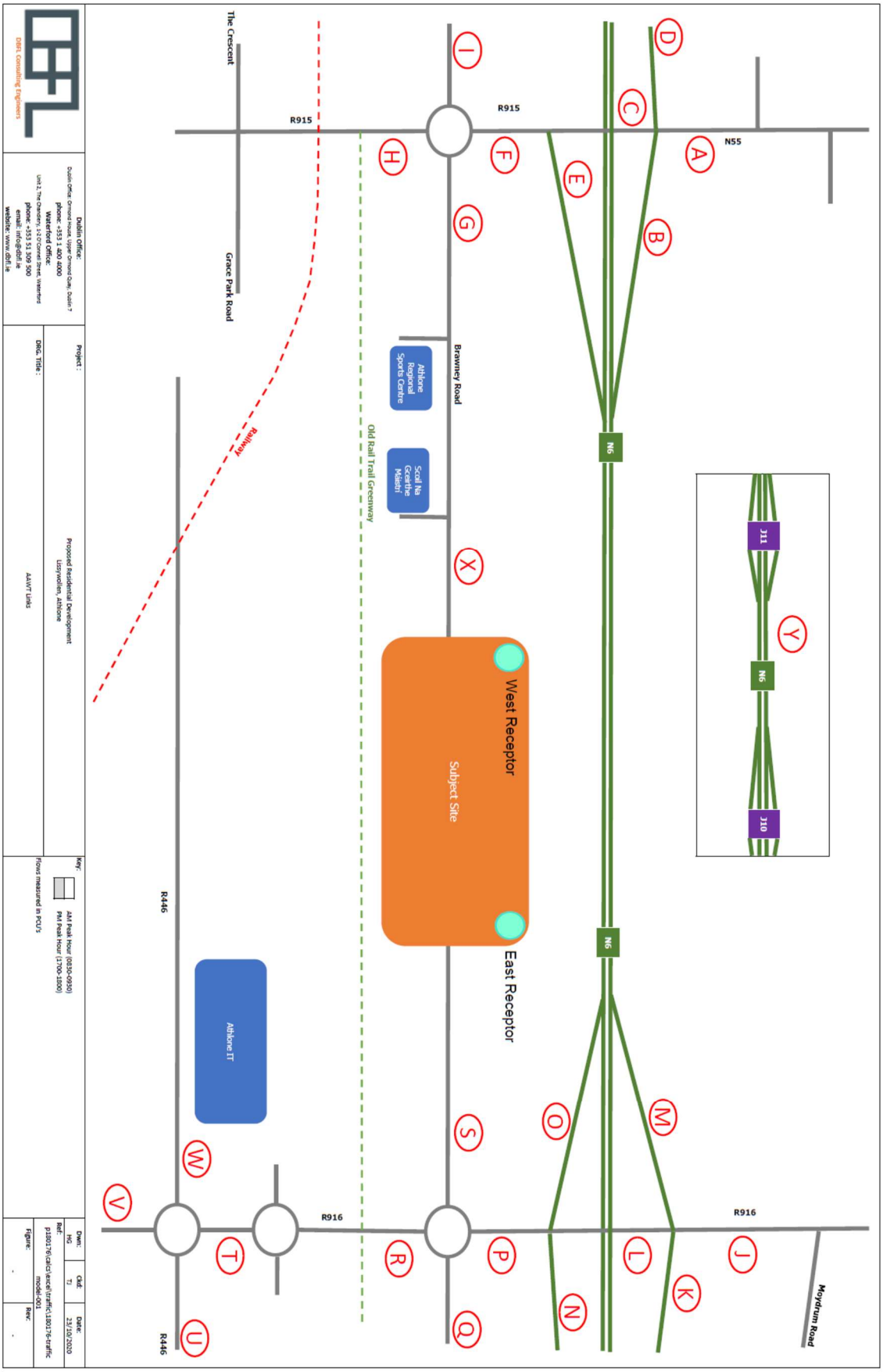
Chapter 8 Appendices

8A – AAWT Link Locations & Receptor Location

8B – AAWT Tables

8C – Calculations

Appendix 8A – AAWT Link Locations & Receptor Location



Appendix 8B – AAWT Tables

Table 1		
Peak Hour Factors	0.071	AM
24hr factor	0.16	0.088 PM
Weekday Index	0.94	Tues

TABLE A : AAWT Values	Link Location																									
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
2019 Base	15868	2997	16477	5622	2448	18138	5876	11339	7898	19237	2448	17949	7118	3293	7248	16435	2075	15046	2087	8259	13639	183	13668	970	43819
2021 DN	16486	2912	16828	5805	2210	18227	5421	11561	8155	20302	2600	19301	7239	3473	7240	18202	2289	16284	4284	9261	14521	189	14335	1616	45388
2021 DS	16514	2930	16959	5890	2229	18376	5741	11648	8239	20365	2642	19428	7261	3516	7282	18392	2289	16378	4569	9295	14555	189	14335	1936	45516
2036 DN	19562	3455	19967	6888	2622	21627	6432	13717	9676	24165	3072	22950	8576	4107	8953	21460	2689	19212	4809	10863	17148	225	16979	1737	53828
2036 DS	19683	3535	20550	7268	2704	22290	7858	14105	10050	24448	3259	23516	8671	4298	9140	22309	2689	19633	6080	11015	17300	225	16979	3162	54395

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
2019 Base	2701	507	2787	951	414	3068	994	1918	1336	3254	414	3036	1204	557	1226	2780	351	2545	353	1397	2307	31	2312	164	7412
24 Hour Total	16987	3189	17228	5981	2604	19296	6252	12063	8403	20467	2604	19094	7572	3503	7711	17484	2208	16066	2220	8786	14509	195	14541	1031	46616
Weekly Average Day - 2019 Base	15968	2997	16477	5622	2448	18138	5876	11339	7898	19237	2448	17949	7118	3293	7248	16435	2075	15046	2087	8259	13639	183	13668	970	43819
2021 DN	2789	492	2846	982	374	3083	917	1955	1379	3434	440	3265	1225	587	1225	3079	387	2754	725	1567	2456	32	2425	273	7677
24 Hour Total	17539	3097	17902	6175	2351	19380	5767	12399	8675	21598	2766	20533	7701	3695	7702	19363	2435	17323	4357	9852	15448	201	15290	1719	48285
Weekly Average Day - 2021 DN	16486	2912	16828	5805	2210	18227	5421	11561	8155	20302	2600	19301	7239	3473	7240	18202	2289	16284	4284	9261	14521	189	14335	1616	45388
2021 DS	2793	496	2869	996	377	3108	971	1970	1394	3445	447	3286	1228	595	1232	3111	387	2770	773	1572	2462	32	2425	327	7699
24 Hour Total	17568	3117	18042	6266	2371	19549	6107	12391	8765	21665	2811	20668	7724	3740	7747	19566	2435	17424	4861	9889	15485	201	15290	2060	48421
Weekly Average Day - 2021 DS	16514	2930	16959	5890	2229	18376	5741	11648	8239	20365	2642	19428	7261	3516	7282	18392	2289	16378	4569	9295	14555	189	14335	1936	45516
2036 DN	3309	584	3377	1165	444	3658	1088	2320	1637	4088	320	3882	1451	695	1514	3630	455	3250	813	1837	2901	38	2872	294	9105
24 Hour Total	20810	3673	21242	7327	2790	23007	6843	14593	10294	25708	3268	24413	9123	4370	9524	22830	2860	20438	5116	11596	18243	239	18063	1847	57263
Weekly Average Day - 2036 DN	19562	3455	19967	6888	2622	21627	6432	13717	9676	24165	3072	22950	8576	4107	8953	21460	2689	19212	4809	10863	17148	225	16979	1737	53828
2036 DS	3329	598	3476	1229	457	3770	1329	2386	1700	4135	551	3978	1467	727	1546	3774	455	3321	1028	1863	2926	38	2872	535	9201
24 Hour Total	20940	3760	21861	7732	2877	23713	8359	15005	10692	26009	3467	25017	9235	4572	9723	23734	2860	20886	6468	11718	18404	239	18063	3364	57867
Weekly Average Day - 2036 DS	19683	3535	20550	7268	2704	22290	7858	14105	10050	24448	3259	23516	8671	4298	9140	22309	2689	19633	6080	11015	17300	225	16979	3162	54395

TABLE B : HGV Volumes	Link Location																							
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
2019 Base	668	59	408	319	65	461	35	219	313	1135	272	875	272	290	272	544	71	538	77	343	396	35	526	12	2465
2021 DN	711	63	434	340	69	489	34	231	333	1208	289	931	289	308	288	581	75	574	86	367	422	38	561	16	2624
2021 DS	711	63	436	341	70	492	39	232	334	1209	290	933	290	309	288	584	75	576	90	367	422	38	561	21	2626
2036 DN	1010	89	617	483	98	694	48	328	474	1716	411	1323	411	438	408	825	107	816	122	521	599	54	796	23	3727
2036 DS	1011	90	622	487	99	701	61	332	477	1719	413	1328	412	440	410	833	107	820	133	522	600	54	796	36	3732

Table 1				
Peak Hour Factors	0.071	AM	0.088	PM
24hr factor	0.16			
Weekday Index	0.94	Tues		

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
2019 Base	113	10	69	54	11	78	6	37	53	192	46	148	46	49	46	92	12	91	13	58	67	6	89	2	417
24 Hour Total	711	63	434	340	69	491	38	233	333	1208	289	931	289	308	289	579	75	572	82	365	421	38	560	13	2623
Weekly Average Day - 2019 Base	668	59	408	319	65	461	35	219	313	1135	272	875	272	290	272	544	71	538	77	343	396	35	526	12	2465
2021 DN	120	11	73	57	12	83	6	39	56	204	49	158	49	52	49	98	13	97	14	62	71	6	95	3	444
24 Hour Total	756	67	462	361	74	520	36	246	355	1285	308	991	308	328	306	618	80	611	91	390	448	40	596	17	2791
Weekly Average Day - 2021 DN	711	63	434	340	69	489	34	231	333	1208	289	931	289	308	288	581	75	574	86	367	422	38	561	16	2624
2021 DS	120	11	74	58	12	83	7	39	57	204	49	158	49	52	49	99	13	97	15	62	71	6	95	4	444
24 Hour Total	757	67	464	363	74	523	41	247	356	1286	308	993	308	329	306	621	80	613	96	390	449	40	596	23	2793
Weekly Average Day - 2021 DS	711	63	436	341	70	492	39	232	334	1209	290	933	290	309	288	584	75	576	90	367	422	38	561	21	2626
2036 DN	171	15	104	82	17	117	8	55	80	290	70	224	70	74	69	140	18	138	21	88	101	9	135	4	630
24 Hour Total	1074	95	656	513	105	739	51	349	504	1825	437	1407	437	466	435	878	114	868	129	554	637	57	847	25	3965
Weekly Average Day - 2036 DN	1010	89	617	483	98	694	48	328	474	1716	411	1323	411	438	408	825	107	816	122	521	599	54	796	23	3727
2036 DS	171	15	105	82	17	119	10	56	81	291	70	225	70	74	69	141	18	139	23	88	102	9	135	6	631
24 Hour Total	1076	96	662	518	105	746	65	353	507	1828	439	1412	438	468	436	886	114	872	142	555	638	57	847	39	3971
Weekly Average Day - 2036 DS	1011	90	622	487	99	701	61	332	477	1719	413	1328	412	440	410	833	107	820	133	522	600	54	796	36	3732

TABLE C : HGV %	Link Location																							
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
2019 Base	4%	2%	2%	6%	3%	3%	1%	2%	4%	6%	11%	5%	4%	9%	4%	3%	3%	4%	4%	4%	3%	19%	4%	1%	6%
2021 DN	4%	2%	3%	6%	3%	3%	1%	2%	4%	6%	11%	5%	4%	9%	4%	3%	3%	4%	4%	4%	3%	20%	4%	1%	6%
2021 DS	4%	2%	3%	6%	3%	3%	1%	2%	4%	6%	11%	5%	4%	9%	4%	3%	3%	4%	4%	4%	3%	20%	4%	1%	6%
2036 DN	5%	3%	3%	7%	4%	3%	1%	2%	5%	7%	13%	6%	5%	11%	5%	4%	4%	4%	3%	5%	3%	24%	5%	1%	7%
2036 DS	5%	3%	3%	7%	4%	3%	1%	2%	5%	7%	13%	6%	5%	10%	4%	4%	4%	4%	2%	5%	3%	24%	5%	1%	7%

Appendix 8C – Calculations

	Screening Result (unconverted)			
	NOX	NO2	PM10	PM2.5
2019 East Receptor	30.39	15.14	14.61	-
2019 West Receptor	30.09	15.06	14.57	-
2021 DM East Receptor	29.07	14.34	14.23	-
2021 DM West Receptor	29.07	14.34	14.23	-
2021 DS East Receptor	29.39	14.42	14.27	-
2021 DS West Receptor	29.09	14.35	14.23	-
2030 DS East Receptor	28.91	13.06	13.84	-
2030 DS West Receptor	28.53	12.97	13.78	-
2030 DM East Receptor	28.81	13.04	13.82	-
2030 DM West Receptor	28.46	12.95	13.77	-

	NO2 Increment	Conversion Tool Result
2019 East Receptor	17.27	17.69
2019 West Receptor	16.97	17.54
2021 DM East Receptor	17.04	16.91
2021 DM West Receptor	17.04	16.91
2021 DS East Receptor	17.36	17.07
2021 DS West Receptor	17.06	16.92
2030 DS East Receptor	19.76	16.14
2030 DS West Receptor	19.38	15.95
2030 DM East Receptor	19.66	16.09
2030 DM West Receptor	19.31	15.91

	PM2.5 Calculation
2019 East Receptor	10.14
2019 West Receptor	10.11
2021 DM East Receptor	9.80
2021 DM West Receptor	9.80
2021 DS East Receptor	9.84
2021 DS West Receptor	9.80
2030 DS East Receptor	9.45
2030 DS West Receptor	9.40
2030 DM East Receptor	9.43
2030 DM West Receptor	9.39

Background Concentrations	2019	2021	2030 (latest year available)
NO2	10.02	9.24	7.14
NOX	13.12	12.03	9.15
PM10	12.54	12.16	11.46
PM2.5	8.28	7.97	7.38

Source: Defra projected background maps from comparable Northern Irish Craigavon Local Authority (IGR: 301500,354500).

AADT	AAWT to AADT (multiplied by 1.056)				
Link	2019	2021 DS	2021 DM	2036 DM	2036 DS
N6 Mainline	46273	48065	47930	56842	57441
Brawney Rd (X)	919	1833	1530	1645	2994
N6 Offslip (E)	2318	2111	2093	2483	2561
N6 Onslip (O)	6864	6896	6856	8478	8655
S Link	1976	4327	4057	4554	5758

HGV %					
Link	2019	2021 DS	2021 DM	2036 DM	2036 DS
N6 Mainline	6	6	6	7	7
Brawney Rd (X)	1	1	1	1	1
N6 Offslip (E)	3	3	3	4	4
N6 Onslip (O)	4	4	4	5	4
S Link	4	2	2	3	2

Receptor	Distance from N6 Link (m)	Distance from Brawney Road (X) (m)	Distance from N6 offslip (E) (m)	Distance from N6 onslip (O) (m)	Distance from S link (m)
East Receptor (1)	20	N/A	N/A	200	200
West Receptor (2)	20	230	470	N/A	N/A

9.0. Noise

9.1 Introduction

This chapter sets out the proposed approach to the assessment of:

- The impact of construction noise and vibration upon existing sensitive receptors close to the development.
- The impact of the existing noise climate on the both the internal and external areas of the proposed development.
- The impact of traffic noise associated with the proposed development upon existing sensitive receptors close to the development.
- The impact of fixed plant associated with the proposed commercial areas of the development, upon both the existing and proposed noise-sensitive receptors of the development.

For each assessment the likely significant effects will be determined.

The assessments have been completed in accordance with the legislation detailed in the following sections of this Report.

To assist the reader a Glossary of Terminology has been included in Appendix 9-1.

The assessment has been completed by Benedict Sarton BSc (Hons), IOA Dip. Benedict is member of SLR's Acoustics Team and is a Corporate Member of the Institute of Acoustics (MIOA).

9.2 Legislation and Planning Policy Guidance

This Section is split into:

- Planning Policy and Development Control
- Technical Standards

9.2.1 Planning Policy and Development Control

The following Planning/Development Control Policies are of relevance to the Lissywollen development:

- Environmental Noise Regulations 2006;
- Lissywollen South Framework Plan 2018-2024;
- Westmeath County Council Development Plan 2014-2020; and
- Westmeath County Council Noise Action Plan 2018-2023.

Environmental Noise Regulations 2006

The Environmental Noise Regulations 2006 give effect to EU Directive 2002/49/EC on the assessment and management of environmental noise. These regulations define environmental noise as unwanted or harmful outdoor sound created by human activities. This includes transport noise, road traffic, rail traffic, air traffic and from sites of industrial activity. They do not control domestic or neighborhood noise.

The directive sets out a clear two-stage plan for the curbing of environmental noise:

1. Noise maps for areas and infrastructure are made within defined criteria; and
2. Based on these results, noise action plans for each area must be made.

The assessment will be undertaken with reference to the above and the Westmeath County Council Noise Action Plan 2018-2023, which is referenced later in this Section.

Lissywollen South Framework Plan 2018– 2024

With regard to noise, objective number O-LUF15 of the Lissywollen South Framework Plan (LSFP) states:

'To protect environmental quality in Lissywollen through the implementation of European, National and Regional policy and legislation relating to air quality, greenhouse gases, climate change, light pollution, noise pollution and waste management, in order to support the national transition to a climate resilient low carbon society and economy, at a local and county level'.

With reference to the proposed development, objective number P3-KS01 of the LSFP States:

'To minimise the adverse impacts of noise and promote good health and a good quality of life through the effective management of noise from the N6'.

Westmeath County Council Development Plan 2014-2020.

The Westmeath County Council Development Plan 2014-2020 states that noise impact assessments are required regarding any development where it is proposed to introduce noise creating uses in proximity to noise sensitive uses, such as residential areas. Where noise sensitive uses are proposed within proximity to a noise source, such as national roads, rail lines, etc., proposals shall include noise and/or vibration attenuation measures in any planning application, for example where development proposals are brought forward within the zone of influence of existing national roads or of planned new national roads.

Westmeath County Council Noise Action Plan 2018-2023

The Westmeath County Council Noise Action Plan 2018-2023 details measures required to lessen the effect of excessive noise in areas highlighted in associated noise maps.

The onset assessment levels for noise mitigation measures are 70 dB L_{den} and 57 dB $L_{night.}$ The onset assessment levels for measures to preserve existing noise situations are 55 dB L_{den} and 45 dB $L_{night.}$ These levels reflect an annual average 24-hour period.

With respect to areas of elevated noise at Athlone, the Noise Action Plan states that future planning applications that are within or bordering excessive noise zones, such developments boarding the N6 or M6, are required to comply with the following actions.

- Provide a detailed site assessment to confirm noise levels are the same on site as per the model and apply appropriate noise reduction measures.
- Consider appropriate planning conditions on any future developments in the areas that may be negatively affected by noise from the public road.
- Future planning applications that are within or bordering the excessive noise zones shall be required to submit a report from a suitable qualified person containing:
    - A detailed noise survey/assessment of the site.
    - Proposals detailing any noise reduction/abatement required at the site.

- Any future proposed upgrading or alterations to the road shall ensure to maintain and/or reduce current noise levels coming from the public road.

The development in question is located to the south of the N6, therefore with reference to the above a detailed noise survey and assessment providing suitable mitigation measures is required at the Site.

Lissywollen South Framework Plan 2018– 2024

With regard to noise, objective number O-LUF15 of the Lissywollen South Framework Plan (LSFP) states:

'To protect environmental quality in Lissywollen through the implementation of European, National and Regional policy and legislation relating to air quality, greenhouse gases, climate change, light pollution, noise pollution and waste management, in order to support the national transition to a climate resilient low carbon society and economy, at a local and county level'.

With reference to the proposed development, objective number P3-KS01 of the LSFP States:

'To minimise the adverse impacts of noise and promote good health and a good quality of life through the effective management of noise from the N6'.

9.2.2 Technical Standards

In the absence of any statutory Irish guidance relating to noise and vibration levels that may be generated by the construction or operation of the development or the potential impact of the existing noise environment on the development proposed, the assessment has been undertaken with reference the technical standards shown in Table 9-1

Table 9-1 Technical Standards

Demolition and Construction Phase	Operational Phase
BS5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise and Part 2: Vibration.	BS8233:2014 Guidance on sound insulation and noise reduction for buildings.
	ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise, New Residential Development, produced by the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH).
	Environmental Noise Guidelines for the European Region document (WHO, 2018) and Night Noise Guidelines for Europe (WHO, 2009).
	BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.
	The Calculation of Road Traffic Noise (CRTN)
	DMRB Volume 11 Section 3 Part 7 Noise and Vibration

Impacts and Effects will be determined with reference to the *Guidelines for Environmental Noise Impact Assessment*, produced by the Institute of Environmental Management and Assessment (IEMA), and published in October 2014.

Summaries of the technical guidance outlined in Table 9-1 are given below.

BS5228-1:2009+A1:2014

Construction noise from the construction of the development will be assessed in accordance with BS5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*. This standard sets out a methodology for predicting noise levels arising from a wide variety of construction and related activities and contains tables of sound power levels generated by a wide variety of mobile and fixed plant equipment.

Compliance with BS5228-1:2009+A1:2014 is expected as a minimum standard when assessing the impact of construction noise upon the existing noise environment at nearby sensitive receptors.

BS5228-1:2009+A1:2014 gives several examples of acceptable noise limits for construction or demolition noise. For this assessment as baseline noise data will be available, it is proposed that the ABC method will be used to determine the threshold value at the receptor locations.

In accordance with this method the threshold noise levels for a potentially significant effect are as detailed in Table 9-2.

Table 9-2 Construction Noise Residential Receptors – Example Threshold Values

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A	Category	Category C
Night-time (23.00-07.00)	45	50	55
Evenings and weekends	55	60	65
Daytime (07.00-19.00) and Saturdays (07.00-13.00)	65	70	75
NOTE1 A significant effect has been deemed to occur if the total L_{Aeq} noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level. **NOTE 2 If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total L_{Aeq} noise level for the period increases by more than 3 dB due to construction activity.** **NOTE 3 Applied to residential receptors only.**			
A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. **B) Category B: threshold values to use when the ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.** **C) Category C: threshold values to use when the ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.** **D) 19.01-23.00 weekdays, 13.01-23.00 Saturdays and 07.01-23.00 Sundays**.			

If the threshold value is exceeded, then the effect of construction noise upon nearby receptors may be significant. BS5228-1:2009+A1:2014 states that the significance of the effect will depend upon "other project-specific factors, such as the number of receptors affected and the duration and character of the impact". Whereby professional judgement will be used to determine whether an effect is considered to be significant, and commentary explaining the reasons for this judgement will be provided.

BS5228-2:2009+A1:2014

Construction vibrations will be assessed in accordance with BS5228-2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites - Part 2: Vibration*. This standard gives recommendations for basic methods of vibration control relating to construction and open sites where work activities/operations generate significant vibration levels.

BS5228-2:2009+A1:2014 provides guidance on the effects of vibration as shown in Table 9-3 over.

Table 9-3 Construction Vibration Residential Receptors – Example Threshold Values

Vibration Level, mms^{-1}	Effect
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.30	Vibration might be just perceptible in residential environments.
1.00	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.
10.00	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

BS8233:2014

The impact of environmental noise upon the proposed residential receptors at the Site will be assessed with reference to BS8233:2014.

BS8233:2014 is the provision of recommendations for the control of noise in and around new buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate. The standard suggests suitable internal noise levels within different types of buildings, including residential dwellings, as shown in Table 9-4.

Table 9-4: Residential Development Suitable Internal Noise Levels, dB

Activity	Location	07:00 to 23:00 $L_{Aeq,16hr}$	23:00 to 07:00 $L_{Aeq,8hr}$
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30

BS8233:2014 states that the recommended limits can be relaxed by up to 5dB "*where development is considered necessary or desirable*" (Paragraph 7.7.2).

Whilst it may be considered desirable to achieve the BS8233:2014 recommended internal noise levels with windows open, it is stated that where the limit cannot be met with an open window, "*there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level*" (Paragraph 7.7.2).

It is, therefore, not essential that the recommended internal noise levels are achievable with open windows if suitable alternative means of ventilation can be provided.

With regards to external noise, Section 7.7.3.2 of BS8233:2014 states that:

> *"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited".*

ProPG: Planning & Noise

As BS8233:2014 does not specify internal limits for maximum noise levels within bedrooms during the night-time, reference has been made to the guidance document ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise, New Residential Development, produced by the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH).

This document states:

> *"For a reasonable standard in noise-sensitive rooms at night (e.g. bedrooms) individual noise events should not normally exceed 45dB LAFmax more than 10 times a night."*

WHO Guidelines

The WHO advice correlates with the guidance within BS8233:2014 and ProPG with regards to suitable indoor and outdoor noise levels.

The Environmental Noise Guidelines for the European Region document (WHO, 2018) and Night Noise Guidelines for Europe (WHO, 2009) recommend guideline noise levels regardless of the current noise environment. The WHO suggests suitable noise levels for both indoor and outdoor living areas during daytime and night-time periods, and these levels are set regardless of the noise type or noise source, i.e. 'benchmark' levels. It advises on the minimum levels of noise before critical health effects, including annoyance, occur.

In this regard, the WHO 2018 guidelines state:

> *"The NNG defines effect thresholds or 'lowest observed adverse health effect levels' for both immediate physiological reactions during sleep and long-term adverse health effects. These guideline exposure levels defined a level below which no effects were expected to occur (corresponding to 30dB L_{night}) and proceeded to define the level where adverse effects start to occur (corresponding to 40dB L_{night}, with the aim of protecting the whole population, including – to some extent – vulnerable groups."*

The WHO 2009 guidelines state:

> *"Below the level of 30dB $Ln_{ight,outside}$, no effects on sleep are observed except for a slight increase in the frequency of body movements during sleep due to night noise. There is no sufficient evidence that the biological effects observed at the level below 40dB $L_{night,outside}$ are harmful to health. However, adverse health effects are observed at the level above 40dB $L_{night,outside}$, such as self-reported sleep disturbance, environmental insomnia, and increased use of somnifacient drugs and sedatives". And "Above 55dB the cardiovascular effects become the major public health concern, which are likely to be less dependent on the nature of the noise. Closer examination of the precise impact will be necessary in the range between 30dB and 55dB as much will depend on the detailed circumstances of each case."*

BS4142:2014+A1:2019

The impact of commercial noise from the proposed development upon existing and future sensitive receptors will be assessed with reference to British Standard 4142:2014 *Methods for rating and assessing industrial and commercial sound*. This standard is intended to be used to assess the potential adverse impact of sound, of an industrial and/or commercial nature, at nearby sensitive receptor locations within the context of the existing sound environment.

Where the specific sound contains tonality, impulsivity and/or other sound characteristics penalties should be applied depending on the perceptibility. For tonality a correction of either 0, 2, 4 or 6dB should be added; for impulsivity a correction of either 0, 3, 6 or 9dB should be added and if the sound contains specific sound features which are neither tonal nor impulsive a penalty of 3dB should be added.

In addition, if the sound contains identifiable operational and non-operational periods, that are readily distinguishable against the existing sound environment, a further penalty of 3dB may be applied.

The assessment of impacts contained in BS4142:2014 is undertaken by comparing the sound rating level, i.e. the specific sound level of the source plus any penalties, to the measured representative background sound level immediately outside the sensitive receptor location. Consideration is then given to the context of the existing sound environment at the sensitive receptor location to assess the potential impact.

- Once an initial estimate of the impact is determined, by subtracting the measured background sound level from the rating sound level, BS4142:2014 states that the following should be considered:
- typically, the greater the difference, the greater the magnitude of the impact;
- a difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- a difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and

- 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. It is an indication that the specific sound source has a low impact.

BS4142:2014 notes that:

> *"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."*

BS4142:2014 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

To account for the acoustic character of proposed sound sources, BS4142:2014 provides the following with respect to the application of penalties to account for, *"the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention"*.

- Tonality – *"For sound ranging from not tonal to predominantly tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible and 6dB where it is highly perceptible;*
- *Impulsivity – A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible;*
- *Intermittency – When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied; and*
- *Other Sound Characteristics – Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied."*

Finally, BS4142:2014 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

Calculation of Road Traffic Noise

It is understood that to facilitate the development, a road will be constructed.

CRTN sets out the UK standard methods and procedures to predict and measure road traffic noise. In the UK, road traffic noise is predicted and measured in terms of a statistical measure, equivalent to the 10th percentile. Termed the L_{A10}, this measure of noise is equivalent to the noise level exceeded for 10% of the measurement period.

The assessment will include a simple assessment, using the noise modelling software CadnaA, at up to ten receptor locations adjacent to the existing effected links. Effected links are those that will experience a 1dB(A) change in the $L_{A10,18hr}$ noise level in the short-term and/or a 3dB(A) change in the $L_{A10,18hr}$ noise level in the long-term. The modelled $L_{A1018hr}$ noise levels will be used to determine the impact of development related traffic upon existing receptors.

To allow the BS8233:2014 assessment to be undertaken, the $L_{A10,18hr}$ noise levels require conversion to a $L_{Aeq,T}$. For assessment purposes, the modelled $L_{A1018hr}$ noise levels will be converted to a $L_{Aeq,T}$, the equivalent continuous sound level using the formulae presented in Table 9-5, as recommended in the '*Method for Converting the UK Road Traffic Noise Index $L_{A1018hr}$ to the EU Noise Indices for Road Noise Mapping'* (2006).

Table 9-5: $L_{A10,18hr}$ conversion calculations

Time Period	Non-Motorway Conversion	Motorway Conversion
07:00 – 21:00	$L_{day} = 0.95 \times L_{A10-18hr} + 1.44$	$L_{day} = 0.98 \times L_{A10-18hr} + 0.09$
21:00 – 23:00	$L_{evening} = 0.97 \times L_{A10-18hr} - 2.87$	$L_{evening} = 0.89 \times L_{A10-18hr}$
23:00 – 08:00	$L_{night} = 0.90 \times L_{A10-18hr} - 3.77$	$L_{night} = 0.87 \times L_{A10-18hr}$
07:00 – 23:00	$L_{Aeq-16hr} = 10\log_{10}\left(\left(12 \times 10^{\frac{L_{day}}{10}} + 4 \times 10^{\frac{L_{evening}}{10}}\right)/16\right)$	

Impact of Traffic Associated with the Development - DMRB 11:3:7

The proposals are likely to alter noise levels near the affected road network. In accordance with the *Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 7 Noise and Vibration*, SLR will undertake an assessment to include all roads where it is anticipated that noise from traffic may change.

For each link, the Basic Noise Level (BNL) will be established for the "With Scheme" and "Without Scheme" scenarios for the opening year of 2021. The BNL is the $L_{A10,T}$ dB noise level at 10m from the kerb of the road assessed.

The BNL results for each link will be tabulated and the impact and significance would be determined

SLR are aware that DMRB has since been superseded by *LA 111 – Noise and Vibration;* however, as the calculations associated with the assessment are being undertaken in conjunction with CRTN and the impact significance contained within LA 111 is identical to the one contained within DMRB this method remains valid.

9.3 Significance of Effect

9.3.1 Sensitivity Criteria

The sensitivity of the receiving environment is shown in Table 9-6.

Table 9-6: Sensitivity Criteria for Acoustic Receptors

Sensitivity	Definition
Very High	Residential properties (night-time), Schools and healthcare building (daytime)
High	Residential properties (daytime), SAC, SPA, SSSI (or similar areas of special interest)
Medium	Offices and other non-noise producing employment areas
Low	Industrial areas

9.3.2 Impact Magnitude

The Guidelines for Environmental Noise Impact Assessment list the following generic noise impacts:

- Negligible Impact: *"Noise impacts can be heard, but do not cause any change in behaviour or attitude, e.g. turning up volume on television; speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is perceived change in the quality of life";*
- Minor Impact: *"Noise impact can be heard and causes small changes in behaviour and/ or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Potential for non-awakening sleep disturbance. Affects the character of the area such that there is a perceived change in the quality of life";*
- Moderate Impact: *"Causes a material change in behaviour and/or attitude, e.g. voiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area";* and
- High Impact "*Significant changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory".*

Demolition/Construction Noise Impact

The impact of construction noise upon existing residential receptors will be determined with reference to the ABC method presented in BS5228-1:2009+A1:2014. The impact of construction noise upon existing residential receptors is as detailed in Table 9-7.

Table 9-7: Construction Noise – Impact Magnitude

Impact Magnitude	Increase in the $L_{Aeq,T}$ Noise Level
High	Threshold value exceeded by more than 5dB
Moderate	Threshold value exceeded between 3.0 and 4.9dB
Minor	Threshold value exceeded between 0.1 and 2.9dB
Negligible	Threshold value not exceeded

Demolition/Construction Vibration Impact

The impact of construction vibration upon existing residential receptors will be determined with reference to BS5228-2:2009+A1:2014. The impact of construction vibration upon residential receptors is as detailed in Table 9-8.

Table 9-8: Construction Vibration – Magnitude of Change (Impact)

Magnitude	Increase in the mms^{-1} Vibration Level
High	Threshold value exceeded by 10.0mms^{-1} or more
Moderate	Threshold value exceeded between 1.0 to 9.9mms^{-1}
Minor	Threshold value exceeded between 0.3 to 0.9mms^{-1}
Negligible	Threshold value of 0.3 mms^{-1} not exceeded

Operational Impact – Environmental Noise

The impact of environmental noise upon proposed residential receptors will be determined with reference to BS8233:2014.

Based on the guidance presented in BS8233:2014 the impact of environmental noise upon proposed residential receptors during the daytime is detailed in Table 9-9. The impact at night-time is detailed in Table 9-10.

Table 9-9: Environmental Noise Upon Residential Receptors Daytime – Impact Magnitude

Magnitude	$L_{Aeq,T}$ Daytime Noise Level dB External	$L_{Aeq,T}$ Daytime Noise Level dB Internal
High	More than 60	More than 40.0
Moderate	55.1 – 60.0	38.0 – 39.9
Minor	50.0 – 55.0	35.0 – 37.9
Negligible	Less than 50.0	Less than 35.0

Table 9-10: Environmental Noise Upon Residential Receptors Night-Time (Internal) – Impact Magnitude

Magnitude	$L_{Aeq,T}$ Ambient Night-Time Noise Level dB Internal	L_{Amax} Maximum Night-Time Noise Level dB Internal
High	More than 35.0	More than 50.0
Moderate	33.0 – 34.9	48.0 – 49.9
Minor	30.0 – 32.9	45.0 - 47.9
Negligible	Less than 30.0	Less than 45.0

Operational Impact – Commercial Noise

The impact of commercial noise upon existing and proposed residential receptors will be determined with reference to BS4142:2014+A1:2019.

Based on the guidance presented in BS4142:2014+A1:2019 the impact of commercial noise upon existing and proposed residential receptors is detailed in Table 9-11.

Table 9-11: Commercial Noise Upon Residential Receptors – Impact Magnitude

Magnitude	Description
High	Rating level is 10dB(A) or more above the background
Moderate	Rating level is between 6 and 9dB(A) above the background
Minor	Rating level is between 1 and 5dB(A) above the background
Negligible	Rating level is equal to or below the background

Operational Impact of Development Related Traffic Noise

The impact of development related traffic noise upon existing receptors will be calculated in accordance with CRTN.

The impact of development related traffic noise upon existing receptors in the short-term is detailed in Table 9-12.

Table 9-12: Development Related Traffic – Short-Term Magnitude of Change (Impact)

Magnitude	Noise Change $L_{A10,18hr}$ dB
High	5.0+
Moderate	3.0 – 4.9
Minor	1.0 – 2.9
Negligible	0.1 – 0.9

The impact of development related traffic noise upon existing receptors in the long-term is detailed in

Table 9-13.

Table 9-13: Development Related Traffic – Long-Term Magnitude of Change (Impact)

Magnitude	Noise Change $L_{A10,18hr}$ dB
High	10.0 +
Moderate	5.0 – 9.9
Minor	3.0 – 4.9
Negligible	0.1 – 2.9

9.3.3 Level of Effect

The sensitivity of the receiving environment together with the magnitude of impact defines the level of effect as shown in Table 9-14.

Table 9-14: Level of Effect Matrix

Impact Magnitude	Sensitivity			
	Very High	High	Medium	Low
High	Major	Major	Major	Moderate
Moderate	Major	Moderate	Moderate	Minor
Minor	Moderate	Minor	Minor	Minor
Negligible	Negligible	Negligible	Negligible	Negligible

Where an effect is classified as High, this is considered to represent a 'significant effect' in terms of the EIA Regulations. Where an effect is classified as Medium, this may be considered to represent a 'significant effect' but should always be subject to professional judgement and interpretation, particularly where the sensitivity or impact magnitude levels are not clear or are borderline between categories or the impact is temporary or intermittent.

The Level of Effect Matrix provided within Table 9-14 therefore provides a guide to decision making but is not a substitute for professional judgement.

Impacts and effects can be beneficial, neutral or adverse and these would be specified where applicable. Effects can also be temporary, intermittent or permanent in nature. It should be noted that significant effects need not be unacceptable or irreversible.

9.4 Baseline Conditions

9.4.1 Baseline Sound Survey

A baseline sound survey was completed on the 24th and 25th of June 2019 and the 20th and 21st of September 2020, at the four locations shown on Figure 9-1.

Figure 9-1: Noise Survey Locations

At Locations 1 and 2 the survey was completed in order to determine noise levels incident upon the Site from the adjacent road network and in particular noise from the N6.

As the sound level meters could not be left unattended (due to security concerns), the daytime survey consisted of a three-hour period between the hours of 10:00 and 17:00. In accordance with the following guidance documents, the data obtained may therefore be used to determine the $L_{Aeq,16\text{-}hour}$, and $L_{Aeq,8\text{-}hour}$ noise levels across the Site.

- Using the shortened measurement procedure in the Calculation of Road Traffic 1988 the three hourly $L_{A10,1hr}$ values at each Location can be converted to an $L_{A10,18hr}$ noise level.
- To convert the $L_{A10,18hr}$ noise level to a $L_{Aeq,16hr}$ and an $L_{Aeq,8hr}$ noise level the formulae presented in Table 9-15 as recommended in the *Method for Converting the UK Road Traffic Noise Index $L_{A10,18hr}$ to the EU Noise Indices for Road Noise Mapping* (2006) has been used.

Table 9-15:$L_{A10,18hr}$ conversion calculations

Time	Non-motorway conversion	Motorway conversion
07:00 – 21:00	L_{day} = 0.95 x $L_{A10,18hr}$ +1.44	L_{day} = 0.98 x $L_{A10,18hr}$ +0.09
21:00 – 23:00	$L_{evening}$ = 0.97 x $L_{A10,18hr}$ – 2.87	$L_{evening}$ = 0.89 x $L_{A10,18hr}$ +5.08
23:00 – 07:00	L_{night} = 0.90 x $L_{A10,18hr}$ – 3.77	L_{night} = 0.87 x $L_{A10,18hr}$ +4.24
07:00 – 23:00	$L_{Aeq,16hr} = 10\log_{10}((12 \times (10^{Lday/10}) + 4 \times (10^{Levening/10})/16)$	

In addition to the three-hour daytime measurement, at Location 1 a 60-minute measurement was completed between 06:00 and 07:00. The purpose of this survey was to obtain the L_{Amax} level from the adjacent road network during the night-time incident upon the Site.

The levels measured at Location 3 were to determine the noise impact of the adjacent school on the proposed development.

At Location 4 a one-hour measurement was undertaken during a Sunday daytime period and a Sunday night-time period. These levels were to determine the prevailing background (L_{A90}) sound levels at the existing and proposed residential properties located in the centre and the south of the development for use in the operational plant assessment.

9.4.2 Survey Equipment

The equipment used during the survey is detailed in Table 9-16.

Table 9-16: Monitoring Equipment

Location	Description	Serial No.
Location 1 (early morning measurement) and Location 3 (Lunch-Time measurement)	Larson Davis 831 Sound Level Meter	0001642
	Larson Davis Acoustic Calibrator CAL 200	1246
Location 1 (daytime) and Location 2 (daytime)	Larson Davis 831 Sound Level Meter	0002582
	Larson Davis Acoustic Calibrator CAL 200	6970
Location 4	Larson Davis 831 Sound Level Meter	0001642
	Larson Davis Acoustic Calibrator CAL 200	6970

The sound level meters were calibrated before the measurements using an acoustic calibrator and the calibration was checked upon completion of the survey. No significant drift was observed. The calibration chain is traceable via the United Kingdom Accreditation Service (UKAS) to National Standards held at the National Physical Laboratory.

9.4.3 Weather Conditions

During all the survey periods the weather conditions were noted to be suitable for undertaken environmental noise monitoring, it being dry with wind speeds below 5m/s.

9.4.4 Survey Results

A summary of the results is shown in Table 9-17. The L_{A90} and L_{A10} values are the median values over the respective time period. The full survey results can be seen in Appendix 9-2 of this document.

Table 9-17: Summary of Measured Noise Levels, free-field, dB

Location	Time Period	$L_{Aeq,T}$	Median L_{A90}	Median L_{A10}	L_{AFmax}
1	Daytime (3-hour measurement)	67.6	61.0	70.8	79.9
	Night-time (1-hour measurement)	67.0	51.7	70.9	82.4
2	Daytime (3-hour measurement)	63.1	57.4	65.9	82.5
3	School Lunch Time	56.3	53.0	58.6	71.3
4	Sunday Daytime	55.4	45.5	55.7	90.3
	Sunday Night-time	37.3	32.4	40.3	59.8

Using the shortened measurement procedure in the Calculation of Road Traffic 1988 the three-hourly daytime $L_{A10,1hr}$ values at Locations 1 and 2 have been converted to an $L_{A10,18hr}$ noise level. The calculated $L_{A10,18hr}$ noise level at each location is as follows:

- Location 1: 69.8dB.
- Location 2: 64.9dB.

To convert the $L_{A10,18hr}$ noise level to a $L_{Aeq,16hr}$ and an $L_{Aeq,8hr}$ noise level the formulae presented in Table 10.15, as recommended in the Method for Converting the UK Road Traffic Noise Index $L_{A10,18hr}$ to the EU Noise Indices for Road Noise Mapping (2006) has been used.

Utilising the motorway conversation calculations[21] outlined in the table the calculated $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ and noise level at each location is as follows:

- Location 1: $L_{Aeq,16hr}$ 68.2dB and $L_{Aeq,8hr}$ 65.0dB.
- Location 2: $L_{Aeq,16hr}$ 63.5dB and $L_{Aeq,8hr}$ 60.7dB.

[21] Though the section of the N6 which passes the site is a dual carriageway, the motorway conversation calculation has been utilised due to the road's close proximity to the site.

9.4.5 Sound Climate

It was noted by the surveyor that:

- At Location 1 the noise climate was dominated during both the daytime and night-time measurements by road traffic using the N6, local activity and the noise of helicopters passing overhead also contributed to the general noise climate.

- At Location 2 the noise daytime climate was dominated by road traffic using the N6. At this location local traffic activity on Brawny Road, the noise of dogs barking and children playing in the school playground also contributed to the general noise climate.

- At Location 3 the noise climate was dominated by road traffic using the N6. At this location the noise of children playing in the playground of the adjacent school was also audible.

- At Location 4 during the daytime the noise climate consisted of road traffic noise from the N6, local activity and the breeze in the trees. During the night-time road traffic on the N6 was again prominent with further contributions from local road traffic.

9.5 Construction Phase – Noise

It is inevitable with any project of this nature that some disturbance would be caused to those living and working nearby during the works should appropriate mitigation not be employed. However, disruption due to construction is a localised phenomenon and is temporary and intermittent in nature.

9.5.1 Noise Sensitive Receptors

This assessment will consider the impact of construction noise and vibration upon existing residents in close proximity to the site. The nearest receptors to the proposed construction site are considered to be:

- Location 1 - The existing school located to the west of Phase 3.
- Location 2 - Residential properties located on Bothar Bhreamhaine located adjacent to the N6 between Phases 2 and 3;
- Location 3 - Residential properties located on Brawney Drive and Brawney Square between Phases 2 and 3;
- Location 4 - Residential properties located on Lana Na Smear on the northern side of the N6 and to the north of Phases 1 and 2;
- Location 5 - Residential properties located on, Cuirt Chlluan Broc, Pairc Ditibh, Arda Auburn and Ceide an Chatuin located to the south of Phases 1, 2 and 3; and
- Location 6 Residential property (bungalow) located directly to the east of Phase 1These receptors are shown on Figure 9-2 below.

Fig. 9-2: Noise Sensitive Receptors

The construction noise limit at each receptor is detailed in Table 9-18. The limit has been determined using the ABC method detailed in of BS5228-1:2009+A1:2014.

Further to the above, the existing baseline ambient levels were not measured at the closest receptors as part of the environmental noise survey; however based on the noise levels measured at Locations 1 and 2 (see figure 9-1) the existing ambient noise levels have been predicted at the receptor locations listed above, utilising the proprietary software-based noise model, CadnaA, the predicted daytime ambient noise levels have then be used to calculated the construction threshold noise limits.

It should be noted that the predicted daytime ambient noise levels have been rounded to the nearest decibel.

Table 9-18 Threshold Construction Noise Limits dB(A)

Receptor	Predicted Daytime Ambient Noise Level	Threshold Noise Limit
Existing School	56	65
Bothar Bhreamhaine	60	65
Brawney Drive/Square	50	65
Lana Na Smear	62	65
Cuirt Chlluan Broc, Pairc Ditibh, Arda Auburn and Ceide an Chatuin	48	65

9.5.2 Construction Phases and Plant

For the purposes of this construction noise assessment SLR has determined the noise level during five typical construction activities which are detailed below. The tables outline the items of plant which will be utilised during each activity, and the equipment sound power levels (determined from BS5228:2009+A1:2014), and the percentage on-time off each item of plant.

- Phase 1: Site Clearance and Enabling Works.
- Phase 2: Road Construction.
- Phase 3: Groundworks.
- Phase 4: Substructure Works.
- Phase 5: Superstructure Works.

It is accepted that the construction activities may vary from the activities presented, but as it would not be feasible to assess all construction configurations, the assessments undertaken in this Chapter are considered a robust representation of anticipated construction noise levels.

9.5.2.1 Phase 1: Site Clearance and enabling works

Site clearance and enabling works typically include the installation of site offices, and levelling of the site. Table 9-19 details plant that is typically utilised during site clearance and enabling works.

Table 9-19 Phase 1: Site Clearance and Enabling Works - Plant List

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use Per Hr.
Large Excavator Mounted Breaker	2	110	20%
Tracked Excavator	2	107	80%
Hand Held Circular Saw	2	109	15%
Spreading Fill	2	109	25%
Vibratory Roller	2	102	30%
Lorry (Unloading)	3	108	40%
Concrete Truck Mixer	1	103	5%
Concrete Crusher	2	110	40%
Road Sweeper	1	104	10 movements per hour

9.5.2.2 Phase 2: Road Construction

Table 9-20 details the plant utilised during this phase.

Table 9-20 Phase 2: Road Construction Works - Plant List

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use Per Hr.
Compressor	1	100.0	80.0
Lorry	1	108.0	4 movements
Road roller	1	107.0	80.0
Breaker	1	114.0	80.0
Road saw	1	114.0	80.0
Planer	1	110.0	80.0
Whacker Plate	1	103.0	80.0
Excavator	1	101.0	80.0
Asphalt Spreader	1	105.0	80.0
Concrete Pump	1	96.0	80.0
Dumper	1	110.0	4 movements

9.5.2.3 Phase 3: Groundworks

Table 9-21 details the plant utilised during this phase.

Table 9-21 Phase 3: Groundworks – Plant List

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use Per Hr.
Concrete Truck Mixer	3	103	25%
Piling Rig	1	111	90%
Mewp - Cherry Picker Genie	1	95	30%
Small Breaker	2	110	20%
Compressor	2	106	50%
Poker Vibrator	3	97	15%
Lorry Mounted Concrete Pump	1	109	80%
Concrete Agitator	3	103	80%
Lorry (Unloading)	2	108	40%
Petrol Saw	3	109	20%
Tracked Excavator	2	107	80%
Hand Held Circular Saw	2	109	35%
Dumper Trucks	2	106	10 movements per hour
Diesel Jet Washer	1	108	25%
Mobile Crane	1	103	90%
Vibratory Roller	2	102	30%

9.5.2.4 Phase 4: Substructure Works

Table 9-22 details the plant utilised during this phase.

Table 9-22 Phase 4: Substructure – Plant List

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use Per Hr.
Concrete Truck Mixer	2	103	25%
Small Breaker	2	110	20%
Compressor	2	106	70%
Lorry (Unloading)	2	108	40%
Petrol Saw	2	109	40%
Tracked Excavator (Rubber Tracks)	2	107	80%
Dumper Trucks	2	106	10 movements per hour
Vibratory Roller	2	102	30%
Poker Vibrator	2	97	40%
Mobile Crane	1	103	100%
Telescopic Forklift (17m) JCB 540	2	107	80%
Hand Tools (Hammers)	8	98	80%

9.5.2.5 Phase 5: Superstructure Works

It is envisaged that this phase would include the erection of buildings. Table 9-23 details the plant utilised during this phase.

Table 9-23 Phase 5: Superstructure Works – Plant List

Type of Machinery	Quantity On Site	Sound Power Level, dB	Percentage Use Per Hr.
Concrete Truck Mixer	2	103	25%
Mewp-Cherry Picker Genie	2	95	60%
Lorry (unloading)	3	108	20%
Petrol Saw	2	109	40%
Tracked Excavator (rubber tracks)	2	107	70%
Dumper Trucks	2	106	10 movements per hour
Poker Vibrator	2	97	40%
Mobile Crane Operation	2	103	90%
Telescopic Forklift (17m) JCB 540	1	107	80%
Hand Tools (hammers)	8	98	40%
Concrete Pump (pumping)	2	112	70%

At this stage it is envisaged that all activities will take place within normal daytime working hours (07:30 to 18:00 hours, Monday to Friday and 07:00 to 13:00 on a Saturday).

9.5.3 Noise Prediction Methodology

Using the sound power levels and associated percentage on-times shown in Tables 9-19 to 9-23, noise levels from each construction activity have been predicted at the nearest noise sensitive receptors to the site.

The predictions have been undertaken using the proprietary noise modelling software CadnaA which incorporates the methodology outlined in BS5228:2009+A1:2014. The model assumes hard ground and applies the screening effect of barriers from Figure F.3 of BS5228:2009+A1:2014 at 500Hz.

With the exception of Superstructure Works it has been assumed that most of the plant will be operating at ground level. A height of 2m above ground level of each item of plant has been assumed.

During superstructure works, some plant will be operating at increased heights. A height of 12m above ground level of each item of plant (that will operate at height) has been assumed.

The location of each item of plant during each phase of construction has been positioned across the site. At times plant would be closer and further away from the receptor.

9.5.3.1 Predicted Noise Level and Assessments

With reference to the methodology above the predicted noise levels for each Activity of the construction works at each of the nearest noise-sensitive receptors are shown in Table 9-24 below.

As the Lissywollen development is divided into five different phases the predictions for each construction activity have been split for each parcel of land (phase). The parcel of land closest to each of the receptors has been included within the assessment to represent worst-case scenario.

The table also compares the predicted noise levels with the threshold value adopted for the assessment.

Noise levels have been predicted at a height of 4m which is representative of a first-floor window, with the exception of at the bungalow to the east of Phase 3 where noise levels have been predicted to a height of 1.5m.

All the predicted noise levels have been rounded to the nearest decibel.

Table 9-24 Predicted Noise Levels and Assessment, L_{Aeq} dB(A)

Receptor	Construction Activity	Nearest Development Phase (s)	Predicted Noise Level	Threshold Value	Difference	Impact	Effect
Existing School	P1: Clearance and Enabling Works	1	67	65	+2	Minor	**Minor**
	P2: Road Construction		69		+4	Mod	**Mod**
	P3: Ground Works		74		+9	High	**Major**
	P4: Substructure Construction		70		+5	High	**Major**
	P5: Superstructure Works		70		+5	High	**Major**
Bothar Bhreamhaine	P1: Clearance and Enabling Works	1 and 2	69	65	+4	Mod	**Mod**
	P2: Road Construction		69		+4	Mod	**Mod**
	P3: Ground Works		71		+6	High	**Major**
	P4: Substructure Construction		70		+5	High	**Major**
	P5: Superstructure Works		71		+6	High	**Major**
Brawney Drive/Square	P1: Clearance and Enabling Works	1 and 2	70	65	+5	High	**Major**
	P2: Road Construction		69		+4	Mod	**Mod**
	P3: Ground Works		75		+10	High	**Major**
	P4: Substructure Construction		72		+7	High	**Major**
	P5: Superstructure Works		71		+6	High	**Major**
Lana Na Smear	P1: Clearance and Enabling Works	3	62	65	-3	Neg	**Neg**
	P2: Road Construction		64		-1	Neg	**Neg**
	P3: Ground Works		64		-1	Neg	**Neg**
	P4: Substructure Construction		63		-2	Neg	**Neg**
	P5: Superstructure Works		65		-	Neg	**Neg**
Cuirt Chlluan Broc	P1: Clearance and Enabling Works	1	64	65	-1	Neg	**Neg**
	P2: Road Construction		67		+2	Minor	**Minor**
	P3: Ground Works		66		+1	Minor	**Minor**
	P4: Substructure Construction		66		+1	Minor	**Minor**
	P5: Superstructure Works		64		-1	Minor	**Minor**

Arda Auburn	P1: Clearance and Enabling Works	2	64	65	-1	Minor	**Minor**
	P2: Road Construction		68		+3	Mod	**Mod**
	P3: Ground Works		66		+1	Minor	**Minor**
	P4: Substructure Construction		68		+3	Mod	**Mod**
	P5: Superstructure Works		66		+1	Minor	**Minor**
Ceide an Chatuin	P1: Clearance and Enabling Works	3	68	65	+3	Mod	**Mod**
	P2: Road Construction		69		+4	Mod	**Mod**
	P3: Ground Works		67		+2	Minor	**Minor**
	P4: Substructure Construction		67		+2	Minor	**Minor**
	P5: Superstructure Works		70		+5	High	**Major**
Residential Property to the East of Phase 3	P1: Clearance and Enabling Works	3	63	65	-2	Neg	**Neg**
	P2: Road Construction		70		+5	High	**Major**
	P3: Ground Works		67		+2	Minor	**Minor**
	P4: Substructure Construction		67		+2	Minor	**Minor**
	P5: Superstructure Works		65		-	Neg	**Neg**

Table 9-24 shows that:

- At the existing school there would be, at worst, a major effect due to the noise generated by construction operations;
- At the properties located on Bothar Bhreamhaine, there would be, at worst, a major effect due to the noise generated by construction operations;
- At the properties located on Brawney Drive/Square, there would be, at worst, a major effect due to the noise generated by construction operations;
- At the properties located on Lana Na Smear, there would be a negligible effect due to the noise generated by construction operations;
- At the properties located on Cuirt Chlluan Broc, there would be, at worst, a minor effect due to the noise generated by construction operations;
- At the properties located on Arda Auburn, there would be, at worst, a moderate effect due to the noise generated by construction operations;
- At the properties located on Ceide an Chatuin, there would be, at worst, a major effect due to the noise generated by construction operations; and
- At the bungalow located to the east of phase 3 there would be, at worst, a major effect due to the noise generated by construction operations.

With reference to the above, mitigation measures to try and reduce the identified impacts are discussed later in this Chapter.

9.5.4 Construction Phase – Vibration

It is inevitable with any project of this nature that some disturbance would be caused to those living and working nearby during the works should appropriate mitigation not be employed. However, disruption due to construction is a localised phenomenon and is temporary and intermittent in nature.

9.5.4.1 Vibration Prediction Methodology

Desktop predictions of vibratory compaction (steady state) and vibratory compaction (start up and run-down) have been completed in accordance with Table E.1 of BS5228:2009+A1:2015 BS5228-2:2009+A1:2014 Part 2 Vibration.

9.5.4.2 Predicted Construction Vibration Levels and Assessment

With reference to the methodology detailed the predicted vibration levels at set distances from each vibration-sensitive Receptors are shown in Table 9-25 below.

For the purpose of the calculation the following parameter values have been assumed:

- Maximum amplitude of drum vibration = 2.38mm (the middle value of the accepted range).
- Vibrating roller drum width = 1.48m (the middle value of the accepted range).
- Number of vibrating drums = 1 (the lowest value of the accepted range).

Table 9-25 Predicted Construction Vibration Levels

Distance from Location (m)	Operation	Predicted Vibration Level, mms-1	Impact Magnitude	Significance of Effect
5	Vibratory Compaction (steady state)	31.9	High	Major
	Vibratory Compaction (start up and run-down)	34.3	High	Major
10	Vibratory Compaction (steady state)	13.5	High	Major
	Vibratory Compaction (start up and run-down)	16.3	High	Major
15	Vibratory Compaction (steady state)	7.9	Moderate	Moderate
	Vibratory Compaction (start up and run-down)	10.2	High	Major
20	Vibratory Compaction (steady state)	5.3	Moderate	Moderate
	Vibratory Compaction (start up and run-down)	7.2	Moderate	Moderate
25	Vibratory Compaction (steady state)	3.9	Moderate	Moderate
	Vibratory Compaction (start up and run-down)	5.5	Moderate	Moderate
30	Vibratory Compaction (steady state)	3.0	Moderate	Moderate
	Vibratory Compaction (start up and run-down)	4.4	Moderate	Moderate
55	Vibratory Compaction (steady state)	1.2	Moderate	Moderate
	Vibratory Compaction (start up and run-down)	2.1	Moderate	Moderate
85	Vibratory Compaction (steady state)	0.7	Minor	Minor
	Vibratory Compaction (start up and run-down)	1.2	Moderate	Moderate

The results in Table 9-25 show that:

- If operating within 15m of a residential Receptor, Steady State construction operations would have a High vibration impact. The corresponding level of effect would be Major. The same would be true for Start Up and Run-Down operation;
- If operating between 15m and 55m of a residential Receptor, Steady State construction operations would have a Moderate vibration impact. The corresponding level of effect would also be moderate. The same would be true for Start Up and Run-Down operations at distances between 20m and 85m from a residential Receptor
- For the impact during Steady State construction to fall to Minor, with a Minor significance of effect, operations would need to be 85m or more from the residential Receptor.
- For the impact during Start Up and Run-Down construction to fall to Minor, with a Minor significance of effect, operations would need to be 85m or more from the residential Receptor.

For all of the above identified impacts the corresponding level of significance would be temporary and reversible.

However, mitigation measures to try and reduce the amount of vibration generated by construction operations are considered later in this Chapter.

9.6 Operational Phase

9.6.1 Noise Levels Across the Site

To determine the daytime and the night-time ambient noise environment across the Site, SLR has developed a noise model of the site using the noise modelling software package CadnaA.

The ambient noise survey results collected at each location have been used to calibrate the noise model which contains the existing site contours. The model has been adjusted to ensure that the predicted ambient noise level at each location matches the surveyed daytime and night-time ambient noise levels measured.

9.6.1.1 Existing Daytime

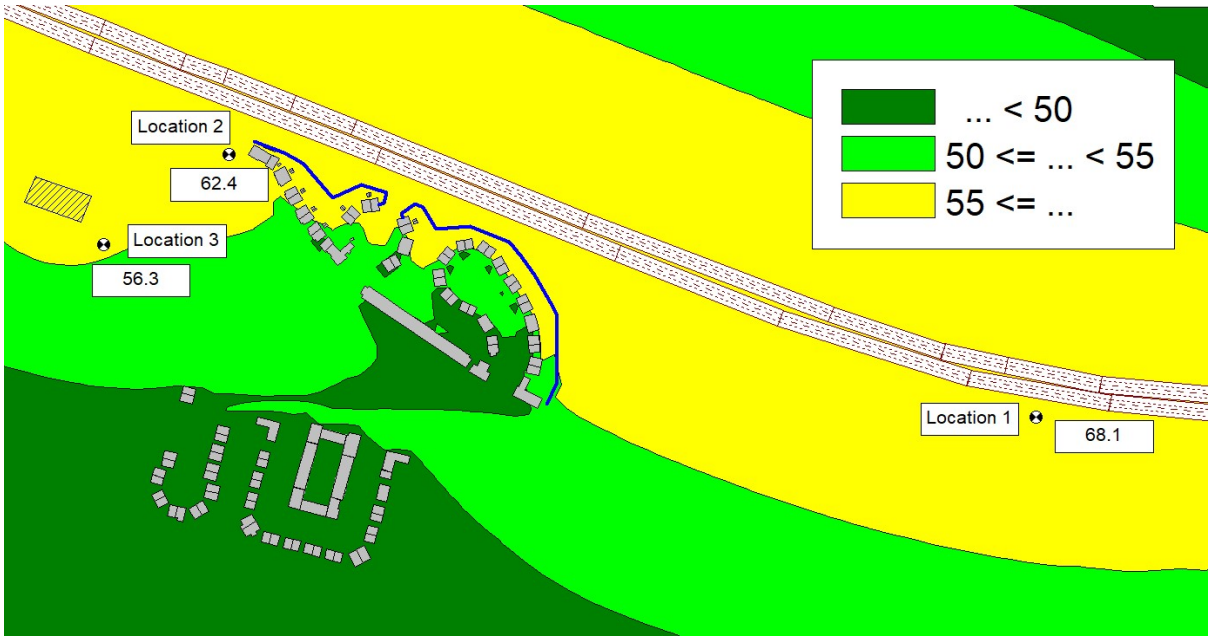
The daytime $L_{Aeq,16hr}$ noise environment at a height of 1.5m above ground level can be seen in Figure 9-2.

For model verification purposes, Locations 1, 2 and 3, and the respective predicted $L_{Aeq,16hr}$ noise levels, have been included in Figure 9-2.

It must be noted that the model is based on a worst-case scenario where the noise from children playing in the playground during a school lunchtime is contributing to the noise climate on the western edge of the site.

From a comparison with Section 9.4.4 of this report the CadnaA model has accurately predicted the daytime noise level at all locations within +/- 1.1dB(A).

Figure 9-3: Predicted $L_{Aeq,16hr}$ dB Noise Level Across the Existing Site



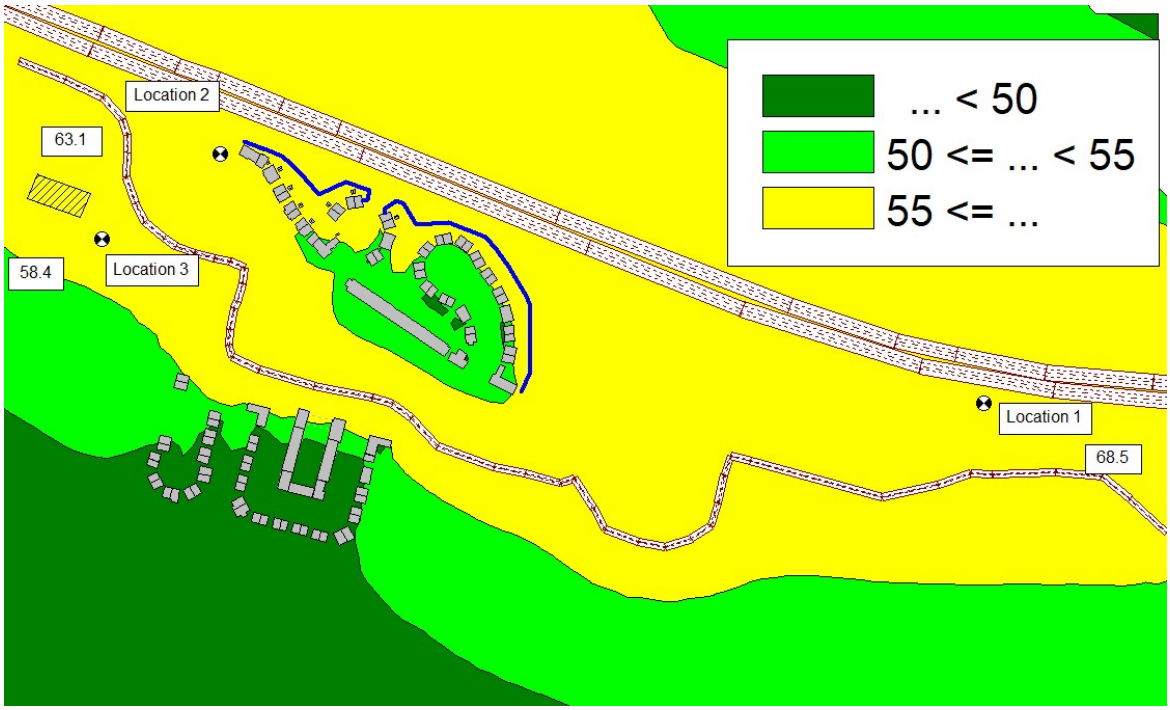
9.6.1.2 Future Daytime

Figure 9-3 details the existing daytime noise climate across the existing site. This noise climate does not include traffic from the new link road which runs through the middle of the Site. As traffic from the new link road may lead to an increase in the daytime ambient noise level experienced across the Site, noise from future traffic movements must be included in the BS8233:2014 assessment.

With reference to the Transport assessment the annual average weekly traffic levels (AAWT) for the link road are 4569[22] vehicles, 2% of which are HGV's.

With reference to the above, the traffic levels have been added to the noise map presented in Figure 9-3. The resultant future daytime ambient noise level across the development site can be seen in Figure 9-4 below

Figure 9-4: Future $L_{Aeq,16hr}$ dB Noise Level Across the Existing Site



9.6.1.3 Existing Night-time – Ambient

The night-time $L_{Aeq,8hr}$ noise environment at a height of 1.5m above ground level can be seen in Figure 9-5.

For model verification purposes, Locations 1 and 2, and the respective predicted $L_{Aeq,8hr}$ noise levels, have been included in Figure 9-5.

From a comparison with Section 9.4.4 of this report the CadnaA® model has accurately predicted the night-time noise level at both locations within +/-1.7dB

[22] Based on 2021 Do Something levels for Link Location 'S'

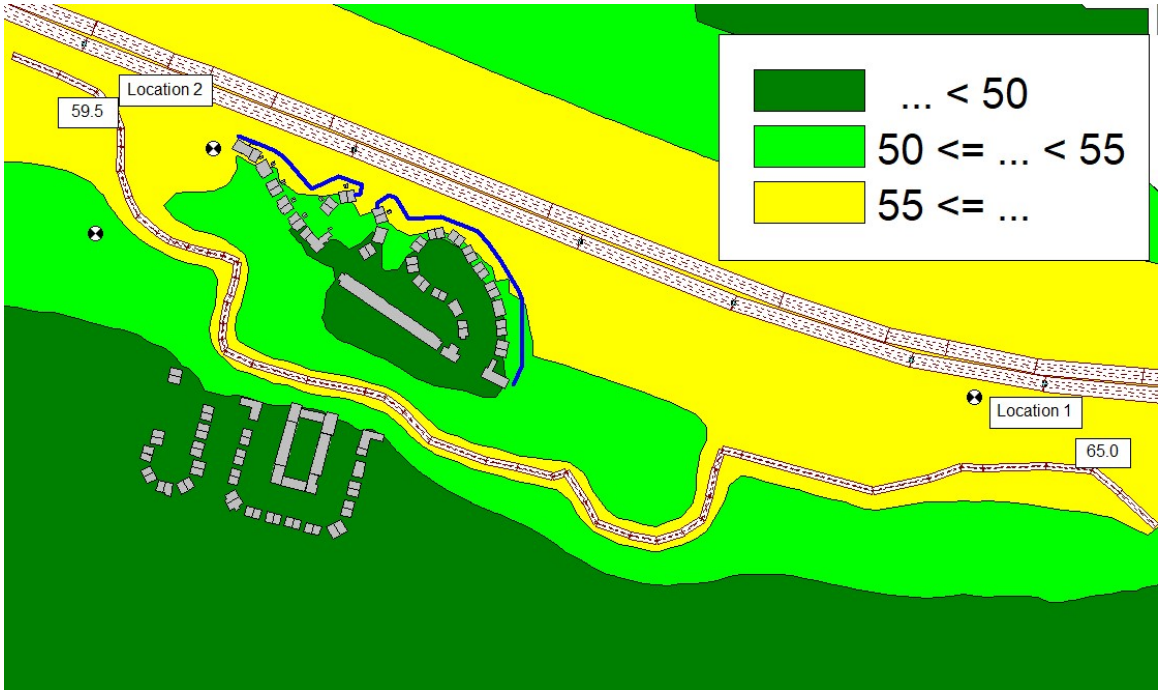
Figure 9-5: Predicted $L_{Aeq,8hr}$ dB Noise Level Across the Existing Site

9.6.1.4 Future Night-time - Ambient

Figure 9-5 details the existing night-time noise climate across the existing site. This noise climate does not include traffic from the new link road which runs through the middle of the Site. As traffic from the new link road may lead to an increase in the daytime ambient noise level experienced across the Site, noise from future traffic movements must be included in the BS8233:2014 assessment.

The AAWT traffic levels stated in Section 9.6.1.2 have been added to the noise map presented in Figure 9-5. The resultant future daytime ambient noise level across the development site can be seen in Figure 9-6 below.

Figure 9-6: Future $L_{Aeq,8hr}$ dB Noise Level Across the Existing Site



9.6.1.5 Existing Night-time – Maximum

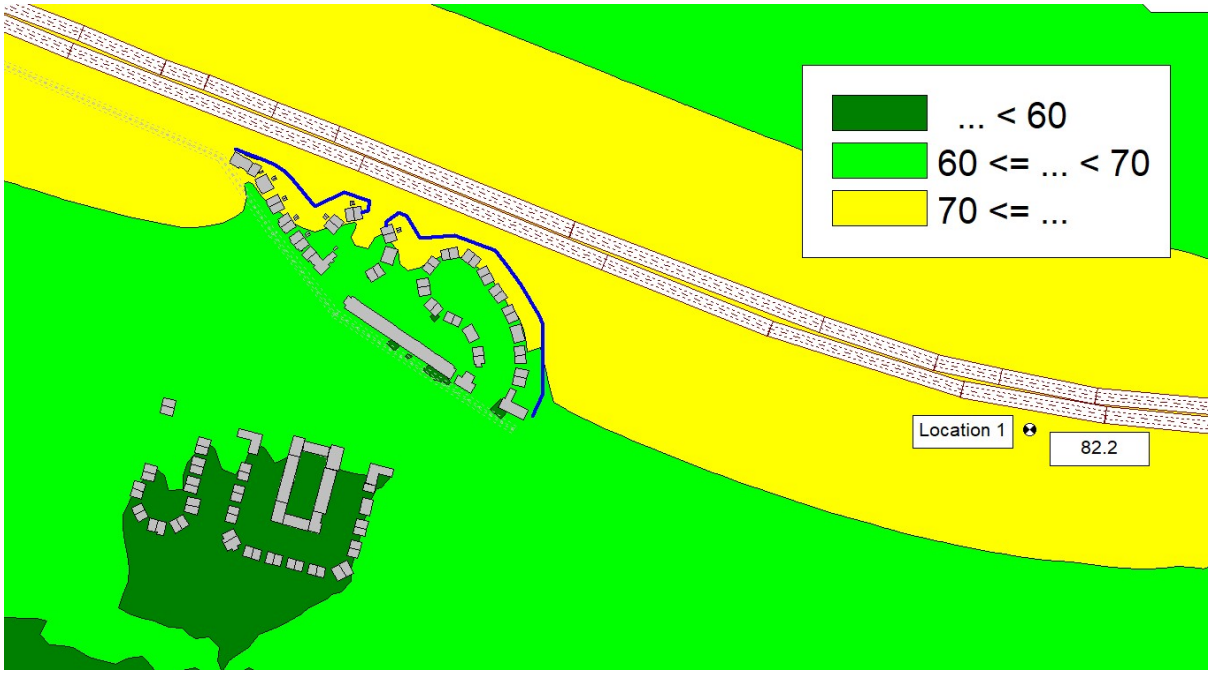
The night-time L_{Amax} noise environment at a height of 1.5m above ground level can be seen in Figure 9-7.

For model verification purposes, Location 1 and the respective predicted L_{Amax} noise level, have been included in Figure 9-7.

It must be noted that a night-time noise measurement was not undertaken at Location 2 as the monitoring position was not considered secure enough to leave the equipment unattended.

From a comparison with Section 9.4.4 of this report the CadnaA model has accurately predicted the night-time L_{Amax} noise level at Location 1.

Figure 9-7: Predicted L_{Amax} dB Noise Level Across the Existing Site



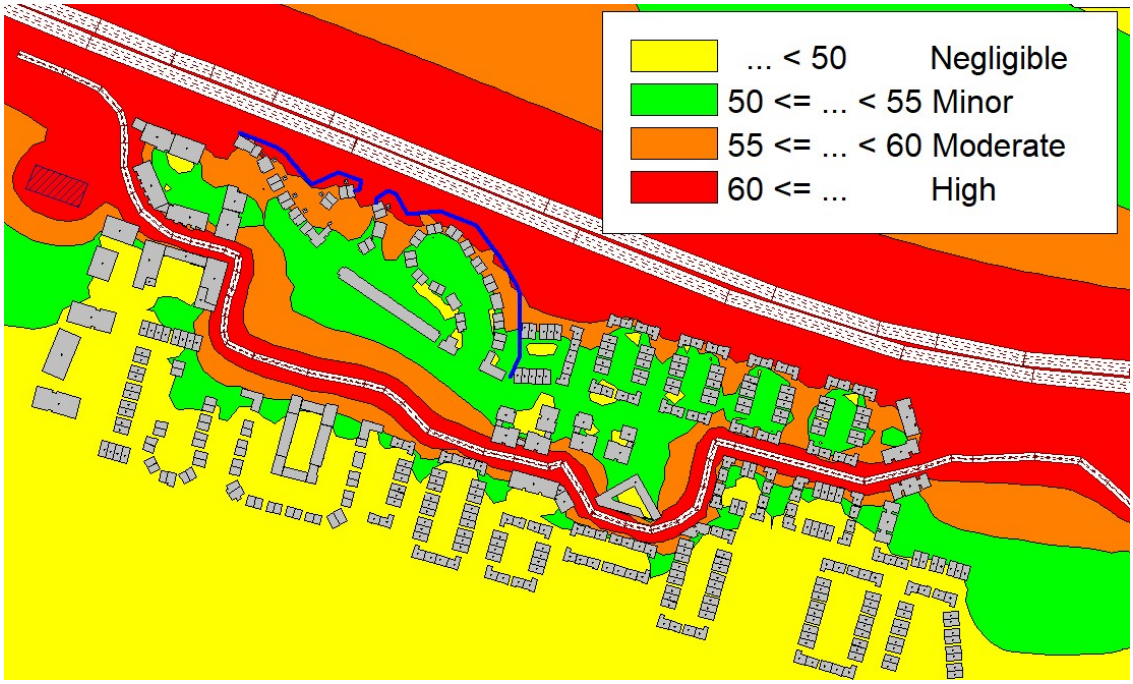
9.6.2 Existing Noise Climate Assessment

9.6.2.1 Daytime External Amenity Areas

The impact of environmental noise upon the external amenity areas of proposed residential receptors has been determined in accordance with BS8233:2014.

With reference to Table 9-9 and 9-14 of this Chapter, Figure 9-8 illustrates the external areas of the Site where the Impact, without mitigation receptors would be, Negligible, Minor, Moderate, or High. The locations of the existing and proposed residential parcels are outlined in grey, the blue lines represent the fences bordering the existing residential properties.

Figure 9-8: External Daytime Noise Assessment, dB $L_{Aeq, 16\text{-hour}}$



It can be seen from Figure 9-8 that:

- Within the majority of the southern area of the Site the daytime $L_{Aeq,16\ hour}$ noise levels within the amenity areas are predicted to be 55dB(A) or less, with those areas shown in green to experience a Minor Impact and Effect, and those in yellow predicted to experience a Negligible Impact and Effect. It is not expected that mitigation of noise levels during the daytime in external amenity areas would be required in these zones;
- Within the majority of central areas of the Site the daytime $L_{Aeq,16\ hour}$ noise levels within the amenity areas are predicted to be 55dB(A) or less, with those areas shown in green to experience a Minor Impact and Effect, and those in yellow predicted to experience a Negligible Impact and Effect. It is not expected that mitigation of noise levels during the daytime in external amenity areas would be required in these zones;
- Within the amenity areas of the Site located close to the new link road (i.e. the external space associated with the Community Hub) the daytime $L_{Aeq,16\ hour}$ noise levels within the amenity areas are predicted to be 55dB(A) or more, with those areas shown in orange to experience a Moderate Impact and Effect, and those in red predicted to experience a High Impact and Major Effect: and
- Within of the northern areas of the Site close to the N6 the daytime $L_{Aeq,16\ hour}$ noise levels within the amenity areas are predicted to be 55dB(A) or more with those areas shown in orange to experience a Moderate Impact and Effect, and those in red predicted to experience a High Impact and Major Effect.

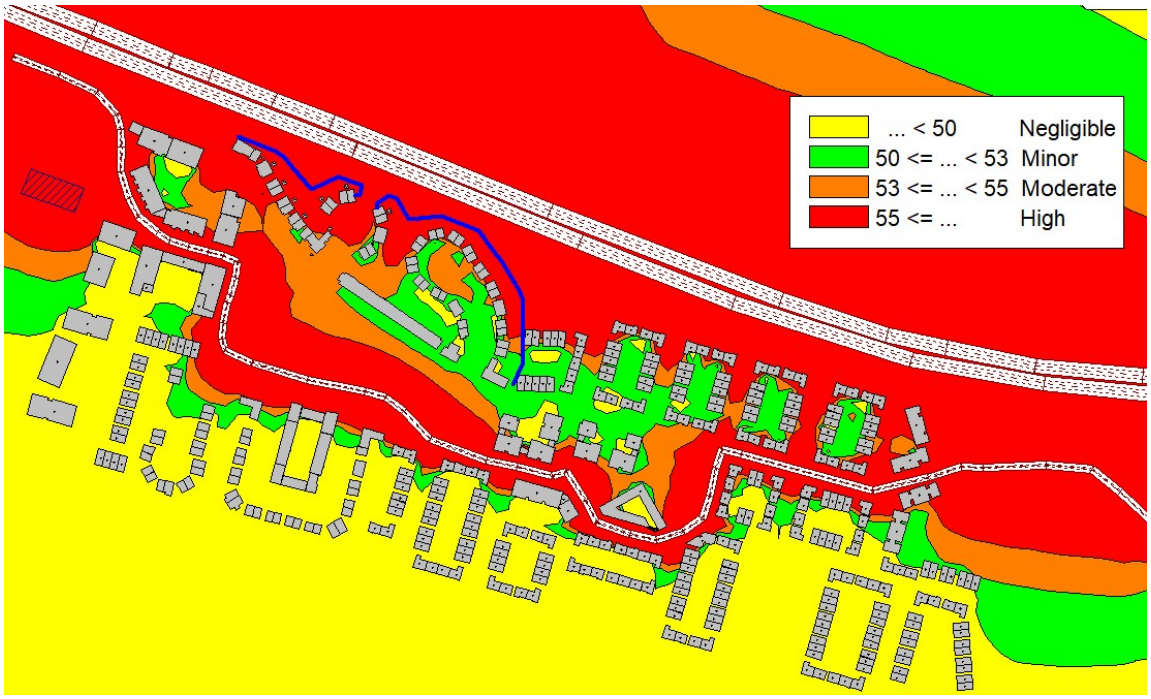
In view of the above, mitigation measures to reduce the level of noise during the daytime are considered in Section 9-7 of this assessment.

9.6.2.2 Daytime External Facades

The impact of daytime environmental noise upon the façades of the proposed Site has been determined in accordance with BS8233:2014. With reference to Tables 9-9 and 9-14 of this Chapter, Figure 9-8 illustrates the external (at the façade) areas of the Site where the Impact, without mitigation would be, Negligible, Minor, Moderate, or High.

The level of impact has been determined by considering the internal BS8233:2014 noise limit required and adding on 15dB(A), the amount of sound that would be attenuated by a partially open window. For example, the BS8233:2014 noise limit in a habitable room during the day is 35dB(A), so for there to be Negligible Impact, the facade level must be no more than 50dB(A) (50dB(A) minus 15dB(A) = 35dB(A)).

Figure 9-9: Daytime Noise Assessment at External Facades, dB $L_{Aeq,\ 16\text{-}hour}$



It can be seen from Figure 9-9 that:

- Most of the facades within the southern area of the Site, are predicted to experience a daytime $L_{Aeq,16\ hour}$ noise level of 50dB(A) or less, with those areas shown in yellow predicted to experience a Negligible Impact and Effect. It is not expected that mitigation of noise levels during the daytime in this zone would be required as the habitable room internal daytime noise limit of 35dB(A) would be met even with a partially open window (affording a decibel reduction of 15dB(A) to external noise);
- In those areas shown green, a daytime $L_{Aeq,16\ hour}$ noise levels of between 50dB(A) and 52.9dB(A) is predicted. The impact internally would be Minor, and the Effect would be Moderate;
- In those areas shown orange a daytime $L_{Aeq,16\ hour}$ noise levels of between 53dB(A) and 54.9dB(A) is precited. The impact internally would be Moderate, and the Effect would be Major; and
- In those areas shown red, a daytime $L_{Aeq,16\ hour}$ noise levels of 55dB(A) and over is predicted. The impact would be High, and the Effect would be Major.

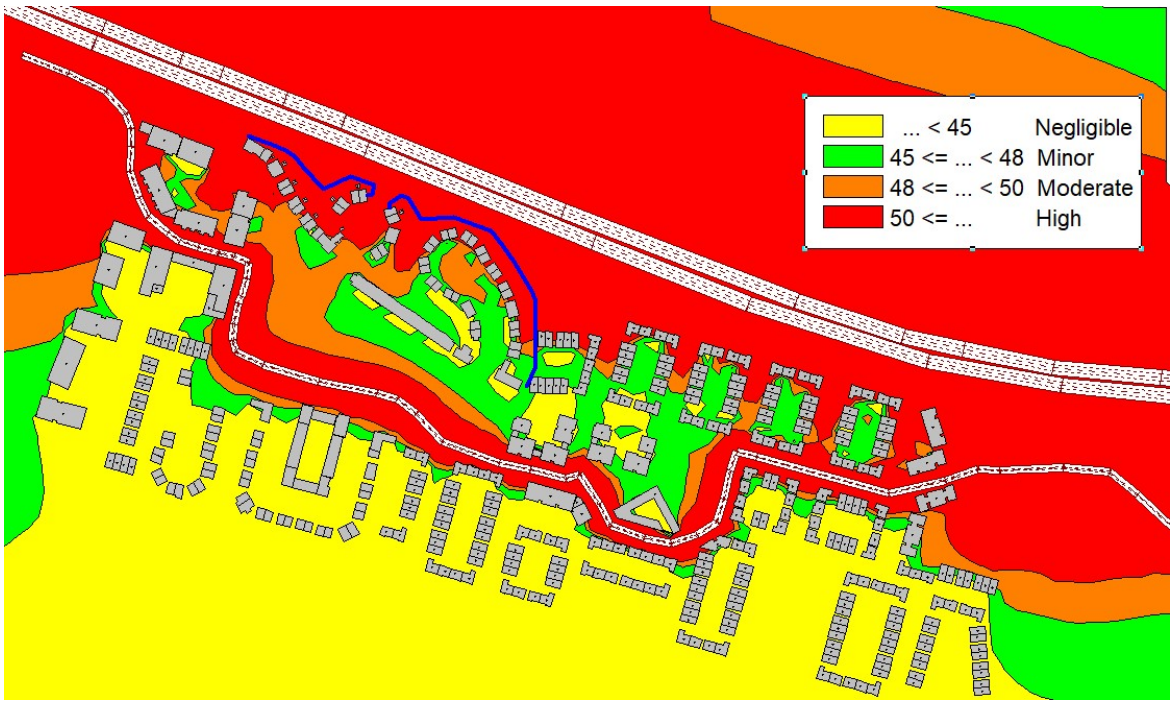
At the facades in the green, orange, and red zones, the internal ambient daytime noise limit of 35dB(A) in a habitable room would not be met with a partially open window (considering a decibel reduction of 15dB(A) to external noise). Therefore, glazing with an appropriate sound reduction would be required. Mitigation will be discussed in Section 9-7.

9.6.2.3 Night-time External Facades – Ambient Levels

The impact of night-time ambient environmental noise upon the facades of the proposed Site has been determined in accordance with BS8233:2014. With reference to Tables 9-10 and 9-14 of this Chapter, Figure 9-10 illustrates the external (at the façade) areas of the Site where the Impact, without mitigation would be, Negligible, Minor, Moderate, or High.

The level of impact has been determined by considering the internal BS8233:2014 noise limit required and adding on 15dB(A), the amount of sound that would be attenuated by a partially open window. For example, the BS8233:2014 noise limit at night in a bedroom is 30dB(A), so for there to be Negligible Impact, the facade level must be no more than 45dB(A) (45dB(A) minus 15dB(A) = 30dB(A)).

Figure 9-10: Night-time Ambient Noise Assessment at External Facades, dB $L_{Aeq, 8\text{-hour}}$



It can be seen from Figure 9-10 that:

- Most of the facades in the southern and western areas are the Site are predicted to experience a night-time $L_{Aeq,8\ hour}$ noise level of 45dB(A) or less, with those areas shown in yellow predicted to experience a Negligible Impact and Effect. It is not expected that mitigation of noise levels during the night in this zone would be required as the bedroom internal ambient night-time noise limit of 30dB(A) would be met even with a partially open window (considering a decibel reduction of 15dB(A) to external noise);

- In those areas shown green, a night-time $L_{Aeq,8\ hour}$ noise level of between 45dB(A) and 47.9dB(A) is predicted. The impact internally would be Minor, and the Effect would be Moderate;

- In those areas shown yellow, a night-time $L_{Aeq,8\ hour}$ noise level of between 48dB(A) and 49.9dB(A) is predicted. The impact internally would be Moderate, and the Effect would be Major; and

- In those areas shown orange, a night-time $L_{Aeq,8\ hour}$ noise level of 50dB(A) and over is predicted. The impact would be High, and the Effect would be Major.

At the facades in the green, orange, and red zones the internal ambient night-time noise limit of 30dB(A) in a bedroom would not be met with a partially open window (considering a decibel reduction of 15dB(A) to external noise). Therefore, glazing with an appropriate sound reduction would be required. Mitigation will be discussed in Section 9-7.

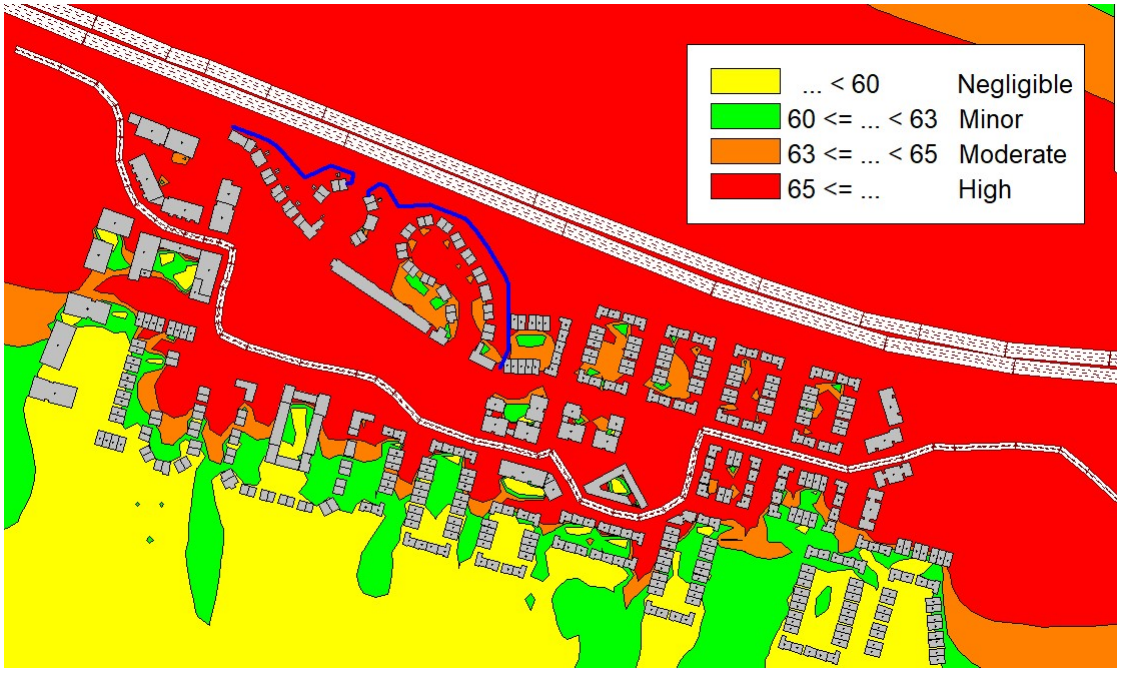
9.6.2.4 Night-time External Facades – Maximum Levels

The impact of night-time maximum environmental noise upon the facades of the proposed Site has been determined in accordance with BS8233:2014. With reference to Tables 9-10 and 9-14 of this Chapter, Figure 9-11 illustrates the external (at the façade) areas of the Site where the Impact, without mitigation would be, Negligible, Minor, Moderate, or High.

With regards to the new link road running through the centre of the Site, the maximum noise levels cannot be predicted from the AAWT levels contained within the traffic assessment. It has therefore been assumed that the maximum noise level measured at Location 1 during the baseline survey was from a vehicle pass-by travelling at approximately 100km/h.

It is understood that the new link road will have a speed limit of 50 km/h, utilising the calculations contained within CRTN the difference in road traffic speeds, would lead to a reduction of 4.5dB in the noise level; therefore a maximum noise level of 77.9 has been assigned to the new link road.

Figure 9-11: Night-time Maximum Noise Assessment at External Facades, dB L_{Amax}



It can be seen from Figure 9-11 that:

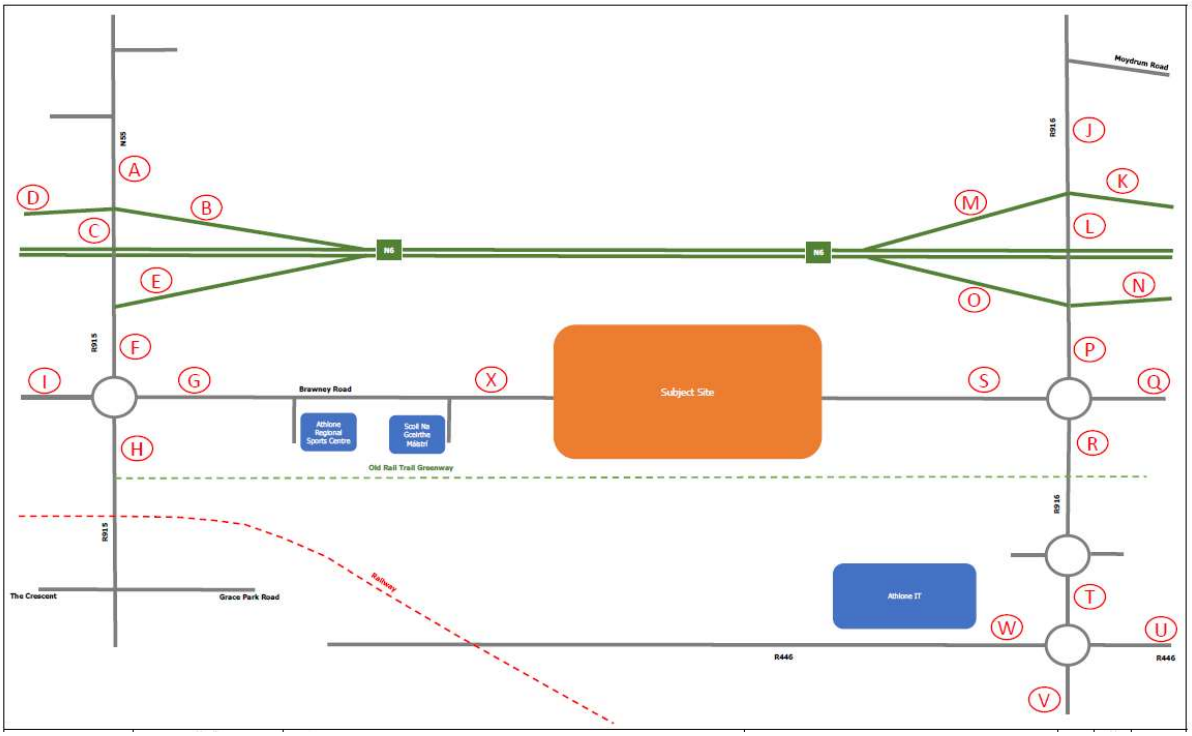
- At the majority of the facades in the northern and central areas of the Site, close to the N6 and new link road and western areas of the Site are predicted to experience a night-time L_{Aamx} noise level of 63dB(A) or more, with those areas shown in orange predicted to have a Moderate Impact and Major Effect and those areas shown in red predicted to experience a High Impact and Major Effect.
- At the facades in the green, orange, and red zones the internal maximum night-time noise limit of 45dB(A) in a bedroom would not be met with a partially open window (considering a decibel reduction of 15dB(A) to external noise). Therefore, glazing with an appropriate sound reduction would be required. Mitigation will be discussed in Section 9.7.

9.6.3 Development Related Traffic Assessment

9.6.3.1 Identified Links

Traffic from the development proposals may alter noise levels near the affected road network. In accordance with the Design Manual for Roads and Bridges (DMRB) *Volume 11 Section 3 Part 7 Noise and Vibration*, SLR has undertaken an assessment to include the links shown in Figure 9-12 below, which have been provided to SLR by DBFL Consulting Engineers.

Figure 9-12: Link Roads Considered within the Assessment



9.6.3.2 Predicted Changes in Noise Levels

For each link the Basic Noise Level (BNL) has been established for the "With Scheme (with the development proposals)" and "Without Scheme (without the development proposals)". Scenarios for the year 2021 'do something' have been assessed. The BNL is the $L_{A10,\ 18hr\ dB}$ noise level at 10m from the kerb of the road assessed.

Table 9-26 Development Related Traffic Assessment

Link	Without Scheme				With Scheme				Change in BNL	Impact	Effect
	AAWT	%HGV	Average Speed km/hr	BNL	AAWT	%HGV	Average Speed km/hr	BNL			
A	15968	4	50	69.8	16514	4	50	69.9	+0.1	Negligible	Negligible
B	2997	2	100	66.8	2930	2	100	66.7	-0.1	Negligible	Negligible
C	16477	2	50	69.3	16959	3	50	69.7	+0.4	Negligible	Negligible
D	5622	6	100	70.3	5890	6	100	70.5	+0.2	Negligible	Negligible
E	2448	3	100	66.1	2229	3	100	65.7	-0.4	Negligible	Negligible
F	18138	3	50	70.0	18376	3	50	70.1	+0.1	Negligible	Negligible
G	5876	1	50	64.4	5741	1	50	64.3	-0.1	Negligible	Negligible
H	11339	2	50	67.6	11648	2	50	67.8	+0.2	Negligible	Negligible
I	7898	4	50	66.7	8239	4	50	66.9	+0.2	Negligible	Negligible
J	19237	6	50	71.2	20365	6	50	71.4	+0.2	Negligible	Negligible
K	2448	11	100	67.4	2642	11	100	67.7	+0.3	Negligible	Negligible
L	17949	5	50	70.6	19428	5	50	70.9	+0.3	Negligible	Negligible
M	7118	4	100	70.9	7261	4	100	71.0	+0.1	Negligible	Negligible
N	3293	9	100	68.4	3516	9	100	68.7	+0.3	Negligible	Negligible
O	7248	4	100	71.0	7282	4	100	71.0	0.0	Negligible	Negligible
P	16435	3	50	69.6	18392	3	50	70.1	+0.5	Negligible	Negligible
Q	2075	3	50	60.6	2289	3	50	61.0	+0.4	Negligible	Negligible
R	15046	4	50	69.5	16378	4	50	69.9	+0.4	Negligible	Negligible
S	2087	4	50	60.9	4569	2	50	63.7	+2.8	Minor	Minor
T	8259	4	50	66.9	9295	4	50	67.4	+0.5	Negligible	Negligible
U	13639	3	50	68.8	14555	3	50	69.1	+0.3	Negligible	Negligible
V	183	19	50	53.5	189	20	50	53.8	+0.3	Negligible	Negligible
W	13668	4	50	69.1	14335	4	50	69.3	+0.2	Negligible	Negligible
X	970	1	50	56.6	1936	1	50	59.6	+3.0	Moderate	Moderate

With reference Tables 9-12 and 9-14 it can be seen from Table 9-26 that in the short-term, there would be;

- At all the links considered, with the exception of Links S and X there would be a Negligible Impact and Effect from operational traffic associated with the development proposals; therefore it is not expected that mitigation of noise levels from operational traffic would be necessary for these links;
- At Link S there would be a Minor Impact and Effect from operational traffic associated with the development proposals; and
- At Link X there would be a Moderate Impact and Effect from operational traffic associated with the development proposals.

Links S and X are associated with the new link road which runs through the Centre of the proposed development Site.

From studying Google Earth images, it has been determined that there is only one existing residential receptor located on Link S, and taking into account that there would only be a Minor Impact associated with Link S, it is considered that mitigation measures would not be necessary.

Link X does run past the existing properties located on Bothar Bhreamhaine, and a Moderate Impact and Effect has been predicted; however, in the context of the development proposals and taking the Site as a whole, only a relatively small number of properties would be effected. It also must be noted that the change in noise levels is predicted to be +3.0, which with reference to Table 9-13 would only result in a Minor Impact and Effect in the long-term.

In view of the above, it is considered that mitigation measures are not required for any of the links considered within the operational traffic assessment.

9.6.4 Commercial Noise Assessment

The proposed commercial areas of the Site consist of;

- A crèche located in the south-western area of the development;
- A crèche located in the centre of the development; and
- A community hub located in the centre of the development.

At the time of the writing of this assessment the exact details of the fixed plant (i.e. air conditioning units, extraction fans) were not known; therefore limits have been set in conjunction with BS4142:2014+A1:2019 and the measured baseline levels, to which any noise generated by the fixed plant would have to adhere to, at the nearest existing and proposed residential properties.

With reference to Table 9-11 of this assessment, Table 9-27 details the specific sound level that would lead to an impact which may be described as Negligible, Minor, Moderate or High at the locations assessed.

The limits are based on the background sound levels (L_{A90}) measured at Location 4 during a Sunday daytime and a Sunday night-time, as these are considered the most sensitive time periods when fixed plant could be operational.

The background sound levels, and subsequent limits have been rounded to the nearest decibel.

Table 9-27 Specified Rating Limits and Associated Impact

Position	Period and Existing Background Sound Levels, dB L_{A90}	Impact	Specified Limit $L_{Aq,T}$
Existing and proposed residential properties located close to the two creches and community hub	Daytime - 46	Negligible	46
		Minor	51
		Moderate	55
		High	56+
	Night-time – 32	Negligible	32
		Minor	37
		Moderate	41
		High	42+

9.7 Mitigation Measures

9.7.1 Construction Phase – Noise

With reference to Table 9-24 the construction noise assessment has shown that construction noise threshold values would be exceeded, and adverse impacts identified at a number the existing residential properties located around the development Site, therefore mitigation measures are considered necessary.

9.7.1.1 Mitigation Measures

Several safeguards exist to minimise the effects of construction and demolition noise and include:

- the various EC Directives and UK Statutory Instruments that limit noise emissions of a variety of construction plant;
- guidance set out in BS5228-1:2009+A1:2014, that covers noise control on construction and open sites

The adoption of Best Practicable Means is usually the most effective means of controlling noise from sites. Within the constraints of efficient site operations and the requirements of the relevant Standards relating to noise, the following should be implemented at the Site:

- limit the use of particularly noise plant, i.e. do not use particularly noisy plant early in the morning;
- limit the number of plant items in use at any one time;
- plant maintenance operations should be undertaken as far away from noise-sensitive receptors as possible;
- phasing the works to maximise the benefit from perimeter structures;
- any compressors brought on to site should be silenced or sound reduced models fitted with acoustic enclosures
- reduce the speed of vehicle movements;
- all pneumatic tools should be fitted with silencers or mufflers;

- ensure that operations are designed to be undertaken with any directional noise emissions pointing away from noise-sensitive receptors where practicable;
- when replacing older plant, ensure that the quietest plant available is considered wherever possible; any deliveries/spoil removal vehicles should be programmed to arrive and depart during daytime hours only.
- drop heights must be minimised when loading vehicles with rubble.
- care should be taken when loading vehicles to minimise disturbance to local residents. Vehicles should be prohibited from waiting within the site with their engines running;
- all plant items should be properly maintained and operated according to the manufacturers' recommendations in such a manner as to avoid causing excessive noise. All plant should be sited so that the noise impact at nearby noise-sensitive properties is minimised
- local hoarding, screens or barriers should be erected as necessary to shield particularly noisy activities; and
- any problems concerning noise from construction works can sometimes be avoided by taking a considerate and neighbourly approach to relations with local residents. Works should not be undertaken outside of the hours agreed with the local authority.

Experience from other sites has shown that by implementing these measures, typical noise levels from construction works can be reduced by 5dB(A) or more.

With reference to Table 9-28 below repeats the construction noise assessment, assuming that the general measured outlined above have been correctly implemented and therefore a 5dB reduction in noise levels has been achieved.

Table 9-28 Construction Noise Assessment including General Mitigation

Receptor	Construction Activity	Nearest Development Phase (s)	Predicted Noise Level	Threshold Value	Difference	Impact	Effect
Existing School	P1: Clearance and Enabling Works	1	62	65	-4	Neg	**Neg**
	P2: Road Construction		64		+1	Minor	**Minor**
	P3: Ground Works		69		+4	Mod	**Mod**
	P4: Substructure Construction		65		0	Neg	**Neg**
	P5: Superstructure Works		65		0	Neg	**Neg**
Bothar Bhreamhaine	P1: Clearance and Enabling Works	1 and 2	64	65	-1	Neg	**Neg**
	P2: Road Construction		64		-1	Neg	**Neg**
	P3: Ground Works		66		+1	Minor	**Minor**
	P4: Substructure Construction		65		0	Neg	**Neg**
	P5: Superstructure Works		66		+1	Minor	**Minor**
Brawney Drive/Square	P1: Clearance and Enabling Works	1 and 2	65	65	+0	Neg	**Neg**
	P2: Road Construction		64		-1	Neg	**Neg**
	P3: Ground Works		70		+5	High	**Major**
	P4: Substructure Construction		67		+2	Minor	**Minor**
	P5: Superstructure Works		66		+1	Minor	**Minor**
Lana Na Smear	P1: Clearance and Enabling Works	3	57	65	-8	Neg	**Neg**
	P2: Road Construction		59		-6	Neg	**Neg**
	P3: Ground Works		59		-6	Neg	**Neg**
	P4: Substructure Construction		58		-7	Neg	**Neg**
	P5: Superstructure Works		60		-5	Neg	**Neg**
Cuirt Chlluan Broc	P1: Clearance and Enabling Works	1	59	65	-6	Neg	**Neg**
	P2: Road Construction		62		-3	Neg	**Neg**
	P3: Ground Works		61		-4	Neg	**Neg**
	P4: Substructure Construction		61		-4	Neg	**Neg**
	P5: Superstructure Works		59		-6	Neg	**Neg**

Arda Auburn	P1: Clearance and Enabling Works	2	59	65	-6	Neg	**Neg**
	P2: Road Construction		63		-2	Neg	**Neg**
	P3: Ground Works		61		-4	Neg	**Neg**
	P4: Substructure Construction		63		-2	Neg	**Neg**
	P5: Superstructure Works		61		-4	Neg	**Neg**
Ceide an Chatuin	P1: Clearance and Enabling Works	3	63	65	-2	Neg	**Neg**
	P2: Road Construction		64		-1	Neg	**Neg**
	P3: Ground Works		62		-3	Neg	**Neg**
	P4: Substructure Construction		62		-3	Neg	**Neg**
	P5: Superstructure Works		65		0	Neg	**Neg**
Residential Property to the East of Phase 3	P1: Clearance and Enabling Works	3	58	65	-7	Neg	**Neg**
	P2: Road Construction		65		0	Neg	**Neg**
	P3: Ground Works		62		-3	Neg	**Neg**
	P4: Substructure Construction		62		-3	Neg	**Neg**
	P5: Superstructure Works		60		-5	Neg	**Neg**

It can be seen from Table 9-28 that assuming the general construction noise mitigation measures have been correctly implemented the impact and effect of noise from construction operations would be Negligible or Minor at the majority the noise-sensitive receptors considered, during each construction phase, therefore no further mitigation measures are considered necessary at these receptors.

At the Existing School during ground works, there is a moderate impact and effect, and at Brawney Drive/Square during ground works there is a high effect and a major impact.

Due to the very close proximity of a number of the receptors to the site it may prove difficult to reduce construction noise levels at all the properties to below the threshold values for the entirety of the construction period.

It is recommended that a Construction Environmental Management Plan ('CEMP') is drafted and implemented during the construction phase.

The CEMP would include input from the Local Planning Authority (LPA) regarding the levels of noise acceptable at the boundaries which may require a programme of noise monitoring at the start of each phase or for the entirety construction programme, it is envisaged that this noise monitoring scheme would be agreed in writing with LPA prior to the commencement of the construction works.

9.7.2 Construction Phase – Vibration

Due to the nature of the Scheme it is not anticipated that operations can take place at sufficient distances from residential Receptors to reduce the impact to Minor. The required distances would need to be:

- 85m away for Steady State operations; and
- 85m away for Start Up and Run-Down operations.

To prevent a Major impact at residential Receptors it is recommended that Start Up and Run-Down operations do not take place at less than 15m from a residential Receptor, and that Steady State construction operations are kept to a minimum at distances less than 15m from a residential Receptor.

At distances between:

- 15m and 85m of a residential Receptor, Steady State construction operations would have a Moderate vibration impact; and
- 20m and 85m from a residential Receptor, Start up and Run-Down construction operations would have a Moderate vibration impact.

In the Moderate impact areas (between 15m and 85m for Steady State operations and 20m and 85m for Start Up and Run-Down operations), the predicted Vibration levels are between 1.2 and 7.9mms^{-1}. With reference to Table 9-3 of this Report:

At vibration levels between 1.00 and 9.9mms^{-1} "… *It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents".*

On the understanding that in the Moderate impact area, if residents are warned and an explanation is given, the level of vibration can be tolerated, no further mitigation is required

9.7.3 Operational Phase

9.7.3.1 Amenity Space Mitigation

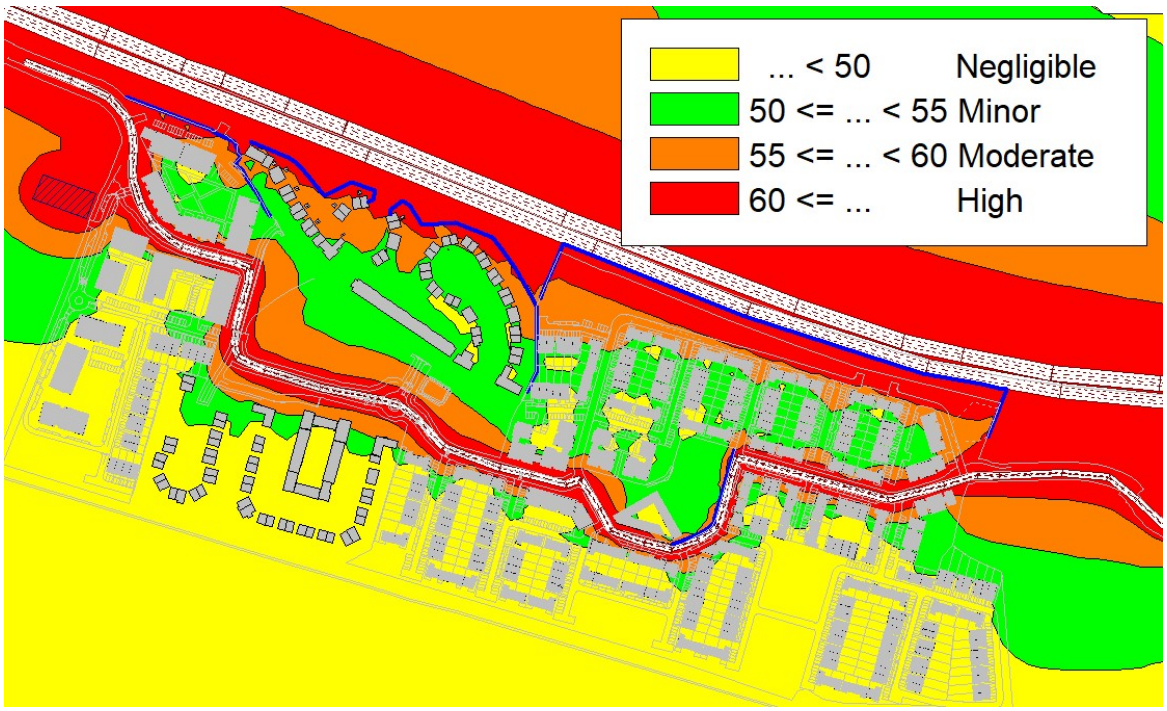
The external amenity space noise assessment has shown that in a number of the areas of the site moderate and high impacts have been predicted, therefore mitigation measures are considered necessary.

The installation of acoustic barriers around the relevant amenity areas would reduce the noise levels within the outdoor amenity spaces.

With reference to Figure 9-13 below, repeats the external noise assessment assuming that 2.4m high acoustic fences have been erected around the relevant amenity spaces; the fences are shown in blue on the image. Barriers have not been included around the block of flats located to the north-west of the site as the amenity space is located to the south of the southern facades and therefore is screened by building itself.

It should be noted that from studying Google Earth images of the site it has been determined that barriers are located around the amenity area of the existing properties located close to the N6 which have also been included on the image.

Figure 9-13: External Daytime Noise Assessment including Mitigation $L_{Aeq,16\text{-}hour}$



It can be seen from Figure 9-13 that assuming the barriers have been correctly installed there would be Negligible or Minor impacts in majority of the external amenity spaces.

There are a small number of areas, i.e. the amenity space adjacent to Block L and the open area located adjacent to the N6 where Moderate and High impacts are still predicted; however it should be noted that the existing properties located close to the N6 gained Planning Permission despite noise levels within the amenity spaces predicted to be in excess of the limits contained in BS8233:2014.

Further to the above and with reference to BS8233:2014, Section 7.7.3.2 states:

"However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited".

Therefore, the above should be taken into account in any subsequent planning decisions for the development proposals.

9.7.3.2 Internal Levels – Façade Mitigation

Noise levels incident upon the façade will require mitigation to meet the internal noise limits stipulated in BS8233:2014.

Windows do not reduce noise equally across the entire frequency spectrum, so the frequency content of the sound will influence the overall sound reduction performance of a given window and by extension, the resulting noise levels within the receiving room.

However, many glazing manufacturers test their products under laboratory conditions using a typical road traffic noise frequency spectrum source. The resultant measured noise attenuation, in dB, gives a very useful guide to in-situ sound reduction performance of the window for situations where road traffic noise dominates. This performance index is known as the $R_W + C_{tr,}$ and the sound reduction requirement set out above should be considered as an $R_W + C_{tr}$ noise level.

From an analysis of the available daytime and night-time ambient noise level predictions the highest glazing specification is required to meet the night-time maximum noise limit of 45dB(A) in a habitable room.

The glazing requirements on each floor, of each proposed building to meet the internal limits, outlined below, are shown in Appendix 9-3.

- An internal ambient daytime limit of 35dB(A) for living rooms; and
- An internal night-time maximum limit of 45dB(A) for bedrooms.

The night-time ambient glazing requirements have not been considered as the glazing requirements associated with the maximum noise levels are greater.

In each Figure in Appendix 9-3 the decibel reduction required by the glazing at each façade can be seen by the numbering, it must be noted that the figures and façade reductions include the attenuation provided by the barriers recommended in Section 9.7.3.1.

For the purpose of selecting the appropriate ventilator the reader should refer to the Dn,e,w (Ctr value).

As referenced in ISO 717-1:2013 *Acoustics – Rating of Sound Insulation in Buildings and of Building Elements* the Dn,e,w is a single number quantity of airborne sound insulation and is a weighted element-normalized level difference that includes a correction for low frequency noise such as noise from road traffic. The number is standardised to a reference area of $10m^2$ and therefore gives a value higher than the actual insertion loss. Consequently, it is standard practice, when selecting an appropriate ventilator, to select a ventilator that has a $D_{n,e,w}$ (C_{tr} value) up to 6dB(A) higher than the required R_{W+Ctr} dB value.

At this stage it is not appropriate to advise on suitable ventilators as the ventilation strategy for the Site has not been developed. The strategy adopted however must have a $D_{n,e,w}$ (C_{tr} value) 6dB(A) higher than the required R_{W+Ctr} dB value.

9.8 Residual Impacts

9.8.1 Construction Noise and Vibration

9.8.1.1 Noise

The construction noise assessment has shown that assuming that the mitigation measures outlined in Section 9.7.1 have been correctly implanted then the construction noise levels can be reduced by 5dB(A) or more. The noise threshold limit, however, would still be exceeded at a number of the noise-sensitive receptors, though at the majority of these only a Minor Effect and Impact has been predicted.

However, at the Existing School during ground works, there is still a Moderate Impact and Effect, and at Brawney Drive/Square during ground works there is still a High Impact and a Major Effect.

As these effects are only short-term during one phase of the construction works they are not considered significant.

As the Threshold Values are still slightly exceeded, whilst it is not anticipated that continuous monitoring would be required, at the request of the LPA the applicant would undertake attended short term monitoring at nearby noise sensitive receptors to validate the predicted construction noise levels in Table 9-28 of this Report.

It is anticipated that short term noise monitoring may be completed on a minimum of four occasions to coincide with the beginning of each phase of construction. If the limit is exceeded, SLR would recommend that further provision is made for additional monitoring.

9.8.1.2 Vibration

With reference to Section 9.7.2, the mitigation measures proposed do not allow for a quantitative residual assessment to be completed.

It may be considered necessary to implement a vibration monitoring scheme during the construction period. If this is required SLR would recommend that continuous vibration compliance monitoring is undertaken at, at least one vibration sensitive dwelling to determine operational vibration levels. Levels should be compared to the specified limit and the monitors should continually transmit live vibration levels and provide remote long-term information.

9.8.2 External Amenity Space

Assuming the barriers recommended in Section 9.7.3.1 have been correctly installed there would be at worst, a Minor Impact with a Minor Effect in majority of the external amenity spaces.

There are a small number of areas, i.e. the amenity space adjacent to Block L and the open area located adjacent to the N6 where Moderate and High impacts are still predicted; however it should be noted that the existing properties located close to the N6 gained Planning Permission despite noise levels within the amenity spaces predicted to be in excess of the limits contained in BS8233:2014.

Further to the above and with reference to BS8233:2014, Section 7.7.3.2 states;
"However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited".

With reference to the above the predicted Impacts and Effects are not considered significant.

9.8.3 Internal Noise Levels

SLR anticipate that with the implementation of the appropriate glazing shown in Appendix 9-3 to mitigate the external noise climate, there would be Negligible impacts and level of effect would also be Negligible and not significant.

9.8.4 Development Related Traffic

As mitigation of development related traffic is not required there are no residual Effects to report.

9.8.5 Commercial Noise – Fixed Plant

It is anticipated that, if permitted, a specific level limit from all plant at the Site would be conditioned (in accordance with the limits presented in Table 9-27 of this report), ensuring that the magnitude of impact is within acceptable levels and the level of Effect is Negligible and not significant.

9.9 Do Nothing Scenario

There are no predicted impacts should the proposed development not proceed.

9.10 Difficulties Encountered

No difficulties were encountered while developing this report.

9.11 Summary

This chapter has set out the proposed approach to the assessment of:

- The impact construction noise and vibration upon existing sensitive receptors close to the development.
- The impact of the existing noise climate on the both the internal and external areas of the proposed development.
- The impact of traffic noise associated with the proposed development upon existing sensitive receptors close to the development.
- The impact of any fixed plant associated with the proposed commercial areas of the development.

For each assessment the likely significant effects have been determined.

The assessments have been completed in accordance with the relevant guidance and legislation.

A summary of the assessment results and residual impacts are shown in Table 9-29 overleaf.

Table 9-29 Summary of Results

Assessment	Receptor	Residual Effect	Is the Effect Significant?
Construction Noise Assessment: Noise from construction operations impacting on the existing noise-sensitive receptors in the vicinity of the development site.	Existing residential properties and school	With the mitigation proposed, the residual effects are predicted to be Negligible or Minor at the majority of the nearest noise-sensitive receptors.	No
Construction Vibration Assessment: Vibration from construction operations impacting on the existing sensitive receptors in the vicinity of the development site.	Existing residential properties and school	The mitigation measures proposed do not allow for a quantitative residual assessment to be completed. To prevent a Major residual Effect at residential Receptors it is recommended that Start Up and Run-Down operations do not take place at less than 15m from a residential Receptor, and that Steady State construction operations are kept to a minimum at distances less than 15m from a residential Receptor.	No
External Amenity Space Assessment: Environmental noise arising from noise sources in the vicinity of the Site incident upon the proposed amenity spaces.	Proposed amenity areas within the Site	With the mitigation proposed, there would be at worst, a Minor Residual Effect in majority of the external amenity spaces	No
Internal Noise Level Assessment: Environmental noise arising from noise sources in the vicinity of the Site incident upon the proposed residential Receptors.	Proposed residential properties at the Site	Inside, in habitable rooms, it is expected that the Residual Effect may be mitigated to a Negligible level.	No
Development Related Traffic Assessment: Noise impact of development related traffic movements on existing sensitive receptors adjacent to transport links to and from the Site	Existing noise-sensitive receptors surrounding the Site	At worst there is predicted to be a Minor Residual Effect during the long-term on one of the transport links considered. On all of the other links considered there is predicted to be a Negligible Residual Effect	No
Commercial Fixed Plant Assessment: Proposed commercial/industrial noise from fixed plant incident upon the Site and existing receptors	Proposed residential properties at the Site, and existing receptors.	With the limits proposed, it is expected the noise Effect on the Site and at existing receptors would be conditioned to be Negligible	No

Chapter 9 Appendices

Appendix 9-1 - Glossary of Terminology

Appendix 9-2 – Full Survey Results

Appendix 9-3 - Glazing Requirements

Appendix 9-4 – Basis of the Report

Appendix 9-1 - Glossary of Terminology

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table A9-1-1 – Sound Levels Commonly Found in the Environment

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

Acoustic Terminology

dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10-5 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
LAeq	LAeq is defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
L10 & L90	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L10 is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L90 is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L10 index to describe traffic noise.
LAFmax	LAFmax is the maximum A-weighted sound pressure level recorded over the period stated. LAmax is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.

Appendix 9-2 – Full Survey Results

Table A9-2-1 Location One Survey Results – dB

Date	Start Time	$L_{Aeq,T}$	L_{A90}	L_{A10}	L_{AFmax}
24/06/2019	13:16:22	67.6	60.8	70.8	77.6
	13:31:22	67.8	60.8	71.1	78.0
	13:46:22	67.6	60.9	70.8	77.0
	14:01:22	68.1	60.7	71.4	76.6
	14:16:22	67.4	59.8	70.6	77.9
	14:31:22	67.4	60.3	70.8	77.8
	14:46:22	67.8	61.6	70.7	75.9
	15:01:22	67.3	61.1	70.3	74.9
	15:16:22	67.6	62.2	70.5	75.8
	15:31:22	67.6	61.1	70.7	79.9
	15:46:22	67.3	61.3	70.4	75.2
	16:01:22	68.0	62.3	71.0	76.1
	05:56:01	66.6	49.7	70.2	82.4
	06:11:01	65.6	48.2	68.9	80.5
	06:26:01	67.1	53.6	71.6	80.0
	06:41:01	68.4	58.6	73.2	80.0

Table A9-2-2 Location Two Survey Results – dB

Date	Start Time	$L_{Aeq,T}$	L_{A90}	L_{A10}	L_{AFmax}
24/06/2019	10:05:52	63.0	56.7	65.8	82.5
	10:20:52	62.8	56.9	65.7	71.5
	10:35:52	62.6	56.3	65.4	71.4
	10:50:52	62.5	56.2	65.4	78.4
	11:05:52	62.5	56.1	65.6	73.3
	11:20:52	62.3	55.9	65.3	79.4
	11:35:52	63.5	58.0	66.2	77.1
	11:50:52	63.2	57.9	66.0	70.0
	12:05:52	63.7	58.7	66.2	71.1
	12:20:52	63.4	58.7	65.9	68.7
	12:35:52	63.7	59.2	66.3	69.9
	12:50:52	63.7	59.2	66.2	69.7

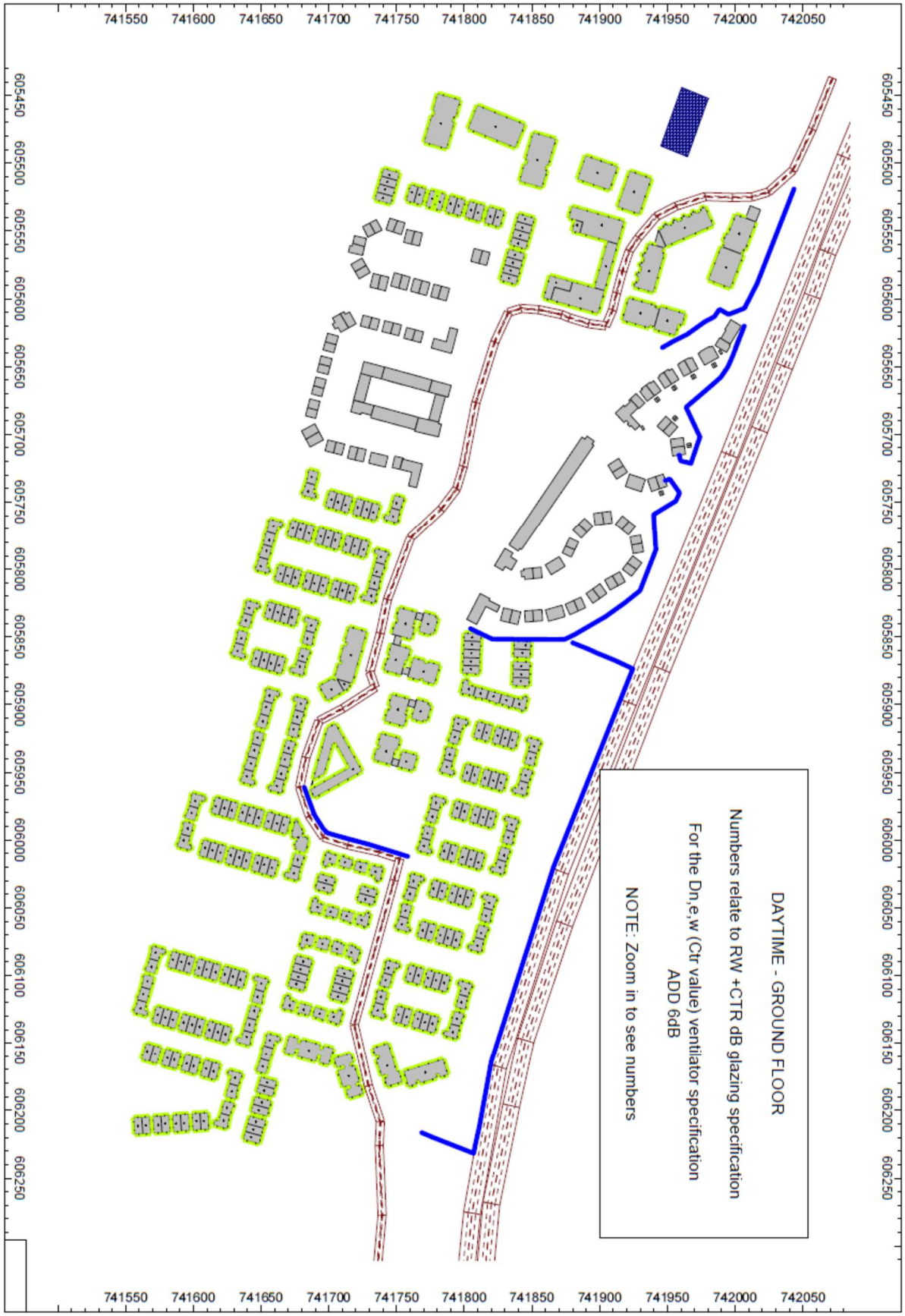
Table A9-2-3 Location Three Survey Results – dB

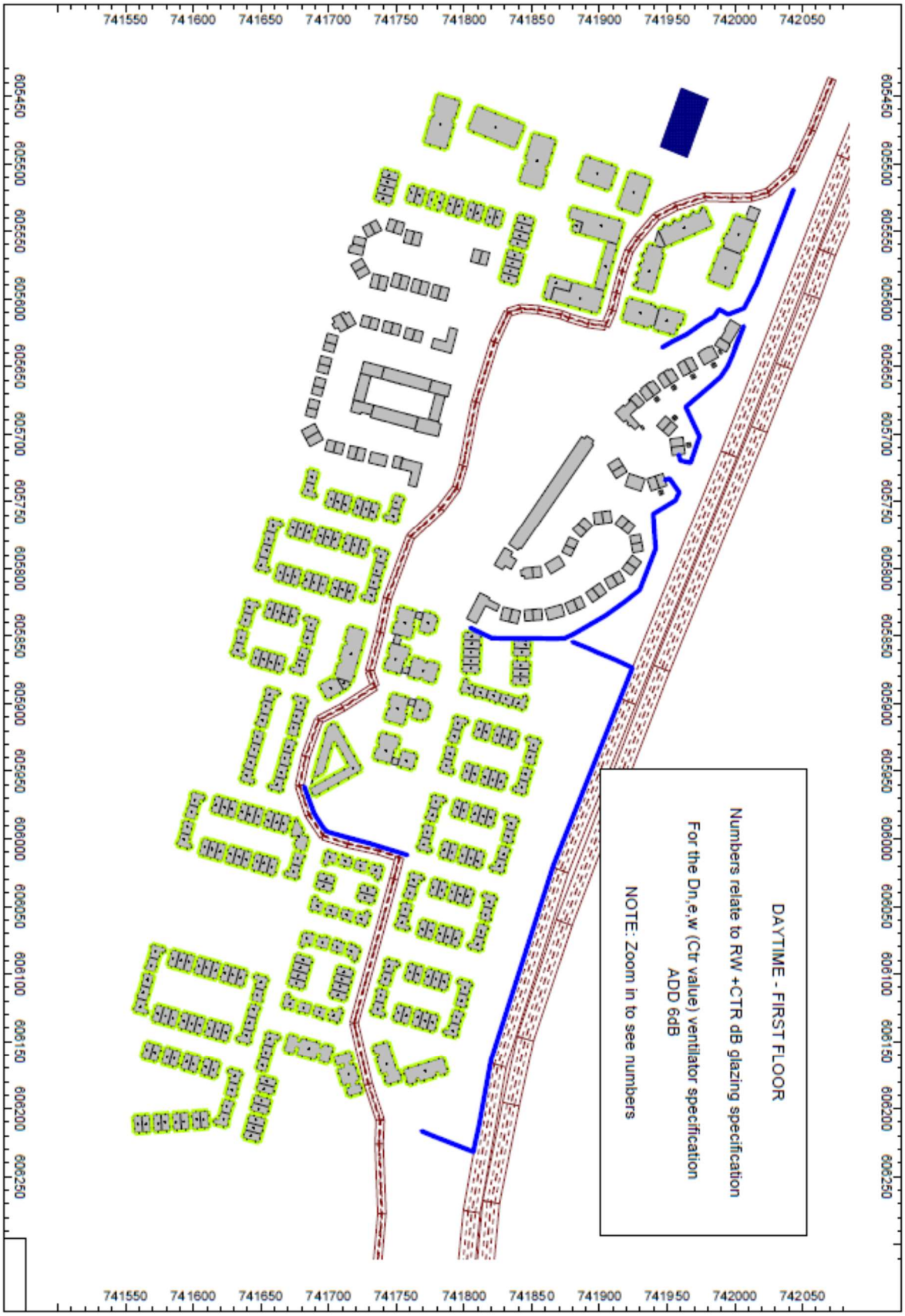
Date	Start Time	$L_{Aeq,T}$	L_{A90}	L_{A10}	L_{AFmax}
24/06/2019	11:42:34	56.0	53.0	58.6	64.7
	11:47:34	56.2	53.2	58.3	63.5
	11:52:34	56.6	53.0	58.6	71.3
	11:57:34	56.1	55.7	56.4	57.0

Table A9-2-4 Location Four Survey Results – dB

Date	Start Time	$L_{Aeq,T}$	L_{A90}	L_{A10}	L_{AFmax}
20/09/2020	15:56:20	53.8	46.1	56.9	77.7
	16:11:20	54.1	45.7	54.4	79.0
	16:26:20	59.2	45.2	57.9	90.3
	16:41:20	47.6	44.9	49.5	58.7
21/09/2020	00:15:00	38.2	32.7	41.3	48.5
	00:30:00	38.4	33.9	41.0	48.5
	00:45:00	36.9	32.1	39.6	45.8
	01:00:00	34.9	29.5	37.2	59.8

Appendix 9-3 - Glazing Requirements

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741900
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742000
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605650
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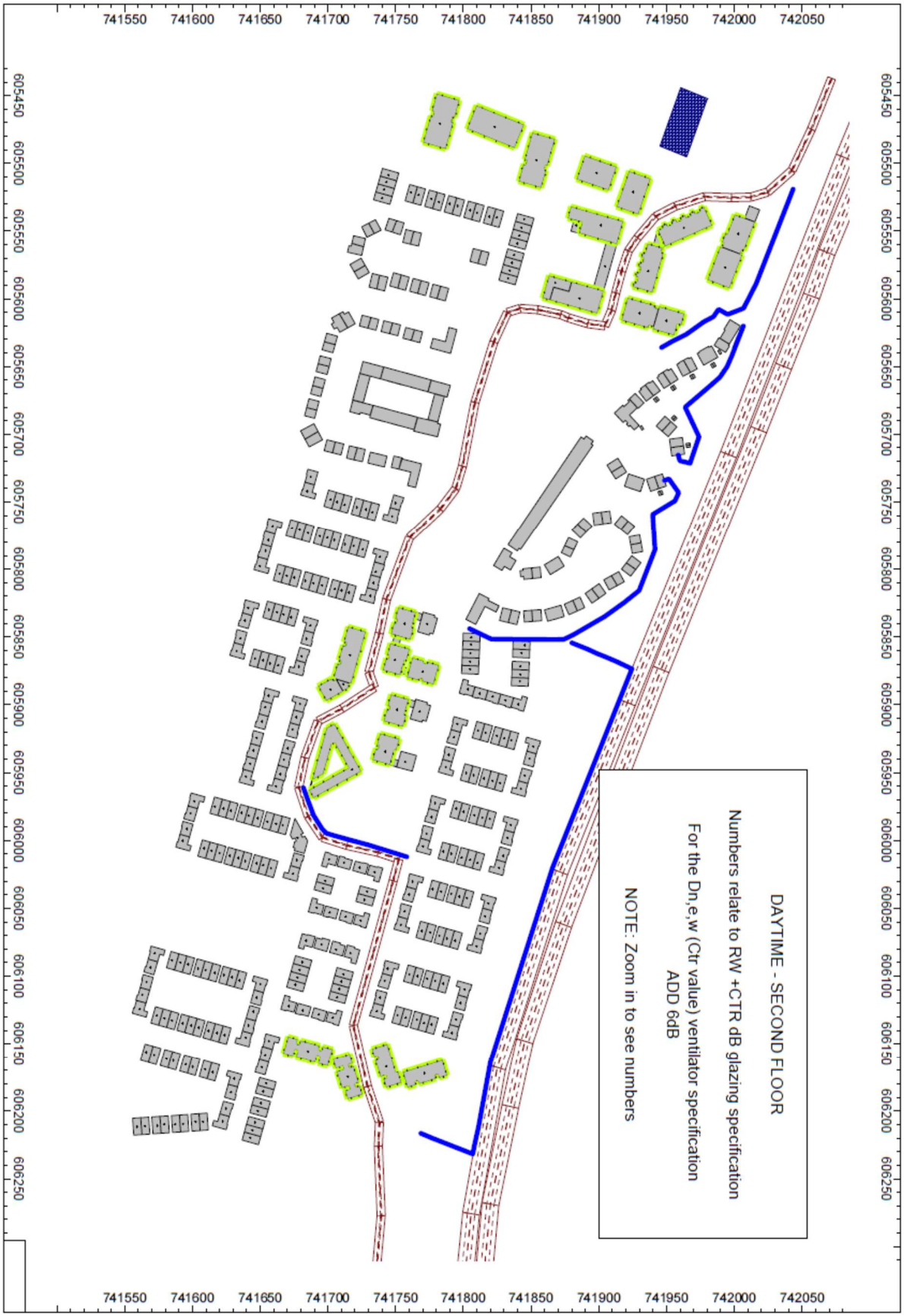
605750
605800
605850
605900
605950
606000
606050
606100
606150
606200
606250
DAYTIME - FIRST FLOOR
Numbers relate to RW +CTR dB glazing specification
For the Dn,e,w (Ctr value) ventilator specification
ADD 6dB
NOTE: Zoom in to see numbers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606100
606150
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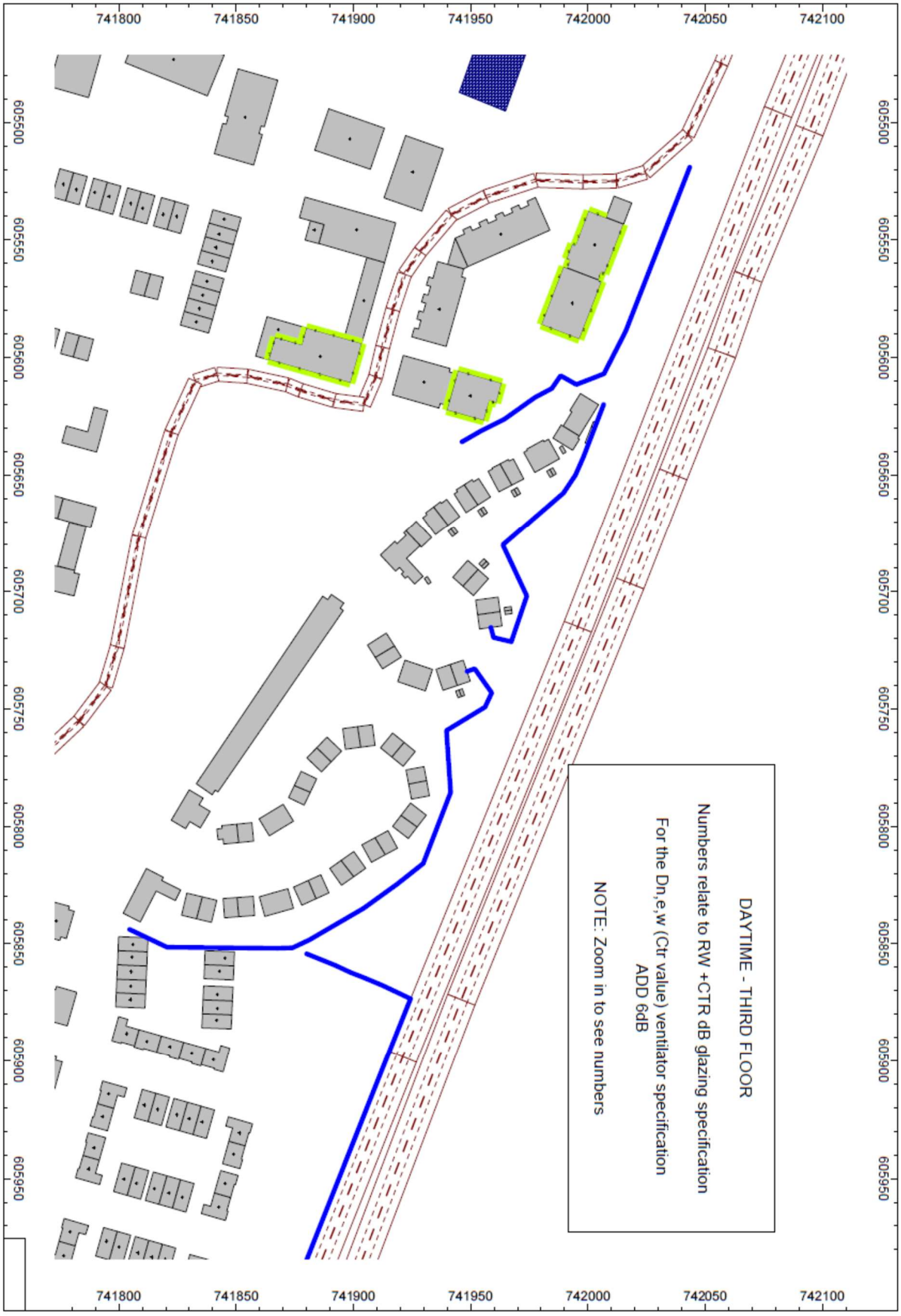
606250
DAYTIME - SECOND FLOOR
Numbers relate to RW +CTR dB glazing specification
For the Dn,e,w (Ctr value) ventilator specification
ADD 6dB
NOTE: Zoom in to see numbers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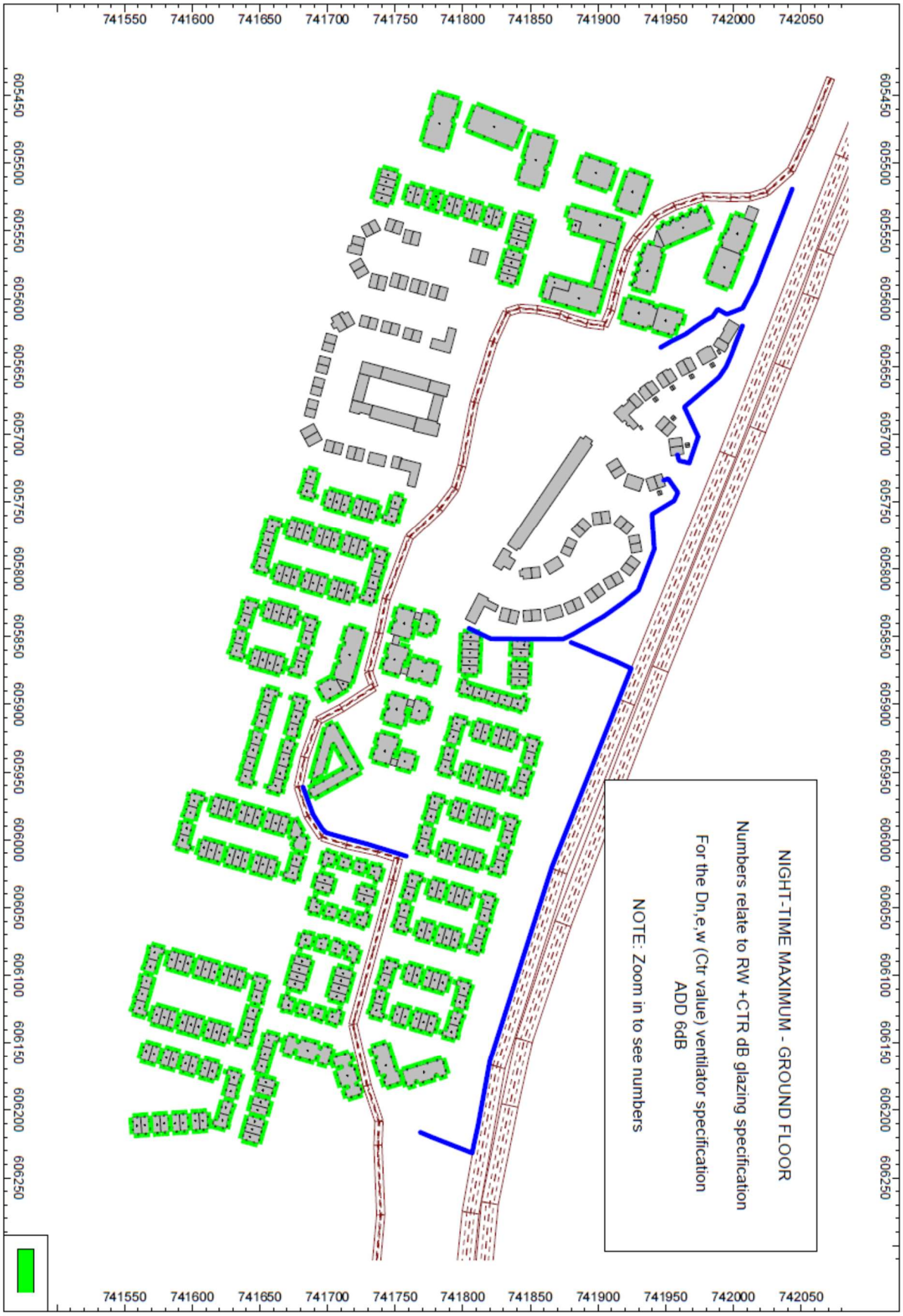
DAYTIME - THIRD FLOOR
Numbers relate to RW +CTR dB glazing specification
For the Dn,e,w (Ctr value) ventilator specification
ADD 6dB
NOTE: Zoom in to see numbers


741900
741920
741940
741960
741980
742000
742020
742040
605480
605500
605520
605540
605560
605580
605600
605620
605640
605660
605680
605700
DAYTIME - FOURTH FLOOR
Numbers relate to RW +CTR dB glazing specification
For the Dn,e,w (Ctr value) ventilator specification
ADD 6dB
NOTE: Zoom in to see numbers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605800
605850
605900
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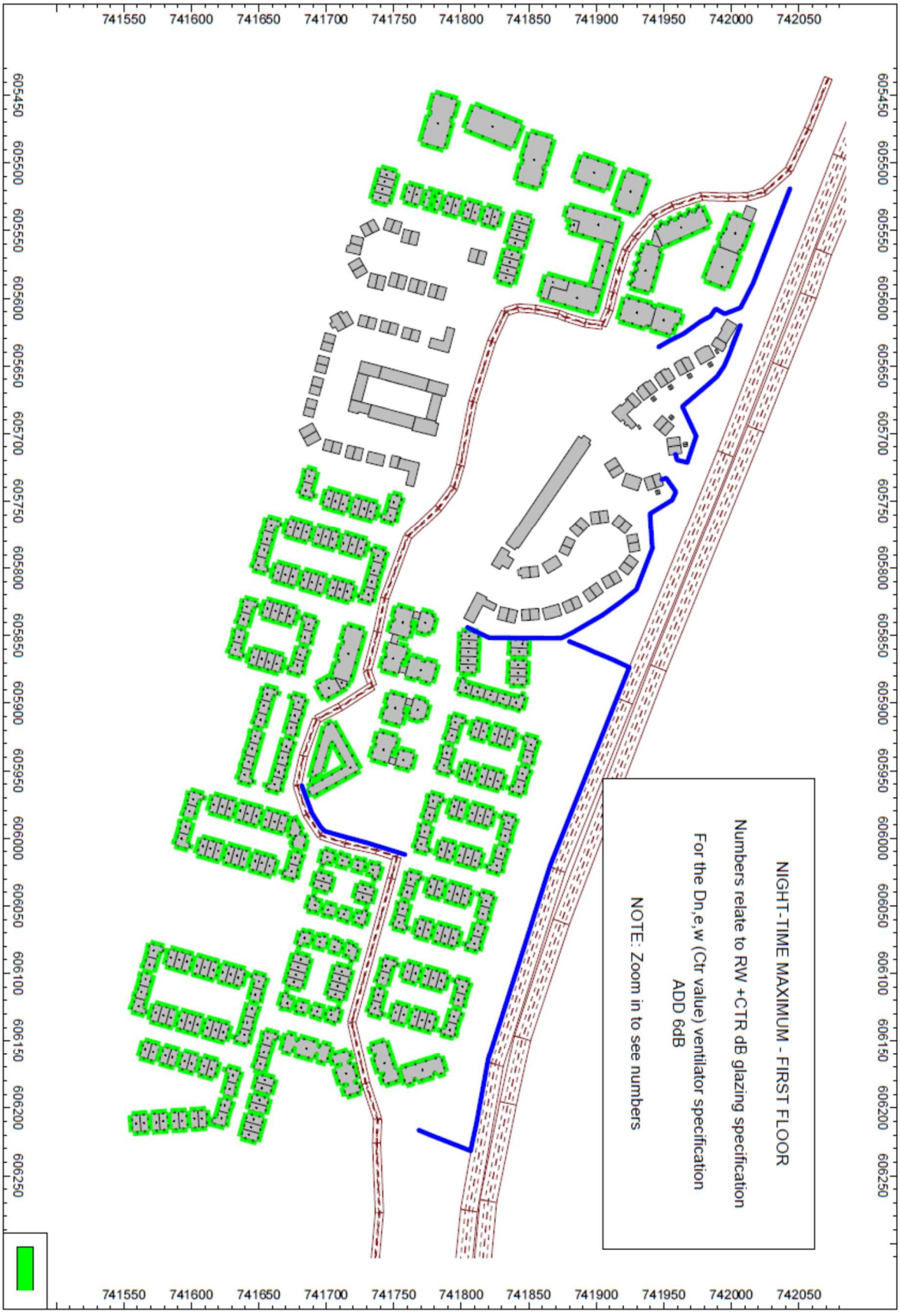
606000
606050
606100
606150
606200
606250
NIGHT-TIME MAXIMUM - GROUND FLOOR
Numbers relate to RW +CTR dB glazing specification
For the Dn,e,w (Ctr value) ventilator specification
ADD 6dB
NOTE: Zoom in to see numbers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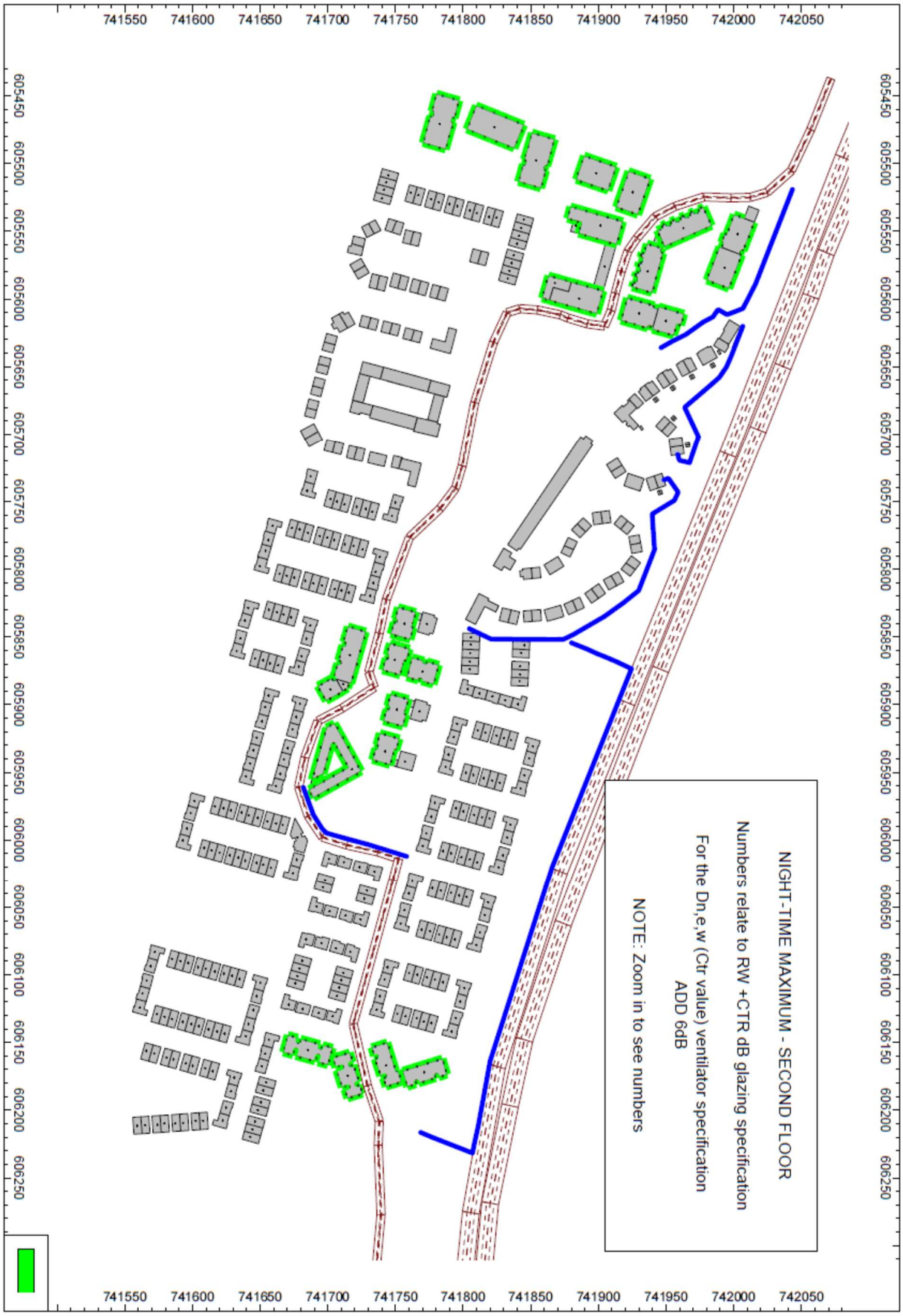
NIGHT-TIME MAXIMUM - FIRST FLOOR
Numbers relate to RW +CTR dB glazing specification
For the Dn,e,w (Ctr value) ventilator specification
ADD 6dB
NOTE: Zoom in to see numbers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NIGHT-TIME MAXIMUM - SECOND FLOOR
Numbers relate to RW +CTR dB glazing specification
For the Dn,e,w (Ctr value) ventilator specification
ADD 6dB
NOTE: Zoom in to see numbers


741860
741880
741900
741920
741940
741960
741980
742000
742020
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NIGHT-TIME MAXIMUM - THIRD FLOOR
Numbers relate to RW +CTR dB glazing specification
For the Dn,e,w (Ctr value) ventilator specification
ADD 6dB
NOTE: Zoom in to see numbers


741920
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741980
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742040
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605560
605580
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605660
605680
605700
NIGHT-TIME MAXIMUM - FOURTH FLOOR
Numbers relate to RW +CTR dB glazing specification
For the Dn,e,w (Ctr value) ventilator specification
ADD 6dB
NOTE: Zoom in to see numbers

Appendix 9-4 – Basis of the Report

This document has been prepared by SLR Consulting Limited with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Newline Homes Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

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10.0. Material Assets: Built Services

10.1 Introduction

This chapter of the EIAR assesses and evaluates the likely impact of the proposed development on existing surface water and foul drainage, and utility services in the vicinity of the site during both the construction and operational phases, as well as identifying the nature of any impacts and provide the necessary mitigation measures arising from the proposed development. The material assets considered in this chapter include Surface Water Drainage, Foul Drainage, Water Supply, Power, Gas and Telecommunications.

This chapter of the EIAR was prepared by Tracy Armstrong, BA, MRUP, Dip EIA/SEA Mgmt, MIPI, MRTPI, Director of Delphi Design.

10.2 Assessment Methodology

The methodology followed for this section is in accordance with the EPA "Revised Guidelines on the Information to be contained in Environmental Impact Statements, Draft September 2015" and "Advice Notes for Preparing Environmental Impact Statements Draft September 2015".

The following legislation, standards and guidelines were consulted to inform the assessment:

As part of assessing the likely impact of the proposed development, surface water runoff, foul drainage discharge and water usage calculations were carried out in accordance with the following guidelines:

- Irish Waters Code of Practice for Water Infrastructure;
- Irish Waters Code of Practice for Wastewater Infrastructure;
- Greater Dublin Strategic Drainage Study, (DCC 2005);
- Regional Code of Practice for Drainage Works, (DCC 2005).

Assessment of the potential impacts of the proposed development on existing built services in the vicinity of the site included:

- Review of Irish Water utility plans (foul drainage and water supply)
- Review of Westmeath County Council utility plans (surface water drainage)
- Consultation with Irish Water and Westmeath County Council
- Receipt of Confirmation of Feasibility (CoF) letter and a Statement of Design Acceptance from Irish Water
- Review of ESB Network Utility Plans
- Review of Gas Networks Ireland Service Plans
- Review of EIR E-Maps
- Land Surveys Topographical mapping
- Westmeath County Development Plan 2014-2020
- Draft Westmeath County Development Plan 2014-2020
- Athlone Town Development Plan 2014-2020
- Lissywollen South Framework Plan 201-2024

GSI.ie Geological datasets

The following information sources were used in the assessment of the land, soils and geology of for the proposed development site:

- Guidelines on the information to be contained in Environmental Impact Statements, 2002, EPA;
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements), 2003, EPA;
- EPA: Draft Revised Guidelines on The Information to be Contained in Environmental Impact Assessment Reports, August 2017;
- EPA: Advice Notes for Preparing Environmental Impact Statements, Draft, September 2015;
- Irish Waters Code of Practice for Water Infrastructure;
- Irish Waters Code of Practice for Wastewater Infrastructure;
- Greater Dublin Strategic Drainage Study, (DCC 2005);
- Regional Code of Practice for Drainage Works, (DCC 2005);
- The Planning System & Flood Risk Management – Guidelines for Planning Authorities, Dept. of Environment, Heritage & Local Government. (Government of Ireland 2009).

Consultation was undertaken with Westmeath County Council and Irish Water including the receipt of a Confirmation OF Feasibility (CoF) letter and a Statement of Design Acceptance from Irish Water.

As part of assessing the likely impact of the proposed development, surface water runoff, foul drainage discharge and water usage calculations were carried out in accordance with the following guidelines;

- Greater Dublin Strategic Drainage Study (GDSDS)
- SuDS Manual
- Irish Water's Code of Practice

10.3 Study Area

The study is confined to the lands subject to the for the submitted application, refer to the planning drawings, notably Site Layout Plan (Drawing No. D1408-19-PL07). The application site covers an area of 17.64 Ha.

10.4 Existing Receiving Environment (Baseline Scenario)

The proposed site is bordered to the north by the Brawny Road, the Athlone Town Stadium to the west, residential development to the south and agricultural lands to the east. There are existing surface water and foul networks that traverse the site.

Figure 10.1 – Site Location – Athlone, Co. Westmeath

The proposed site is a 'Greenfield' site and the proposed development seeks to provide for the construction of 576 no. residential units, childcare facilities, a community hub, open space and all associated site and infrastructural works. It is located approximately 1km from Athlone town centre.

10.4.1 Existing Surface (Storm) Water Infrastructure

There is an existing 1350mm diameter surface water sewer traversing the proposed site from east to west - of which a length of approximately 563m will be diverted. 2no. 750mm diameter surface water sewer from existing developments north of the proposed development also currently discharge to the existing 1350mm diameter sewer at separate locations. The easternmost of these 750mm sewer will need to be diverted as part of the proposed development (approx. 109m). These 2no. sewers will be picked up by the diverted sewer as shown on the submitted DBFL Consulting Engineers drawings 180176-DBFL-SW-SP-DR-C-1011 and 180176-DBFL-SW-SP-DR-C-1012.

Historical 25" map (1888-1913) indicates the presence of a drainage ditch traversing the site and parts of this ditch appear to exist today. It is considered likely that this ditch only drained lands within the boundary of the proposed development. Regardless, it has partly been built over by residential development. Therefore, it is considered likely that much of this ditch has been made redundant by the aforementioned 1350mm surface water sewer.

As with the existing foul infrastructure (noted above) there may be existing surface water infrastructure located within the western portion of the site for a previous planned development – since abandoned. However, there are no records available from the Council regarding these. Further investigatory work is to be undertaken to determine the presence of this infrastructure and removed/utilised if appropriate.

10.4.2 Existing Foul Water Infrastructure

Foul sewage from the site will drain by gravity to an existing 525mm diameter foul sewer that traverses the site from east to west, which outfalls towards the Old Rail Trail Greenway. Athlone Wastewater Treatment Plant is located approximately 1,400m south west of the proposed development. The existing 525mm diameter foul sewer ultimately discharges to this plant. It is also noted that there are two separate Irish Water projects to improve foul drainage infrastructure in Athlone to increase capacity at the Athlone wastewater treatment plant.

The Applicant was informed at the pre-application consultations that there may be existing foul infrastructure located within the western portion of the site for a previous planned development – since abandoned. However, there are no records available from Westmeath County Council regarding these and the Applicant has been unable to confirm same. Further investigatory work is to be undertaken following receipt of planning approval to determine the presence/location of this infrastructure. Where possible this existing infrastructure will be incorporated into the design.

10.4.3 Existing Potable Water Infrastructure

There is an existing 200mm diameter uPVC in the Brawny Road to the north west corner of the site, which branches off into 2 no. 100mm mains, and an existing 200mm diameter uPVC watermain on the R916 to the east of the site.

10.4.4 Existing ESB Infrastructure

An ESB Networks plan is included in Appendix 10-1 showing the locating of existing electrical services in the vicinity of the site.

Two MV (10KV/20KV) overhead lines enter the eastern portion of the site from the north east and south east before dropping into below ground ducting immediately west of existing housing development at Brawny Road.

10.4.5 Existing Telecoms Infrastructure

EIR network plans are included in Appendix 10-2 showing the location of telecommunications infrastructure in the vicinity of the site.

Telecommunications infrastructure is located along Brawny Road to the west and north west of the proposed development and the R916 road to the east.

10.4.6 Existing Gas Infrastructure

Gas Networks Ireland plans are included in Appendix 10-3 showing the location of gas distribution infrastructure in the vicinity of the site.

An existing medium pressure distribution pipeline (125mm / 4 bar) is shown entering the proposed site in the south west corner. This then reduces down to a 63mm / 4 bar service main serving the existing housing development in Brawny Drive, Square, Close, Crescent and Brawny Road.

10.5 Characteristics of the Proposed Development

The development proposal relates to the the construction of a residential development of 576 no. dwellings, a community hub, 2 no. crèches as follows:

- 576 no. residential dwellings, comprised of 285 no. houses and 291 no. apartment and duplex units consisting of:
- 285 no. 2 storey detached, semi-detached & terraced houses comprising 50 no. 4 bedroom houses, 200 no. 3 bedroom houses & 35 no. 2 bedroom houses;
- 291 no. apartments in 18 no. buildings (Blocks A, B, C, D, E, F, H, K, N, P, Q, R, S & T - all 3 storey, Block G - 2 storey, Block L - 5 storey with a 5 storey setback, Block M - 4 storey with a 4 storey setback, Block O - 2 to 4 storey) comprising 60 no. 1 bedroom apartments, 169 no. 2 bedroom apartments & 17 no. 3 bedroom apartments;
- With 45 no. duplex units in 9 no. of the above buildings (Blocks A, B, D, E, F, H, M, O, Q & S) comprising 8 no. 2 bedroom duplex units & 37 no. 3 bedroom duplex units;
- Development of 2 no. *crèche* facilities comprised *of a 2 storey crèche of circa 321m² located on the ground & first floors of Block C; & a* 1 storey *crèche of circa 448m² located on the* ground floor of Block T;
- Access to the subject site will be from the Ballymahon roundabout (on the R915) to the west via Brawny Road and the Garrycastle roundabout (on the R916) to the east. The development proposal includes for road development works and the construction of an east-west access route through the subject site from the Ballymahon roundabout (on the R915) to the west to the Garrycastle roundabout (on the R916) to the east. The development proposal provides for pedestrian and cyclist connectivity to Old Rail Trail Greenway to the south;
- The development proposal includes for the provision of public open spaces, planting, boundary treatments & all ancillary landscape works, public lighting, drainage and attenuation, car & bicycle parking, bin storage, ESB sub-stations and all associated site development works.

10.5.1 Proposed Surface (Storm) Water Design

The surface water management strategy for the proposed development is outlined a separate document prepared by DBFL Consulting Engineers entitled “Engineering Services Report”. Also refer to Chapter 7 Water of this EIAR for further information on the surface water infrastructure impacts and mitigation measures.

The proposed surface water discharge point is to the existing 1350mm sewer noted above. The site has been split into two separate catchments, which will be served by its own surface water drainage network, both discharging to the existing 1350mm trunk sewer. As mentioned above, this existing sewer traverses the site from east to west, which ultimately discharges to the south-west corner of the western catchment. Diversion of this existing sewer will be required in order to accommodate the proposed site layout. The existing 750mm diameter surface water sewers will continue to discharge to the diverted 1350mm sewer, however, the easternmost of these sewers will need to be diverted as part of the proposed development works.

Surface water runoff from the site’s road network will be directed to a proposed surface water pipe network via road gullies while surface water from roofs will be routed to the proposed surface water pipe network via the porous aggregates beneath permeable paved driveways (providing an additional element of attenuation).

Surface water will pass through silt trap manholes prior to entering the attenuation system. Discharge rates from the proposed surface water drainage network will be controlled by a vortex flow control device (Hydrobrake or equivalent), associated underground attenuation tanks (Pluvial Cube or equivalent) and detention basins. Surface water discharge will also pass via a by-pass fuel / oil separator (sized in accordance with permitted discharge from the site).

Surface water calculations are based on an allowable greenfield runoff rate of 78.5l/s (20.7l/s western catchment, 57.8l/s eastern catchment) in accordance with the Greater Dublin Strategic Drainage Strategy (GDSDS). This results in a total attenuation volume for the 2 no. Surface Water Drainage Catchments of approx. 2,770m³ (810m³ western catchment, 1960m³ eastern catchment).

The surface water drainage network, attenuation storage and site levels are designed to accommodate a 100-year storm event (provision for climate change included). Floor levels of the residential units are set above the 100-year flood levels by a minimum of 0.5m. For storms in excess of a 100 year event, the development has been designed to provide overland flood routes towards the surface water drainage outfall and landscaping features. These overland flood routes also reduce the development's vulnerability to climate change.

The Proposed surface water drainage network has been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS), the Department of the Environment's Recommendations for Site Development Works for Housing Areas, the Department of the Environment's Building Regulations "Technical Guidance Document Part H Drainage and Waste Water Disposal" and BS EN 752: 2008 Drain and Sewer Systems Outside Buildings.

10.5.2 Proposed Foul Drainage Design

The proposed foul discharge point is to the existing 525mm diameter sewer located at the south-west corner of the western catchment. As mentioned above, an existing 525mm sewer traversing the site from east to west ultimately discharges to this point. Diversion of this existing sewer will be required in order to accommodate the proposed site layout. Raising of ground levels may also be required in localised areas, particularly in the eastern catchment, in order to enable gravity connections with acceptable levels of cover to the proposed foul drainage network.

The proposed foul drainage network will comprise of a series of main sewers 150mm/225mm diameter in size, which will serve the majority of the residential units. These will then discharge to the diverted 525mm trunk sewer. Some residential units will discharge directly to the diverted trunk sewer due to proximity. Each residential unit will be serviced by individual 100mm diameter connections in accordance with Irish Water Code of Practice.

The foul drainage network for the proposed development has been designed in accordance with the following guidance:

- Irish Water Code of Practice for Wastewater Infrastructure & Standard Details for Wastewater Infrastructure;
- Department of the Environment's Recommendations for Site Development Works for Housing Areas;
- Department of the Environment's Building Regulations "Technical Guidance Document Part H Drainage and Waste Water Disposal";
- BS EN 752: 2008 Drain and Sewer Systems Outside Buildings;
- IS EN 12056: Part 2 (2000) Gravity Drainage Systems Inside Buildings.

A peak flow rate of 24.7l/s has been calculated using the EN752 method, which equates to a daily foul discharge volume of 2134m³

A BOD (Biochemical Oxygen Demand) loading (based on 60g per person per day) of 93,312g has been calculated for the proposed development as outlined in the EPA Waste Water Treatment Manual.

Pre-connection enquiry feedback received from Irish Water states that the existing drainage network can accommodate the proposed development without upgrade. Irish Water issued a Statement of Design Acceptance for the proposed development under their Ref. CDS20004573 on 25th November 2020, stating they had no objection to the proposals submitted to them.

10.5.3 Proposed Water Supply

It is proposed to form a 200mm diameter connection off the existing 200mm watermain located in the R916 and another off the 200mm watermain Brawny Road. A 200mm spine watermain will be provided along the development's arterial roads with a number of 100mm/150mm looped branch mains off this spine to service the wider development.

Individual houses will have their own 25mm connections to distribution water mains via service connections and meter / boundary boxes.

All connections, valves, hydrants, meters etc. have been design and are to be installed in accordance with Irish Water's Code of Practice / Standard Details and the Department of the Environment's Building Regulations "Technical Guidance Document Part B Fire Safety".

An average daily domestic demand of approx. 248.5m³ has been calculated as outlined in Irish Water's Pre-Connection Enquiry Application Form.

Pre-connection enquiry feedback received from Irish Water states that the existing watermain network can accommodate the proposed development without upgrade. Irish Water issued a Statement of Design Acceptance for the proposed development under their Ref. CDS20004573 on 25th November 2020, stating they had no objection to the proposals submitted to them.

10.5.4 Proposed ESB Infrastructure

Electricity supply for the proposed development will be taken from the existing ESB Network.

Existing overhead electricity lines within the site MV (10KV/20KV) will be relocated in advance of the commencement of site works

10.5.5 Proposed Telecoms Infrastructure

The existing EIR network located along Brawny Road will be extended to service the proposed development.

10.5.6 Proposed Gas Infrastructure

Gas supply for the proposed development (if required as part of the energy strategy) will be taken from the existing Gas Networks Ireland network located to the west of the site.

10.6 Potential Impacts of the Proposed Development

10.6.1 Construction Phase

Power and water would be required during construction activities and servicing of the temporary site compound. The development site would be connected to the local electricity grid network system and mains water supply. Given the scale and transient nature of construction works, the power and water demand on the local electricity and mains water systems would not be considered significant and would not be anticipated to impact upon local power or water supply.

Telecommunications requirements during the construction phase would be provided using mobile phones / broadband. There would be no anticipated impacts to the local telecommunications system.

Foul water from staff welfare facilities generated during the construction phase would be collected on site in designated waste holding containers / port-a-loo units and emptied on a regular basis by a licenced waste contractor.

The construction works contractor would liaise with the relevant utilities provider prior to works commencing, with ongoing consultation throughout the proposed development. Where new services would be required, the construction works contractor would apply to the relevant utility provider and adhere to the requirements outlined in the connection permit / licence.

10.6.1.1 Power, Gas & Telecommunications

The installation of the utilities for the development will be conducted in parallel with the other services. This will mainly involve excavation of trenches to lay ducting, construction/installation of access chambers and backfilling of trenching. The trenching and backfilling works will be carried out in conjunction with the construction of the roads and footpaths throughout the scheme.

The relocation or diversions of the existing overhead ESB lines may lead to loss of connectivity to and / or interruption of the supply from the electrical grid to the surrounding areas. Any loss of supply will be managed by ESB Networks to minimise impact on neighbouring properties.

Potential loss of connection to the Gas Networks Ireland infrastructure while carrying out works to provide service connections. This likely adverse impact may be characterised as a temporary, regionally short term, moderate impact. Potential loss of connection to the Telecommunications infrastructure while carrying out works to provide service connections. This likely adverse impact may be characterised as a temporary, regionally short term, moderate impact. The site compound will require a power and telecommunications connection. This likely adverse impact will be temporary and negligible.

10.6.1.2 Do-nothing' scenario

There are no predicted impacts on these material assets should the proposed development not proceed.

10.6.2 Operational Phase

Potential operational phase impacts on the water infrastructure are noted below:

- Accidental hydrocarbon leaks and subsequent discharge into piped surface water drainage network (e.g. along roads and in driveway areas);
- Increased impermeable surface area will reduce local ground water recharge and potentially increase surface water runoff (if not attenuated to greenfield runoff rate);
- Increased discharge to foul drainage network (Daily Foul Discharge Volume = approx. 2134m³);
- Increased potable water consumption (Average Daily Domestic Demand = approx. 248.5m³).

Implementation of the mitigation measures described under section 10.6 will prevent and minimize the potential impacts of this interaction.

10.6.2.1 Surface Water

During the operational phase of the works, the surface water drainage has been designed to maintain the flows from the site at the greenfield run-off rates.

10.6.2.2 Foul Water

The impact of the operational phase of the proposed development on the foul drainage network would be the increased flows to the foul network. Irish Water have confirmed in the pre-connection response that the existing drainage network can accommodate the proposed development without upgrade.

10.6.2.3 Watermains

The impact of the operational phase of the proposed development on the water supply network would be the increased demand on the local system. Irish Water have confirmed in the pre-connection response that the existing watermain network can accommodate the proposed development without upgrade.

10.6.2.4 Power, Gas & Telecommunications

There will be no operational phase impacts or associated effects on electricity, gas, and telecommunications networks associated with the proposed development. There will be a moderate positive impact on land use at the site, as the current greenfield nature of the site will change to what it is zoned for, providing a location for housing.

10.7 Mitigation Measures

10.7.1 Construction Mitigation

The construction works contractor shall liaise with the relevant utilities provider prior to works commencing, with on-going consultation throughout the proposed development. Where new services would be required, the construction works contractor shall apply to the relevant utility provider and adhere to the requirements outlined in the connection permit / licence.

The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services unless this has been agreed in advance with the relevant service provider.

All works in the vicinity of utilities apparatus will be carried out in ongoing consultation with the relevant utility company or local authority and will be in compliance with any requirements or guidelines they may have.

Where new services or diversions to existing services are proposed, the Contractor will apply to the relevant utility company for a connection permit where appropriate, and will adhere to their requirements.

Mitigation measures proposed in relation to the drainage and water infrastructure include the following:

A detailed *"Construction Management Plan"* will be developed and implemented during the construction phase. Site inductions will include reference to the procedures and best practice as outlined in the "Construction Management Plan".

Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.

In the event of groundwater being encountered during the construction phase, mitigation measures will include dewatering by pumping to an appropriate treatment facility prior to discharge. Other measures would include excluding contaminating materials such as fuels and hydrocarbons from sensitive parts of the site i.e. highly vulnerable groundwater areas.

In order to reduce the risk of defective or leaking sewers, all new sewers should be laid in accordance with Irish Water standards, pressure tested and CCTV surveyed to ascertain any possible defects.
The construction compound will include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be removed off site to a licensed facility until a connection to the public foul drainage network has been established.

The construction compound's potable water supply shall be protected from contamination by any construction activities or materials.

Where possible backup network supply to any services will be provided should the need for relocation or diversion or existing services be required otherwise relocation or diversion works will be planned to incur minimal impact, with users notified in advance of any works.

Connections to the existing gas and telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.

10.7.1.1 Surface (Storm) Water Infrastructure

In accordance with the Greater Dublin Regional Code of Practice for Drainage Works, all sites are required to develop a drainage system which separates storm & foul water on site.

In addition to improving overall storm water quality following Westmeath County Council sustainable urban drainage systems, SuDs protocols, there is also a requirement to reduce storm water runoff rates to pre-development levels.

Surface water runoff from areas stripped of hardstanding and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.

In the event of groundwater being encountered during the construction phase, mitigation measures will include dewatering by pumping to an appropriate treatment facility prior to discharge. Other measures would include excluding contaminating materials such as fuels and hydrocarbons from sensitive parts of the site i.e. highly vulnerable groundwater areas.

Surface water pumped from excavations is to be directed to on-site settlement ponds. Surface water runoff from areas stripped of hardstanding and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.

In order to mitigate against spillages contaminating the surrounding surface water and hydrogeological environments, all oils, fuels, paints and other chemicals shall be stored in a secure bunded hardstand area. Refuelling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any surface water inlets (where not possible to carry out such activities off site).

Please refer to Chapter 7 of this EIAR “Water” for further mitigation measures associated with the surface water during the construction stage.

10.7.1.2 Foul Infrastructure

All foul water infrastructure is under the control of Irish Water. The proposed development will be serviced by a new separate internal foul network for the proposed development. The proposed development will discharge to the existing 525mm diameter sewer located at the south-west corner of the western catchment

The construction compound will include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be removed off site to a licensed facility until a connection to the public foul drainage network has been established.

Diversion of the existing Foul Sewer traversing the site will be fully coordinated with Irish Water to ensure interruption to the existing foul network is minimised. Foul sewer along the proposed relocated route will be constructed and ready for rerouting in advance of decommissioning and removal of existing foul sewer. In order to reduce the risk of defective or leaking sewers, all new sewers should be laid in accordance with Irish Water standards, pressure tested and CCTV surveyed to ascertain any possible defects.

It is envisaged that the development would take place and be occupied over a reasonable time period, and therefore the downstream foul sewerage system (foul sewer network and wastewater treatment facility) would be gradually loaded.

As required by the SHD process, Irish Water are required to review the schemes foul drainage proposal and to issue a letter of Design Acceptance. This has been received by the design team and is included as an appendix in the DBFL Consulting Engineering Services Report accompanying this SHD planning application.

10.7.1.3 Potable Water Infrastructure

All potable water infrastructure is under the control of Irish Water. The proposed development will be serviced by connecting to the existing 200mm diameter watermain in Brawny Road to the northwest corner of the site. A second connection will be made to the main in the R916 road to supply the site from the east also.

The construction compound's potable water supply shall be protected from contamination by any construction activities or materials.

Where possible backup network supply to any services will be provided should the need for relocation or diversion or existing services be required otherwise relocation or diversion works will be planned to incur minimal impact, with users notified in advance of any works.

As required by the SHD process Irish Water are required to review the schemes potable water proposal and to issue a letter of Design Acceptance, this has been received by the design team and is included as an appendix in the DBFL Consulting Engineering Services Report accompanying this SHD planning application.

10.7.1.4 Electrical Supply

Contractor to prepare Method Statement detailing proposals for works in the vicinity of existing utilities (method statement to be agreed with PSDP).

Contractor to locate and record all services on site prior to commencement of excavations (including but not limited to a GPR utility survey along the Maynooth Road and slit trench investigation to confirm the location of electrical infrastructure).

Connections to the existing electrical networks will be coordinated with the relevant utility provider and carried out by approved contractors.

Contractor to comply with HSA Code of Practice for Avoiding Danger from Underground Services.

Relocation of existing overhead ESB lines will be fully coordinated with ESB Networks to ensure interruption to the existing electricity network is minimized (e.g. agreeing electricity outage to facilitate relocation of cables).

Ducting and / or poles along the proposed relocated route will be constructed and ready for rerouting of cables in advance of decommissioning of existing overhead electricity lines.

10.7.1.5 Gas Supply

Contractor to prepare Method Statement detailing proposals for works in the vicinity of existing utilities (method statement to be agreed with PSDP).

Contractor to locate and record all services on site prior to commencement of excavations (including but not limited to a GPR utility survey along the Maynooth Road and slit trench investigation to confirm the location of existing gas infrastructure).

Connections to the existing gas networks will be coordinated with the relevant utility provider (e.g. agreeing outage to facilitate connection). and carried out by approved contractors.
Contractor to comply with HSA Code of Practice for Avoiding Danger from Underground Services.

10.7.1.6 Telecommunications

Contractor to prepare Method Statement detailing proposals for works in the vicinity of existing utilities (method statement to be agreed with PSDP).

Contractor to locate and record all services on site prior to commencement of excavations (including but not limited to a GPR utility survey along the Maynooth Road and slit trench investigation to confirm the location of existing telecommunications infrastructure).

Connections to the existing telecoms networks will be coordinated with the relevant utility provider (e.g. agreeing outage to facilitate connection). and carried out by approved contractors.

Contractor to comply with HSA Code of Practice for Avoiding Danger from Underground Services.

10.7.2 Operational Mitigation

Please refer to Chapter 7 of this EIAR "Water" for mitigation measures associated with the surface water treatment. All new drainage lines (foul and surface water) will be pressure tested and will be subject to a CCTV survey to identify any possible defects prior to being made operational.

Chapter 7 includes the mitigation measures associated with the surface water system for the development.

Water conservation methods such as the use of low flush toilets and low flow taps should be incorporated into dwellings to reduce water volumes and related treatment and abstraction costs of the development.

Similarly, water conservation methods would reduce the loading on the foul sewer network. As part of the development, a number of different SuDS measures are proposed to minimise the impact on water quality and quantity of the runoff and maximise the amenity and biodiversity opportunities within the site.

The measures detailed below have been designed to take account of potential percolation, but have not been incorporated into any storage calculations. This will result in additional storage being available in extreme events.

The proposed SuDS measures will include a combination of Source Control, Site Control and Regional Control measures as part of a Management Train whereby the surface water is managed locally in small sub-catchments rather than being conveyed to and managed in large systems further down the catchment. The combination of the SuDS measures outlined below will maximise the potential for surface water infiltration to the subsoil, reducing the impact on the existing surface water drainage network. The proposed techniques will offer a high level of treatment processes and nutrient removal of the turnoff, particularly during the "first flush".

On completion of the construction phase no further mitigation measures are proposed in relation to the electrical, gas and telecommunications infrastructure.

The proposed development is located within an area designated for the type of development proposed. As such the services pertaining to the development are required to facilitate the proposed scheme. It is not possible to not provide the services required. Notwithstanding this, the potable water, foul and stormwater services have all been designed in accordance with the requirements of the various stake holders, notable Irish Water for the foul potable water utilities and Westmeath County Council for the surface water services.

10.7.2.1 ESB Infrastructure

ESB have been engaged at an early stage to ensure an potential issues with utility connections are reviewed and mitigated as early in the process as possible. ESB will not engage with design process until such time as planning has been approved and scheme name and numbering is approved.

The proximity to the existing ESB sub-station at Brawny ensures access to the network which avoids the need for extensive network upgrades and infrastructure. In addition, 6 no. sub-stations are proposed as part of the current application.

10.8 Cumulative Impacts

10.8.1 Surface (Storm) Water Infrastructure

The cumulative impacts of the proposed development are such that the requirement to attenuate the subject site to pre-development run-off rates will ensure that during extreme storm events the surface water from the development is limited to the greenfield run off rate in accordance with the GDSDS and Westmeath County Council requirements. The use of sustainable urban drainage features will aid in improving overall storm water quality prior to ultimate discharge. Please refer to DBFL report 180176-DBFL-XX-XX-RP-C-0002 for further details

10.8.2 Foul Infrastructure

The potential impacts on the local and regional foul drainage system are that the proposed development would reduce capacity in the adjoining sewer and the capacity in the Regional WasteWater Treatment Plant in Athlone. Notwithstanding same, the lands are zoned for residential development and local up-grades to the regional infrastructure combined with the adequate capacity in the WwTP in Athlone. Additionally, Irish Water have confirmed in Confirmation of Feasibility and Statement of Design Acceptance that there is sufficient capacity within the Irish Water network to enable the development. Please refer to DBFL report 180176-DBFL-XX-XX-RP-C-0002 for further details.

10.8.3 Potable Water Infrastructure

The potential impacts for the local public potable water are that the proposed development will reduce the capacity in the public main. However, Irish Water have confirmed in Confirmation of Feasibility and Statement of Design Acceptance that there is sufficient capacity within the Irish Water network to enable the development. Please refer to DBFL report 180176-DBFL-XX-XX-RP-C-0002 for further details.

10.8.4 ESB Infrastructure

Potential impacts for ESB are impact on existing network capacity and potential issues with current harmonics if heat pumps are selected as energy source.

10.8.5 Telecoms Infrastructure

Potential impacts for telecoms is considered to be negligible

10.8.6 'DO NOTHING' IMPACT

In the "do-nothing" scenario the proposed site would not be redeveloped and therefore there would be no adverse impacts to the foul, stormwater and potable water system.

10.9 Predicted Impacts of the Proposed Development

10.9.1 Stormwater Infrastructure

The predicated impacts are that the use of an attenuation system to restrict storm water flow from extreme storm events will aid in the freeing up of hydraulic capacity in the existing sewer during extreme storm water events. By reducing the storm water run-off during extreme storm events will increase the capacity in the existing sewer. The use of SuDs sytems will also have the effect in removing polluting matter from the first flush of rainfall event, which will improve the overall storm water quality leaving the site.

10.9.2 Foul Infrastructure

The proposed development will reduce the overall capacity of the Regional Waste Water Treatment Plant in Athlone. Notwithstanding, the WwTP Plant has hydraulic and qualitive capacity. The proposed effluent treatment requirement has been assessed by Irish Water and sufficient capacity in the local network is in

place to facilitate the proposed development. Refer to Confirmation of Feasibility and Statement of Design issued by Irish Water to the project design team (See DBFL report 180176-DBFL-XX-XX-RP-C-0002 for further details),

10.9.3 Potable Water

The proposed development will reduce the spare capacity in the local network, but as with the waste water requirement, Irish Water has assessed the requirement and have determined that sufficient capacity is in place and the proposed development can be accommodated. Refer to Confirmation of Feasibility and Statement of Design issued by Irish Water to the project design team (See DBFL report 180176-DBFL-XX-XX-RP-C-0002 for further details),

10.10 Residual Impacts

10.10.1 Construction Phase

Implementation of the measures outlined in Section 10.7 will ensure that the potential impacts of the proposed development on the sites material assets do not occur during the construction phase and that any residual impacts will be short term.

10.10.2 Operational Phase

The demand on power supply, gas supply and telecommunications supply will all increase due to the development of the lands. The infrastructure of the networks is available in the vicinity of the site and there will be no adverse effect on the ability of the respective networks to meet the existing demands in the areas surrounding the site. The development of the lands will be constructed in phases, with the final phase being due for completion circa 2026.

10.11 Monitoring

All internal potable water and drainage services within the proposed building will be monitored by the local authority / management firm and their maintenance personnel will routinely inspect and carry out maintenance as required. The external potable water and foul drainage connections to the public system will be maintained by Irish Water. The public surface water drainage connections and sewers will be maintained by Westmeath County Council.

The electricity network will be monitored by ESB networks. Telecoms will be monitored by EIR and Gas Networks Ireland will monitor the existing gas network.

10.12 Reinstatement

As the proposed development will be a ‘new build’ there will be no reinstatement within the site boundary required. The external connections into the potable water and combined sewer will be carried out by Irish Waters regional contactor and reinstated to Westmeath County Council’s requirements.

10.13 Interactions

DBFL Consulting Engineers lodged pre-connection enquiry information to Irish Water, (copies of their response and design acceptance are appended to the Engineering Services Report 180176-DBFL-XX-XX-RP-C-0002). In addition, consultations were held as part of the SHD system with Westmeath County Council.

10.14 Difficulties Encountered in Compiling

No difficulties were encountered while compiling this chapter

10.15 Reference List

The baseline environment and the assessment of the development in this chapter was described based on the information collected from the sources mentioned in Section 10.2.

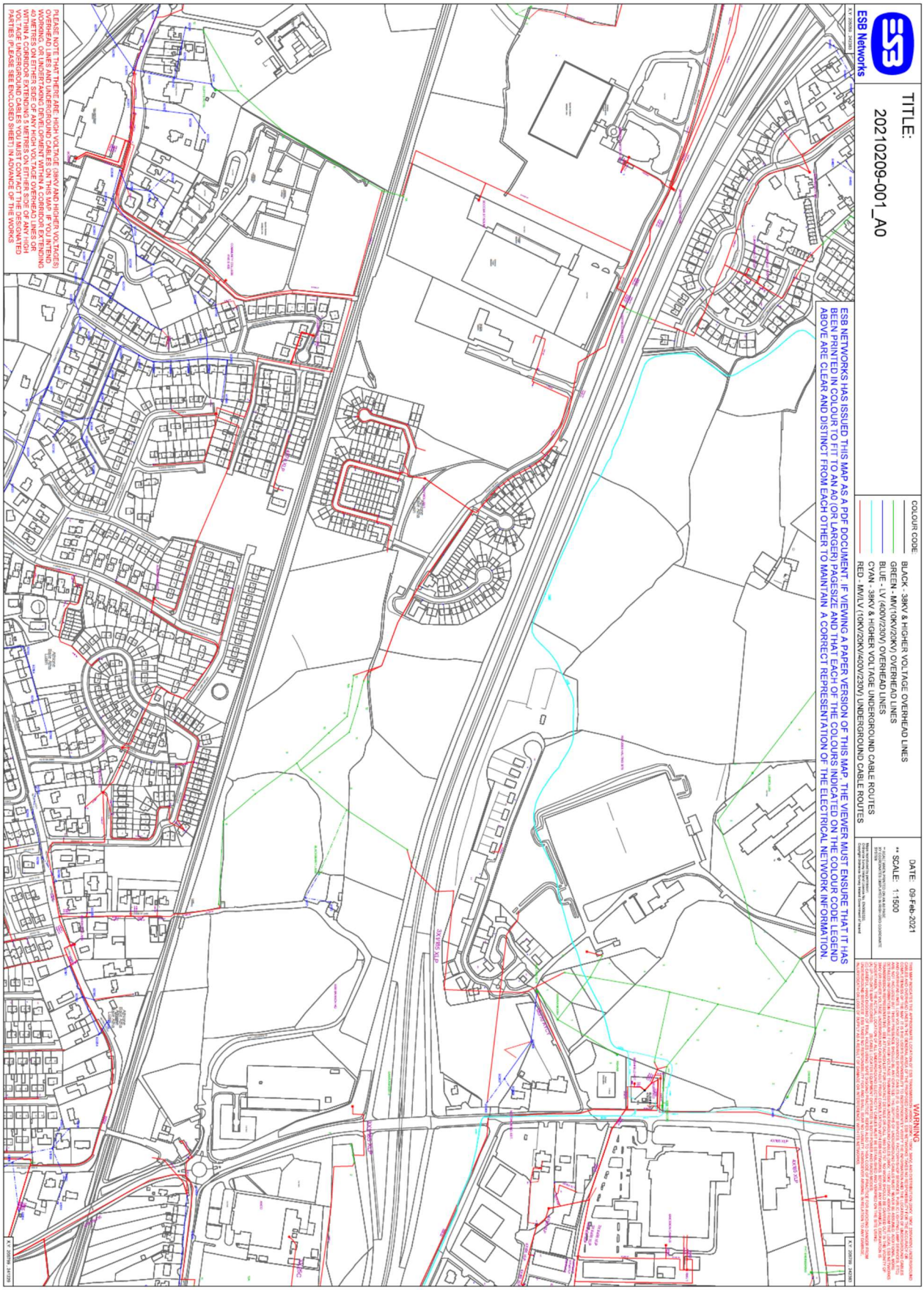
Chapter 10 Appendices

Appendix 10-1 – ESB Networks Plan

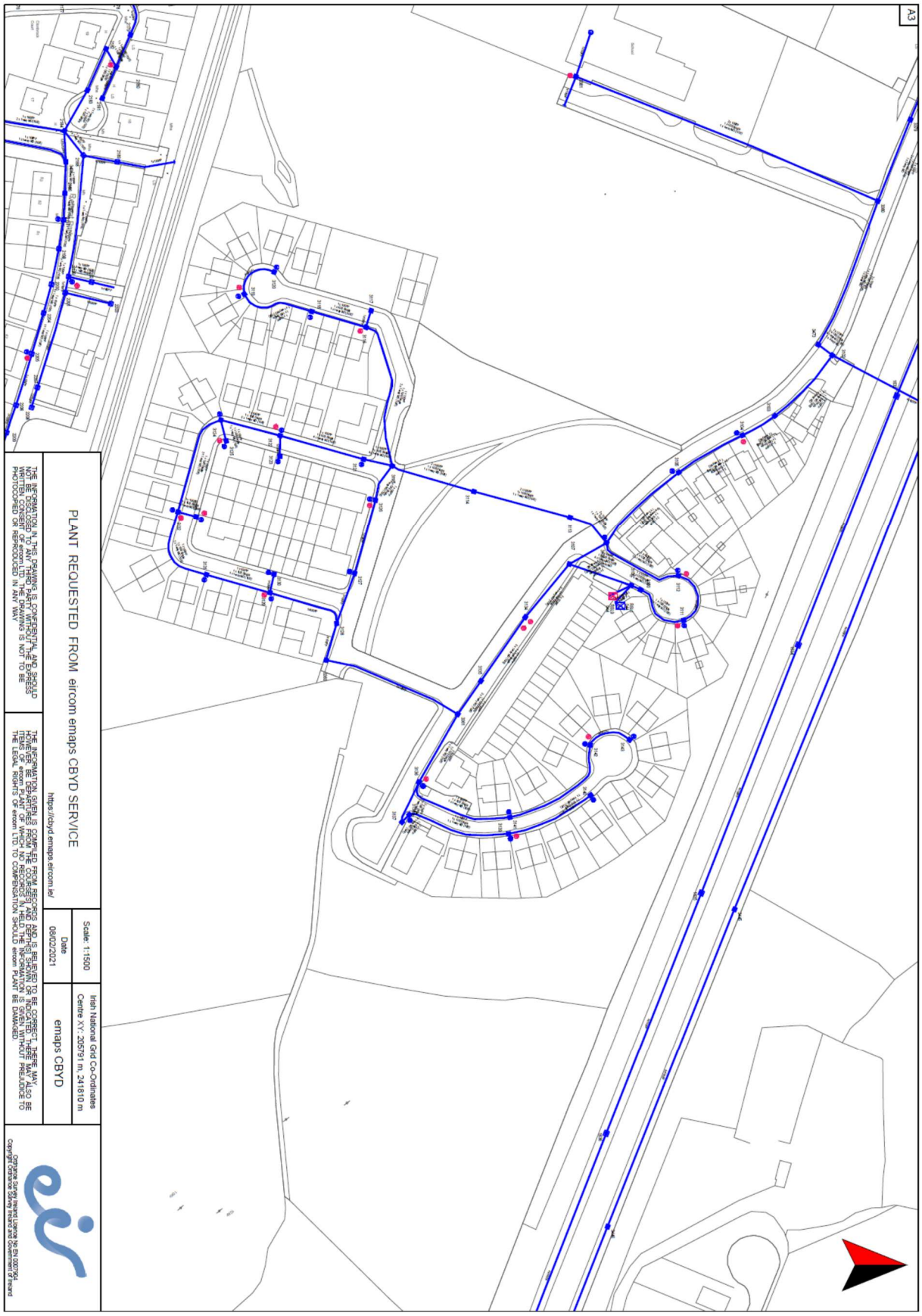
Appendix 10-2 – EIR network Plan

Appendix 10-3 – Gas Networks Ireland Plan

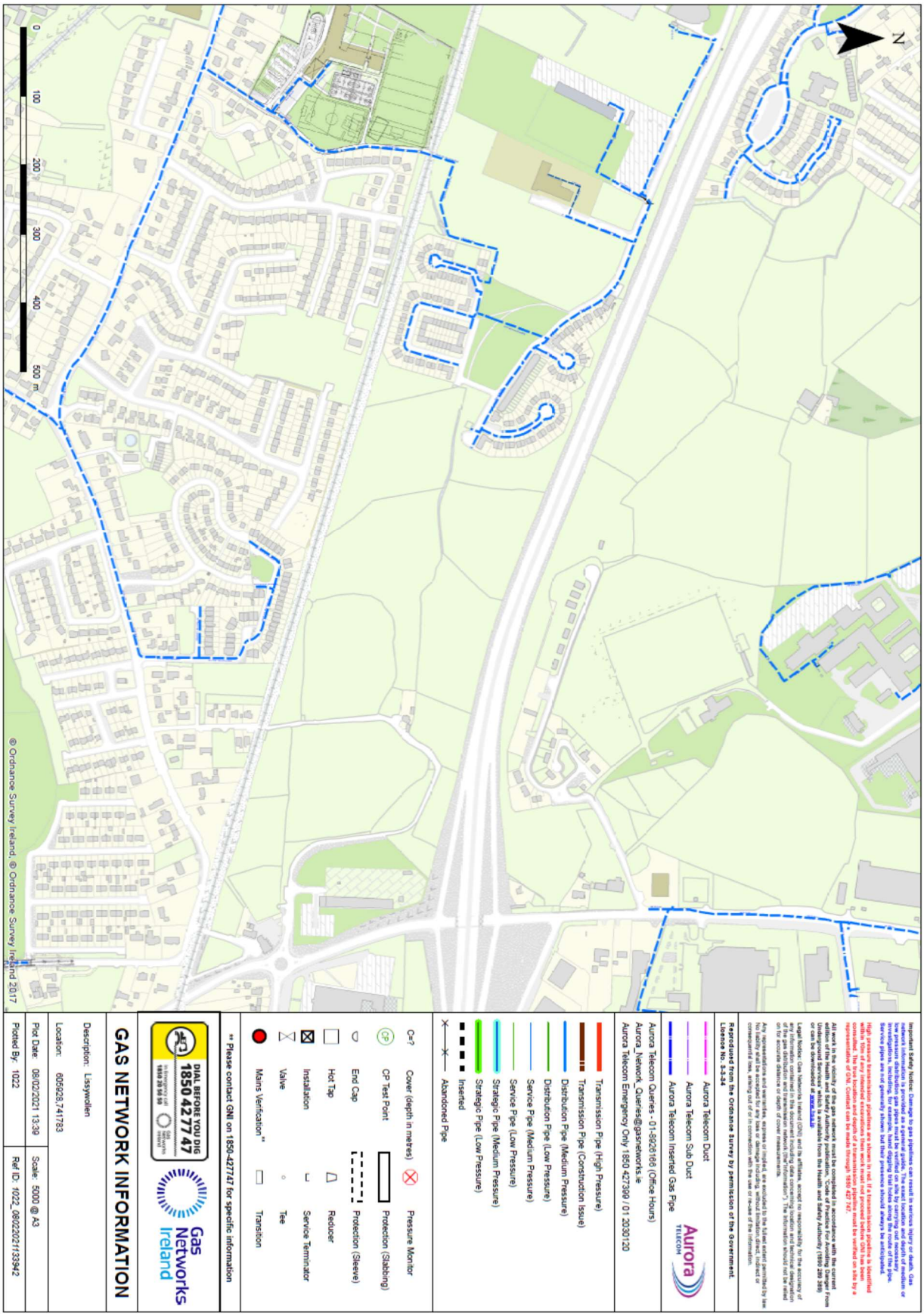
Appendix 10-1 – ESB Networks plan



Appendix 10-2 – EIR Networks Plan



Appendix 10-3 – Gas Networks Ireland Plan



11.0 Material Assets: Transportation

11.1 Introduction

This section of the report assesses and evaluates the likely impact of the proposed development on the existing transportation system in the vicinity of the site, as well as identifying proposed mitigation measures to minimise any identified impacts arising from the development at Lissywollen, Athlone, Westmeath.

The material assets considered in the traffic section include pedestrian, bicycle, public transport (bus, light and heavy Rail) infrastructure and associated services in addition to the local road network and associated junction nodes.

This chapter was prepared by Thomas Jennings BEng (Hons) MSc MIEI CMILT MIHT and Sayed Ahmad Saeed BEngTech BE(Hons) MIEI of DBFL Consulting Engineers. Thomas is a Director with DBFL Consulting Engineers with 24 years' experience as a traffic engineer and transport planner with particular expertise in network management and design. Thomas currently leads the Transportation section within DBFL. Sayed Ahmad is a Transportation Engineer with DBFL Consulting Engineers and has over 3 years' experience in the industry. He has considerable knowledge and experience in transport planning and design along with highway engineering.

11.2 Assessment Methodology

The purpose of this assessment is to quantify the existing transport environment and to detail the results of assessment work undertaken to identify the potential level of transport impact generated as a result of the proposed mixed use development. The scope of the assessment covers transport and sustainability issues including vehicular access and pedestrian, cyclist and public transport connectivity. Recommendations contained within this report are based on existing and proposed road layout plans, site visits, traffic observations and junction vehicle turning count data. Our methodology incorporated a number of key inter-related stages, including;

- **Site Audit:** A site audit was undertaken to quantify existing road network characteristics and identify local infrastructure management arrangements, in addition to establishing the level of accessibility to the site in terms of walking, cycling and public transport. An inventory of the local road network was also developed as this stage of the assessment.

- **Pre-planning Meeting:** A pre-planning meeting was undertaken with officers of Westmeath County Council including representatives of the Transport Planning Department.

- **Traffic Counts:** Junction turning counts were undertaken and analysed with the objective of establishing local traffic characteristics in the immediate area of the proposed development.

- **Trip Generation:** A trip generation exercise has been carried out to establish the potential level of vehicle trips generated by the proposed development.

- **Trip Distribution:** Based upon existing traffic characteristics and anticipated travel patterns of the proposed development, a trip distribution exercise has been undertaken to assign site generated trips across the local network.

The assessment of effects of the proposed development on material assets are assessed in terms of quality (positive, neutral or negative effects), significance (imperceptible, not significant, slight, moderate, significant, very significant or profound effects), extent, context, probability (likely, unlikely effects) and duration (temporary, short term, long term or permanent effects) in line with the criteria set out in Table 3.3 Description of Effects of the Environmental Protection Agency *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (August 2017)*.

11.3 Receiving Environment

11.3.1 Site Location

The development site is located approximately 2km to the northeast of Athlone Town Centre. The subject lands are bounded to the north by the N6 National Road corridor and to the south by the 'Old Rail Trail Greenway'. The western boundary of the smaller development plot comprises Athlone Town Stadium lands and Scoil Na Gceirthe Máistrí. The existing Brawney residential development forms the eastern boundary of the smaller development plot and the western boundary of the larger development plot. The larger development plot's eastern boundary comprises a greenfield site and the existing ESB Networks facility.

The general site location is shown in Figure 11.1. This figure also demonstrates the site's proximity to several schools in addition to the Athlone Institute of Technology. The indicative site boundary is presented in Figure 11.2. Existing walking time isochrones from the development site, shown in Figure 11.3, illustrate the high levels of accessibility for pedestrians walking to/from the site.

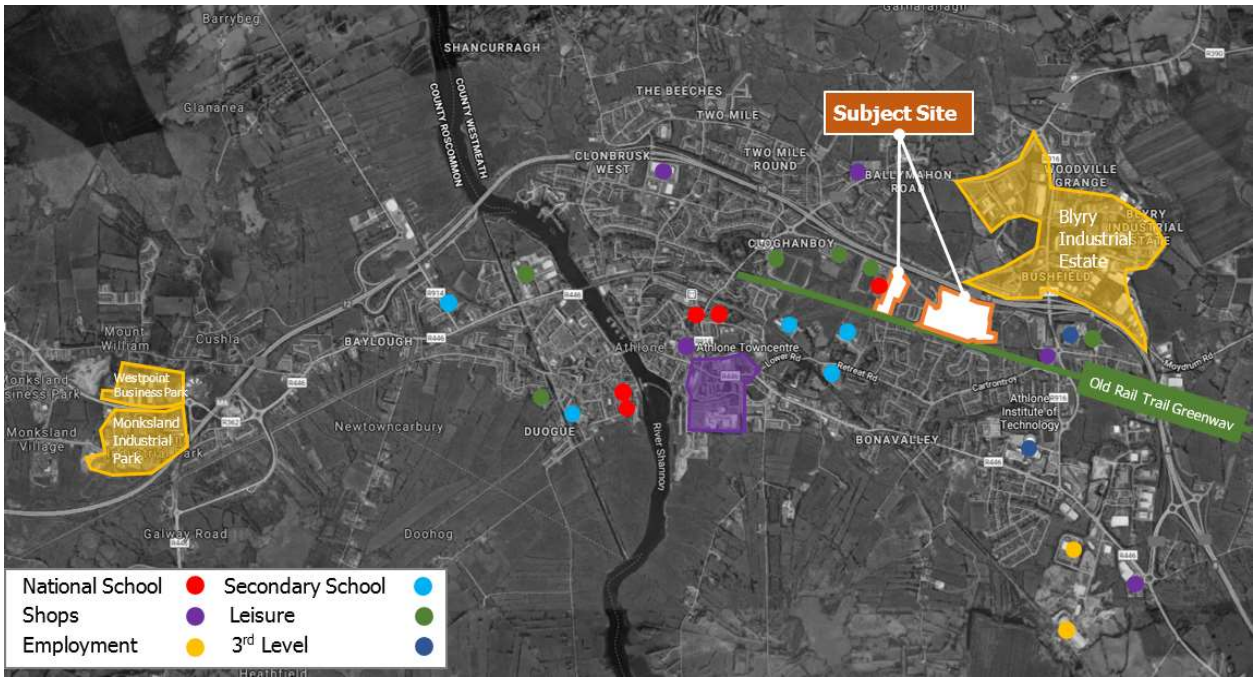


Figure 11.1: Site Location

Figure 11.2: Indicative Site Boundary

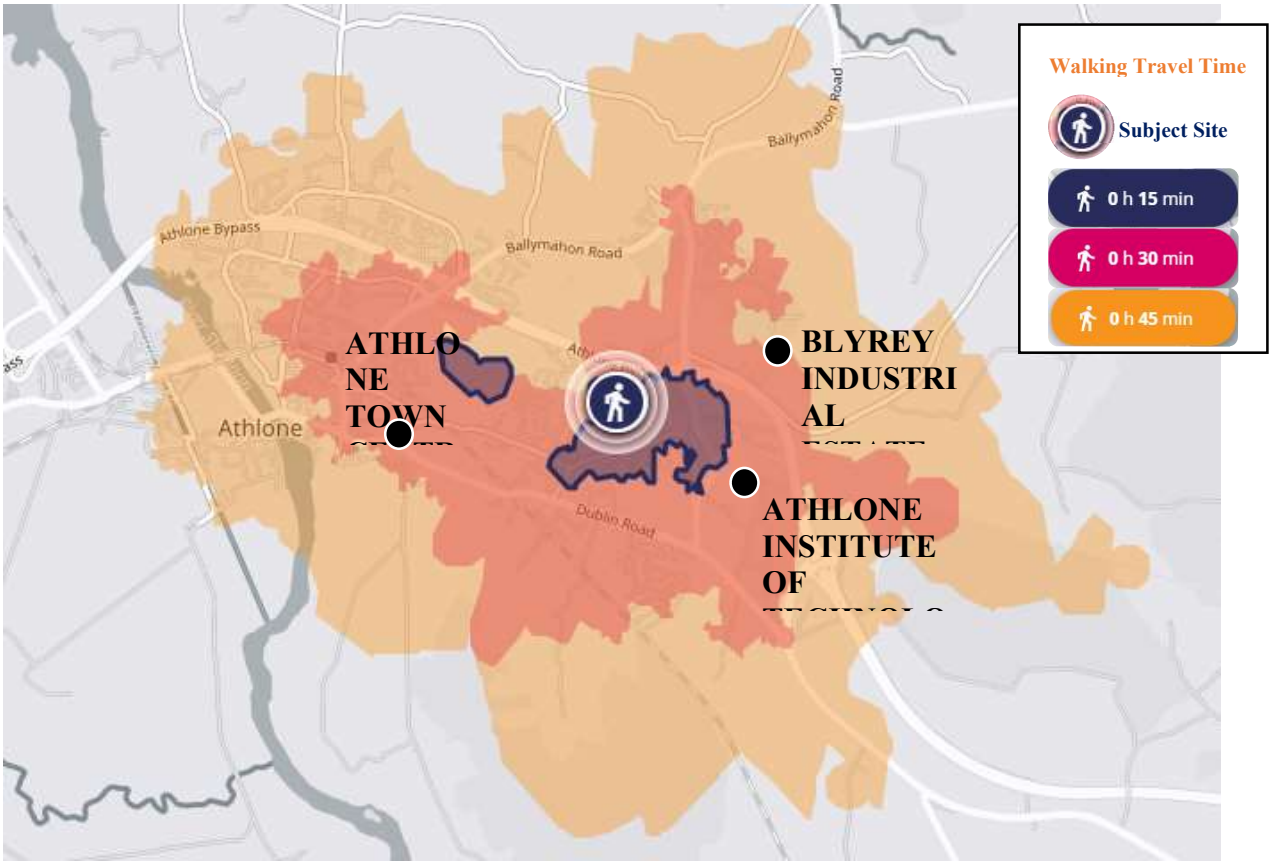


Figure 11.3: Walking Isochrones from the Subject Development Site

11.3.2 Existing Transportation Infrastructure

The main arterial road in vicinity of the subject sites are R915 west of the subject site, which links the site to Athlone town centre, in addition to N6 and N55, and R916 east of the subject site that links the site to N6, N55 and N62. The proposed development site will be accessed via Brawney Road which forms a roundabout junction with the R915, N55 and One Mile Round west of the development site. Brawney Road is approximately 6m wide two-way single lane carriageway with a 50kph speed limit. The subject site will be also access Garrycastle roundabout (on R916) east of the development site. The subject site can be easily accessed by road from a number of directions including:

(i) From the North via N55;
(ii) From the south via N62; and
(iii) From the east and west via N6/M6

In the immediate vicinity of the site, pedestrians benefit from good quality footways and speed calming measures along the Brawney Road which provides access to the subject development site, whilst other surrounding streets have footways provided on both sides of the carriageway. Dedicated pedestrian crossing facilities and footways are provided on all approaches to the Brawney Road / R915 / N55 / One Mile Round roundabout junction, as located at the western extent of Brawney Road. Pedestrians can also benefit from the Old Rail Trail Greenway which is located to the south of the proposed development lands and operates in and East-West direction adjacent to the disused rail line.

In terms of existing cycling facilities surrounding the site, cyclists benefit from sharing road surface with other road users along the Brawney Road. Cycle facilities are provided on all approaches to the Brawney Road / R915 / N55 / One Mile Round roundabout junction located west of the subject site and Garrycastle roundabout with the site access and R916 east of the subject site. Cyclists also benefit from the Old Rail Trail Greenway which is located to the south of the proposed development.

The site is highly accessible by Bus as Bus Eireann operates 2 no. town services (A1 and A2) between Monksland and Greggan but along different routes. Both services are within walking distance of the subject site with the nearest interchanges located approximately 600m (A2) and 750m (A1) from the development site. Furthermore, 3 no. 'local link' services are accessible at Athlone Institute of Technology as located approximately 1.6km from the subject site. These 'local link' services provide access to destinations including Moate, Roscrea, Shannonbridge, Pollagh and Kilcormac. Also, three no. regional bus services serve Athlone including Bus Eireann services 70 and 73 which is accessible at Athlone Bus Station (2km from subject site) and Citylink service 763 as accessible at AIT (1.6km from subject site). Bus Eireann route 70 operates between Galway and Dundalk whilst route 73 operates between Waterford / Carlow and Longford. The Citylink 763 service operates between Galway and Dublin Airport.

The proposed development site also has excellent links to the Railway Line, with the closest stop (Athlone Train station) being located approximately 2km from the subject site via the R915 (by all modes) and 1.4km away via the Old rail Trail Greenway (pedestrian / cyclists). The railway line provides excellent linkages to major national destinations including Dublin Heuston, Galway, Westport, Ballina and local stations en-route.

11.3.3 Proposed Transportation Infrastructure

It is an objective of the Athlone Town Development Plan 2014-2020 (O-WC16) *"To provide a walking/cycling route from the Athlone Mullingar railway line in Athlone, to the River Shannon, via a new bridge over the Shannon to the west bank and onwards to the Roscommon County boundary, with the potential to connect to Athlone Castle and southwards around the town".*

The Westmeath County Council proposed extension of the Old Rail Trail Greenway as far as the River Shannon is expected to be operational within the next 12 months (i.e. by August 2020). The future pedestrian / cycle bridge over the River Shannon within the next 3-4 years (funded by the NTA).

Another objective of the Development Plan is *"To provide north-south pedestrian and cycle linkages between Curragh-Lissywollen and Lissywollen South/Retreat, to overcome barriers to access and movement created by the N6 and rail lines".*

The subject development proposals include 6 no. new formal cycle / pedestrian access points between the masterplan lands and the adjoining Old Rail Trail Greenway to the south of the development site, subsequently ensuring excellent cycle / pedestrian accessibility. The proposals also include dedicated pedestrian/cycle paths throughout the development site with TOUCAN controlled crossing along the new east-west spine road (Lissywollen Avenue) each located on key pedestrian / cycle travel desire routes.

The Development Plan highlights the potential for the reopening of the rail link between Athlone and Mullingar and acknowledges that *"would serve to further strengthen public transport interconnectivity by connecting the Galway/Mayo rail line with the Sligo rail line and potentially provide an additional line option for the Galway-Dublin service. This would also facilitate greater accessibility to Athlone and connectivity within the county and also on a national level providing improved cross linkages, with services to the two main stations in the capital and enabling increases on the Galway Dublin rail line. The Councils are committed to supporting and facilitating the re-opening of the Athlone to Mullingar rail line".*

Bus services are considered a *"key player in offering an alternative to the private car"* within the Development Plan. The provision of a Quality Bus Corridor (QBC) is considered to be a possibility within Athlone Town in the future. The subject scheme layout has been designed to facilitate the existing local bus route A2 to extend eastwards into the subject development lands beyond its existing extents at Athlone Regional Sports Centre.

A new link road is proposed to the east of Athlone Town known as the Loughandonning Link Road and will provide a local road link between The Creggan LAP lands and Athlone Town Centre. The Westmeath County Council proposed North / South link between Brawney Road and Retreat Road, once implemented sometime in the future, will *"give priority to buses, cyclists and pedestrians and shall be sited so as not to adversely impact upon the landscape setting of the Marist School ".*

11.4 Characteristics of the Proposed Development

The development proposal consists of the construction of a residential development of 576 no. dwellings, a community hub, 2 no. crèches as follows:

- 576 no. residential dwellings, comprised of 285 no. houses and 291 no. apartment and duplex units consisting of:
- 285 no. 2 storey detached, semi-detached & terraced houses comprising 50 no. 4 bedroom houses, 200 no. 3 bedroom houses & 35 no. 2 bedroom houses;
- 291 no. apartments in 18 no. buildings (Blocks A, B, C, D, E, F, H, K, N, P, Q, R, S & T - all 3 storey, Block G - 2 storey, Block L - 5 storey with a 5 storey setback, Block M - 4 storey with a 4 storey setback, Block O - 2 to 4 storey) comprising 60 no. 1 bedroom apartments, 169 no. 2 bedroom apartments & 17 no. 3 bedroom apartments;
- With 45 no. duplex units in 9 no. of the above buildings (Blocks A, B, D, E, F, H, M, O, Q & S) comprising 8 no. 2 bedroom duplex units & 37 no. 3 bedroom duplex units

- Development of 2 no. crèche facilities comprised of a 2 storey crèche of circa 321m^2 located on the ground & first floors of Block C; & a *1 storey* crèche of circa 448m^2 located on the ground floor of Block T;
- Access to the subject site will be from the Ballymahon roundabout (on the R915) to the west via Brawny Road and the Garrycastle roundabout (on the R916) to the east. The development proposal includes for road development works and the construction of an east-west access route through the subject site from the Ballymahon roundabout (on the R915) to the west to the Garrycastle roundabout (on the R916) to the east. The development proposal provides for pedestrian and cyclist connectivity to Old Rail Trail Greenway to the south;
- The development proposal includes for the provision of public open spaces, planting, boundary treatments & all ancillary landscape works, public lighting, drainage and attenuation, car & bicycle parking, bin storage, ESB sub-stations and all associated site development works.

11.5 Construction Impacts, Mitigation and Monitoring Measures

11.5.1 Management of Construction Activities

All construction activities on-site will be governed by a Construction Traffic Management Plan (CTMP), the details of which will be agreed in full with Westmeath County Council(WCC) prior to the commencement of construction activities on site.

The principal objective of the CTMP is to ensure that the impacts of all building activities generated during the construction of the proposed development upon both the public (off-site) and internal (on-site) workers environments, are fully considered and proactively managed / programmed respecting key stakeholders, thereby ensuring that both the public's and construction workers safety is maintained at all time, disruptions minimised and undertaken within a controlled hazard free / minimised environment. The impact of the construction period will be temporary in nature.

11.5.2 Construction Traffic

Construction traffic will only be generated on weekdays (07:00-19:00 subject to planning conditions) and will consist of the following two principal categories:

- Private vehicles owned and driven by site construction staff and by full time supervisory staff.

- Excavation plant, dumper trucks and delivery vehicles involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready-mix concrete and mortar, concrete blocks, miscellaneous building materials, etc.

On-site employees will generally arrive before 08:00, thus avoiding the morning peak hour traffic. These employees will generally depart after 17:00. It should be noted that a large proportion of construction workers are anticipated to arrive in shared transport. Considering the sensitivity of the site, opportunities for remote off-site compound parking will be explored. Deliveries will be actively controlled and subsequently arrive at a dispersed rate during the course of the working day.

Based upon the experience of similar developments, a development of this type and scale would at a maximum necessitate approximately 20 staff on site at any one time, subsequently generating no more than 15 two-way vehicle trips during the peak AM and PM periods over the period of the phased construction works.

It is anticipated that the proposed development would be constructed over a period of approximately 5 years. Following the completion of the initial site clearance works, the generation of HGV movements during the build period will be evenly spread throughout the day and as such will not impact significantly during the peak traffic periods. For this scale of development, we do not expect HGV vehicle movements to exceed 4 vehicles per hour during the busiest period of construction '*build*' works.

Based on a preliminary review of the existing survey data and proposed site levels, we estimate that approximately 42,000m³ of material will require excavation consisting of 18,000m³ stripped topsoil and 24,000m³ excavated subsoil as part of the scheme proposals. All topsoil and subsoil materials will be re-used as part of the permanent works.

It is estimated that a total of 60,000m³ of fill materials are required. A total of 42,000m³ excavation topsoil/subsoil materials will be re-used as fill materials. As a result, a total of 18,000m³ materials are required to be imported to the subject site. The estimated 18,000m³ equates to between 2,069 and 2,308 truckloads depending upon vehicle characteristics. At 3 loads per hour and 10 hours per day this equates to 69 days of arriving fill materials as part of the adopted worst-case assessment to import the estimated quantum of materials. Considering the programme and volume of this importation , the effect on the local road network is considered negligible.

An appropriate control and routing strategy for HGVs can also be implemented for the duration of site works as part of the CTMP. It is not proposed to utilise any roads with weight/height restrictions as part of the routing of HGVs during the construction phase. HGVs will be directed to use Brawney Road when accessing/egressing the site from the wider strategic network.

A significant benefit of the subject development site's characteristics is that all construction traffic vehicle parking demands can be accommodated on-site thereby minimising the impact upon the operational performance and safety levels of the adjacent public road network.

Considering the site's proximity to the strategic road network and following the implementation of an appropriately detailed CTMP, it is concluded that construction traffic will not give rise to any significant traffic concerns or impede the operational performance of the local road network and its surrounding junctions. The level of significance of the above findings are categorised in Section 11.7

11.5.3 Mitigation and Monitoring Measures

An Outline Construction Management Plan will be prepared as part of the planning application with an associated Construction Traffic Management Plan (CTMP) which will incorporate a range of integrated control measures and associated management activities with the objective of minimising the construction activities associated with the development. The following initiatives will be implemented to avoid, minimise and/or mitigate against the anticipated construction period impacts:

- During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads;
- Appropriate on-site parking and compound area will be provided to prevent overflow onto the local network;
- It is likely that some numbers of the construction team will be brought to/from the site in vans/minibuses, which will serve to reduce the trip generation potential;
- Delivery vehicles to and from the site will be spread across the course of the working day, therefore, the number of HGVs travelling during the peak hours will be relatively low;
- Truck wheel washes will be installed at construction entrances and any specific recommendations with regard to construction traffic management made by Westmeath County Council will be adhered to;
- Potential localised traffic disruptions during the construction phase will be mitigated through the implementation of industry standard traffic management measures. These traffic management measures shall be designed and implemented in accordance with the Department of Transport's Traffic Signs Manual "*Chapter 8 Temporary Traffic Measures and Signs for Roadworks*" and "*Guidance for the Control and Management of Traffic at Roads Works – 2nd Edition*" (2010); and
- Site entrance point/s from the public highway will be constructed with a bound, durable surface capable of withstanding heavy loads and with a sealed joint between the access and public highway. This durable bound surface will be constructed for a distance of 10m from the public highway.
- Material storage zone will be established in the compound area and will include material recycling areas and facilities;
- 'Way finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas;
- Dedicated construction haul routes will be identified and agreed with Westmeath County Council prior to commencement of activities on-site; and
- On completion of the works, all construction materials, debris, temporary hardstands etc. form the site compound will be removed off-site and the site compound area reinstated in full on completion of the works.

During the construction stage, the following monitoring exercises are proposed:

- Compliance with construction vehicle routing practices;
- Compliance with construction vehicle parking practices;
- Internal and external road conditions; and
- Timing of construction activities.

11.6 Operational Impacts, Mitigation and Monitoring Measures

11.6.1 Development Schedule's Trip Generation

Whilst the vast majority of person trips to/from the proposed development will be undertaken by sustainable modes of travel, the specific impact of the subject scheme will be predominantly influenced by the number of additional vehicle movements that the scheme could potentially generate. To assist in determining this, a review of trip generation factors contained within the TRICS database was carried out. TRICS data is primarily UK based, although a number of Irish sites have recently been included and the number of Irish sites continues to expand. Nevertheless, we consider that TRICS will provide a reasonable indication of traffic generation from the proposed development.

Notwithstanding the above, internal research undertaken by TRICS has shown that there is no direct evidence of trip rate variation by country or region. The use of English, Scottish or Welsh data can be equally applicable to Ireland if users take into account important site selection filtering factors such as levels of population, location type, local public transport provision, and development size and car ownership level, amongst others.

Data supplied for inclusion in TRICS undergoes a procedure of validation testing, and there is no evidence from this procedure suggesting that data from Ireland bears any significant fundamental differences to that from the other countries included. Consequently, we consider that TRICS will provide a reasonable indication of traffic generation from the proposed development.

Table 11.1 below presents the trip rates (using data from TRICS) used for the proposed development during the morning and evening peak hour periods. For the purpose of this assessment, it is assumed that 100 houses will be completed and occupied by 2021 whereas the full development will be completed by 2026. Therefore, the Table 11.1 below outlines vehicle trip generation during 2021 opening year and 2026+ years.

Lissywollen Development	AM Peak Hour			PM Peak Hour		
	Arr	Dep	Total	Arr	Dep	Total
Vehicle Trips (2021)	17	30	47	35	20	55
Service Traffic (2026&2036)	72	127	198	152	96	249
Total	**72**	**127**	**198**	**152**	**96**	**249**

Table 11.1: Proposed Development Vehicle Trips

11.6.2 Traffic Growth

With the objective of quantifying the existing traffic movements across the local road network a number local traffic surveys were commissioned. The traffic survey included 1 no. ATC (automatic traffic count) survey and 11 no. classified JTC's (junction turning counts) at Junctions 1 to 11 as listed below. In addition to the JTC's, queue length surveys were also undertaken at the aforementioned junctions.

The surveys were undertaken by specialist survey firm Idaso Ltd in May 2019. The JTC and queue length traffic surveys were conducted. over two number 2 hour survey periods from 07:30 to 09:30 in the AM and again from 16:30 to 18:30 in the PM period. At survey site No. 3, an eleven hour count was undertaken between 07:30 and 18:30. At the request of local stakeholders, Junction 3 and the ATC were surveyed on a second subsequent neutral weekday. The below junctions were included in the survey.

- **1** – N55 / N6 Eastbound On-ramp / N6 off-ramp junction;
- **2** – N55 / N6 Westbound off-ramp junction;
- **3** – Brawney Road / R915 / N55 / One Mile Round;
- **4** – R916 / N6 Eastbound On-ramp / N6 off-ramp junction;
- **5** – R916 / N6 Westbound On-ramp / N6 off-ramp junction;
- **6** – R916 / Moydrum Road junction;
- **7** – R446 / R916 Wash House Road junction;
- **8** – R915 / The Crescent / Grace Park Road / Gleeson Street junction;
- **9** – N55 / Coosan Road junction;
- **10** – N55 / Cloghanboy Avenue; and
- **11** – R916 / Moydrum Road junction.

The traffic surveys established that the local AM and PM peak hours occur between 08:30-09:30 and 17:00-18:00 respectively. In order to analyse and assess the impact of the proposed development on the surrounding road network, a traffic generation and distribution model (excel based) of the above key junctions was created and the following traffic scenarios were assessed:

- 2021 Opening Year without/with development;
- 2026 Interim Year without/with development
- 2036 Future Design Year without/with development.

To ensure a robust analysis of traffic upon the local road network, growth rates using the National Roads Authority (NRA) Project Appraisal Guideline projections were adopted. Table 6.2 within the TII Project Appraisal Guidelines (May2019) provides Annual National Traffic Growth Factors for the different regions within Ireland. The subject site lies within '*County – Westmeath*'.

Applying the annual factors (medium growth) for the adopted Opening Year of 2022 and Future Design Year of 2032, the following growth rates have been adopted to establish corresponding 2022 and 2032 baseline network flows:

- 2019 to 2021 – 1.032 (or 3.2%);
- 2019 to 2026 – 1.118 (or 11.8%); and

- 2019 to 2036 – 1.225 (or 22.5%).

11.6.3 Assessment Scenarios & Network Impact

It is anticipated that the earliest the scheme could be built and fully occupied would be some time in 2021. Accordingly, 2021, 2026 and 2036 (e.g. Opening Year plus 5 &15 years) have been adopted as the Opening Year, Interim Year and Future Design Years respectively. Two different traffic scenarios have been assessed, namely (a) the 'Base' (Do-Nothing) traffic characteristics and (b) the 'Post Development' (Do-Something) traffic characteristics.

The 'Base' traffic scenario takes into account the existing flows travelling across the local road network. The proposed development traffic is then added to the network's 'Base' traffic flows to establish the 'Post Development' traffic flows. In summary, the following scenarios have been investigated:

Base	2019 - Base Traffic Flows
Do-Nothing	2021 – 'Do Nothing' Scenario
	2026 – 'Do Nothing' Scenario
	2036 – 'Do Nothing' Scenario
Do-Something	2021 – 'Do Something' Scenario
	2026 – 'Do Something' Scenario
	2036 – 'Do Something' Scenario

Table 11.2: Proposed Traffic Scenarios

The TII document '*Guidelines for Traffic Impact Assessments*' states that the impact of any specific development upon the local road network is considered material when the level of traffic it generates surpasses 10% and 5% on normal and congested networks respectively. When such levels of impact are generated a more detailed assessment should be undertaken to ascertain the specific impact upon the networks operational performance. An assessment was therefore undertaken for the relevant links surrounding the site, to determine the percentage level of impact generated by the proposed development as presented in Table 11.3 over.

Ref	Junction	Design Year	AM Peak Hour	PM Peak Hour
1	N55 / N6 Eastbound On-ramp / N6 off-ramp junction	2021	-0.53%	0.06%
		2026	0.83%	2.46%
		2036	0.67%	2.18%
2	N55 / N6 Westbound off-ramp junction	2021	-2.47%	-1.10%
		2026	-0.80%	1.88%
		2036	-0.99%	1.54%
3	Brawney Road / R915 / N55 / One Mile Round	2021	-2.08%	-0.79%
		2026	1.63%	4.09%
		2036	1.19%	3.53%
4	R916 / N6 Eastbound On-ramp / N6 off-ramp junction	2021	0.47%	0.56%
		2026	2.48%	2.77%
		2036	2.32%	2.57%
5	R916 / N6 Westbound On-ramp / N6 off-ramp junction	2021	1.85%	1.60%
		2026	6.18%	5.74%
		2036	5.88%	5.39%
6	R916 / Moydrum Road junction	2021	5.15%	4.37%
		2026	8.99%	9.33%
		2036	8.59%	8.81%
7	R446 / R916 Wash House Road junction	2021	0.88%	0.67%
		2026	1.41%	1.18%
		2036	1.33%	3.72%
8	R915 / The Crescent / Grace Park Rd/ Gleeson St. junction	2021	-0.43%	-0.17%
		2026	0.73%	1.30%
		2036	0.60%	1.14%
9	N55 / Coosan Road junction	2021	0.13%	0.15%
		2026	0.50%	0.62%
		2036	0.46%	0.57%
10	N55 / Cloghanboy Avenue	2021	0.14%	0.16%
		2026	0.56%	0.66%
		2036	0.51%	0.60%
11	R916 / Moydrum Road junction	2021	0.26%	0.34%
		2026	2.80%	2.60%
		2036	2.71%	2.49%

Table 11.3: Proposed Development Traffic Percentage Impact

It was determined that with the exception of the R916 / Moydrum Road Roundabout, the proposals will generate a subthreshold (under 5%) impact upon all off-site junctions during the AM and PM peak hours in each of the three adopted design years. The AM and PM peak hour impact recorded at the R916 / Moydrum Road Roundabout are over the 5% threshold for congested networks with 8.59% and 8.81% respectfully in the 2036 Future Design Year. Accordingly, this junction and junction 3 due to proximity to the subject site have been further analysed.

11.6.4 Worst Case' Scenario

As stated previously, the analysis carried out represents a worst-case appraisal of a typical weekday as it is focused upon the two busiest periods of the day (i.e. AM and PM peak hours). During the remaining 22 hours of the day, traffic flows are predicted to be significantly lower resulting in the network operating with additional reserve capacity to that forecast for the peak hour periods. Similarly, over the weekend periods, both the site generated traffic and the external road network traffic flows are generally lower compared to the weekday peak hour periods that have been assessed.

11.6.5 Potential Cumulative Impacts

The analysis detailed above represents an appraisal in terms of potential cumulative impacts for a typical weekday as it is focussed upon the key two busiest periods of the day (e.g. AM and PM peak hours). During the other 22 hours of the day, traffic flows are predicted to be significantly lower resulting in the network operating with additional reserve capacity to that forecast for the peak hour periods.

The committed development ((Pl. Ref. 167155) a petrol filling station's predicted peak hour vehicle trips as outlined in the separate Traffic and Transport Assessment (TTA) document submitted as part of the subject SHD planning application are incorporated into the subject development assessment.

Furthermore, if all the adjacent zoned lands in the area were to be developed, this would have an effect on the local road network. However, the scale of potential impact would be fully assessed during the planning procedures for any of these individual third-party developments (which currently do not benefit from planning permission). Nevertheless, the utilisation of TII's growth rates does take some account of the potential additional traffic that such third party site could generate.

11.6.6 Mitigation and Monitoring Measures

A package of integrated mitigation measures has been identified to off-set the additional local demand that the proposed residential development at the subject site could potentially generate as a result of the forecast increase in vehicle movements by residents of the scheme. The identified measures and associated timescale for their implementation are summarised below.

- **Management** – A Mobility Management (MMP) has been compiled by DBFL with the aim of guiding the delivery and management of coordinated initiatives by the scheme promotor to be implemented upon occupation of the site, and is submitted as a separate document as part of the subject SHD planning application. The MMP will ultimately seek to encourage sustainable travel practices for all journeys to and from the proposed development.

- **Car Parking Management Strategy** - A management regime will be implemented by the development's management company to control and actively manage the availability of on-site car parking for residents. The signing of a rental agreement for one of the proposed residential apartments will NOT include access to a designated on-site parking space. All potential residents (prior to signing rental agreement) will be notified that the proposed scheme is a 'low car allocation' development with no access (or guarantee thereof) to either (i) the limited on-site residents car parking provision or (ii) apply to Westmeath County Council for a residents parking permit (to park on-street in one of the neighbouring streets). Nevertheless, all residents of the proposed residential apartment scheme will have the opportunity to apply to the on-site management company for both a (i) residents car parking permit (updated weekly, fortnightly, monthly, quarterly or annually) and subsequently access to a dedicated (assigned) on-site basement car parking space or (ii) a visitor's car parking permit for a short period of time. A charge will be applied to obtain a permit with the objective of covering the associated management costs and discouraging long term usage of the car parking space.

- **Infrastructure** – Infrastructure measures identified to reduce reliance of private vehicles include the provision of ample secure cycle parking on site and ensuring a design which promotes permeability for pedestrians and cyclists to, through and from the development. The level of parking provision for the development will also act as a powerful mobility management measure, ensuring against an overprovision of parking and a resultant over reliance on the private vehicle.

  The development proposes the provision of dedicated pedestrian footpaths and cycle paths throughout the development site.

- **Car Sharing –** The provision of 2 no. dedicated car share (GoCar) spaces in the basement parking facility for the sole use of the scheme's residents. The availability of these on-site provide a viable alternative to residents owning private vehicles whilst still having access to a car when required.

As part of the MMP process, bi-annual post occupancy surveys are to be carried out in order to determine the success of the measures and initiatives as set out in the proposed MMP document. The information obtained from the monitoring surveys will be used to identify ways in which the MMP measures and initiatives should be taken forward in order to maintain and further encourage sustainable travel characteristics

11.7 Residual Impacts

11.7.1 Construction Phase

Provided the above mitigation measures and management procedures are incorporated during the construction phase, the residual impact on the local receiving environment will be temporary in nature and neutral in terms of quality and effect.

The significance of each of the projected impacts are detailed in Table 11.4 for the following key junctions:

- **1** – N55 / N6 Eastbound On-ramp / N6 off-ramp junction;
- **2** – N55 / N6 Westbound off-ramp junction;
- **3** – Brawney Road / R915 / N55 / One Mile Round;
- **4** – R916 / N6 Eastbound On-ramp / N6 off-ramp junction;
- **5** – R916 / N6 Westbound On-ramp / N6 off-ramp junction;
- **6** – R916 / Moydrum Road junction;
- **7** – R446 / R916 Wash House Road junction;
- **8** – R915 / The Crescent / Grace Park Road / Gleeson Street junction;
- **9** – N55 / Coosan Road junction;
- **10** – N55 / Cloghanboy Avenue; and
- **11** – R916 / Moydrum Road junction.

The significance of the impacts has been determined in accordance with the classifications stipulated within the Environmental Protection Agency *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports - Draft (August 2017).*

Ref	Environment Character	Quality / Scale of Impact	Impact Significance	Duration
1	Low Sensitivity	Negative - Low	Slight	Temporary
2	Low Sensitivity	Negative - Low	Slight	Temporary
3	Low Sensitivity	Neutral Effects	Not Significant	Temporary
4	Low Sensitivity	Neutral Effects	Not Significant	Temporary
5	Low Sensitivity	Negative - Low	Slight	Temporary
6	Low Sensitivity	Neutral Effects	Not Significant	Temporary
7	Low Sensitivity	Neutral Effects	Not Significant	Temporary
8	Low Sensitivity	Neutral Effects	Not Significant	Temporary
9	Low Sensitivity	Neutral Effects	Not Significant	Temporary
10	Low Sensitivity	Neutral Effects	Not Significant	Temporary
11	Low Sensitivity	Neutral Effects	Not Significant	Temporary

Table 11.4: Impact Significance – Construction Phase

11.7.2 Operational Phase

The implementation of the mitigation measures outlined above, including the MMP, will ensure that the residual effect on the local receiving environment is both managed and minimised. In reference to Table 11.3, the analysis predicts the scale of residual impact, during the 2021, 2026 and 2036 design years, as largely being well below 5% on the surrounding links, with the exception of following links as shown in Table 11.5:

Link		Peak Hour	2021 Do Something	2026 Do Something	2036 Do Something
5	R916/N6 Westbound on-ramp/N6 off-ramp	AM	1.85	6.18	5.88
		PM	1.60	5.74	5.39
6	R916/Moydrum Road	AM	5.15	8.99	8.59
		PM	4.37	9.33	8.81

Table 11.5: Links with Impact >5%

With regards to the TII thresholds, the 2021, 2026 and 2036 analysis for R916/N6 Westbound on-ramp/N6 off-ramp demonstrate that the proposed development will not generate an impact greater than 10% or 5% on normal or congested networks respectively. As a result, the impact can be classified as sub threshold.

The significance of each of the projected impacts at each of the key links is detailed within the following tables for the worst case (e.g. peak hours) 2036 Future Year scenarios.

Ref	Environment Character	Quality / Scale of Impact	Impact Significance	Duration
5	Low Sensitivity	Negative - Negligible	Not Significant	Long Term
6	Low Sensitivity	Low - Low	Slight	Long Term

Table 11.6: Impact Significance – 2036 Design Year (AM & PM)

11.8 'Do Nothing' Impact

In the absence of the proposed development, the overall operational performance of the existing junctions on the surrounding road network will be affected by the impact caused by the forecast background network traffic growth (should that growth arise).

11.9 Reinstatement

11.9.1 Construction Phase

The constructions works areas will be reinstated following completion of development with landscaped areas provided, where proposed. The works will be restricted to the footprint of the site for the proposed development. Excavated topsoil and subsoil will be reused in reinstatement and landscaping where appropriate or dealt with in the appropriate manner i.e. sent for soil recovery as appropriate.

11.9.2 Operational Phase

No reinstatement requirements have been identified in relation to the operational phase of the proposed development.

11.10 Interactions

No impact interactions have been identified and it is considered that any minor impacts will be avoided through the implementation of best working practices as stipulated within the Construction Traffic Management Plan and Mobility Management Plan prepared in support of the proposed development.

11.11 Difficulties Encountered in Compiling

There were no material difficulties encountered in compiling and assessing the data for this EIAR sufficient to prevent modelling of the likely transport effects of the proposed development. The analysis reported within this chapter is based upon the traffic survey data specifically commissioned for this appraisal and undertaken in May 2019.

11.12 References

- Bus Connects website (www.busconnects.ie)
- Department of Transport's Traffic Signs Manual "*Chapter 8 Temporary Traffic Measures and Signs for Roadworks*"
- Department of Transport's "*Guidance for the Control and Management of Traffic at Roads Works – 2nd Edition*" (2010)
- Bus Eireann website (https://www.buseireann.ie)
- Westmeath Council Development Plan (2014-2020)
- Athlone Town Development Plan (2014-2020)
- Environmental Protection Agency *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (August 2017)*
- Irish Rail website (www.irishrail.ie)
- National Transport Authority; Greater Dublin Area Cycle Network Plan (2013)
- NRA '*Traffic and Transport Assessment Guidelines*' (2014)
- Ordnance Survey Ireland (www.osi.ie)
- The Institution of Highways and Transportation '*Guidelines for Traffic Impact Assessments*' (1994)
- Transport for Ireland (www.transportforireland.ie)
- Transport Infrastructure Ireland (www.tii.ie)

12.0. Material Assets: Resource and Waste Management

12.1. Introduction

This chapter of the EIAR was prepared by Tracy Armstrong, BA, MRUP, Dip EIA/SEA Mgmt, MIPI, MRTPI, Director of Delphi Design. The resource and waste management impacts associated with the project are considered in this Chapter. This assessment covers potential impacts from the construction phase as well as the operational phase of the development. The principle objective of sustainable resource and waste management procedures is to ensure efficient consumption of resources, to promote the minimisation of waste generation and, where this is not possible, to encourage reuse, recycling and recovery of waste to minimise the quantity of waste requiring disposal.

To achieve resource efficiency, there is a need to move from a traditional linear economy to a circular economy (see Figure 12.1). Sustainable waste management should follow the waste hierarchy (see Figure 12.2) as set out in Article 4 of the *Waste Framework Directive (2008/98/EC)*.

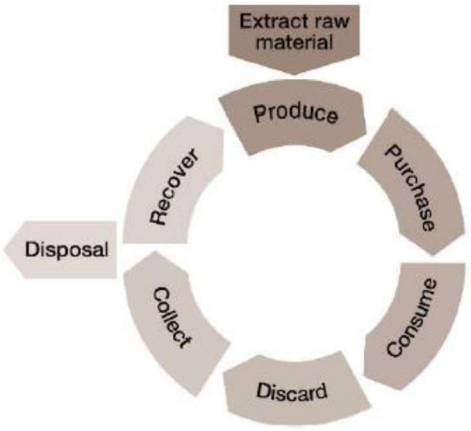


Figure 12.1: Circular Economy

Figure 12.2: EU Waste Hierarchy

This assessment has been conducted in the context of current legislation, relevant standards and guidance, and identifies any requirements or opportunities for mitigation.

12.2. Assessment Methodology

The assessment of the impacts of the proposed development arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management including national and regional waste policy, waste strategies, management plans, Directives and relevant reports. An extensive list of the documents reviewed in the preparation of this Chapter can be found in Section 12.9.

This Chapter is based on the project, as described in Chapter 3 and considers the following aspects:

- The legislative context;
- The construction phase (including excavation) (there is no demolition works); and
- The operational phase.

A desk study was carried out which includes the following tasks:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the construction and operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction and operational phase of the project have been calculated. The waste types and estimated quantities are based on published data by the EPA in *National Waste Reports*, data recorded from similar previous developments, Irish EPA waste generation research and other available research sources listed in Section 12.9.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring final disposal.

A detailed review of the existing ground conditions on a regional, local and site specific scale are presented in Chapter 6 Land and Soils. This section of the EIAR also discusses the environmental quality of soils which will have to be excavated to facilitate construction of the proposed development.

12.2.1. Legislation and Guidance

The sustainable consumption of resources is carried out in accordance with the overarching concept of Sustainable Development defined in the Brundtland Commission Report as *"development which meets the needs of current generations without compromising the ability of future generations to meet their own needs"*. This concept has informed European policy publications such as the *European 2020 Strategy*

and *Roadmap to a Resource Efficient Europe* as well as *Our Sustainable Future* - a framework for sustainable development in Ireland.

Waste management in Ireland is subject to EU, national and regional waste legislation which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the *Waste Framework Directive (2008/98/EC)* which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the *Waste Management Act 1996* (as amended).

In addition, the Irish government issues regular policy documents which outline measures aimed to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document *A Resource Opportunity – Waste Management Policy in Ireland* was published in 2012 and stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention. The document sets out a number of actions, including the following:

- A move away from landfill and replacement through prevention, reuse,
- recycling and recovery.
- A Brown Bin roll-out diverting 'organic waste' towards more productive uses.
- Introducing a new regulatory regime for the existing side-by-side competition
- model within the household waste collection market.
- New Service Standards to ensure that consumers receive higher customer
- service standards from their operator.
- Placing responsibility on householders to prove they use an authorised waste
- collection service.
- The establishment of a team of Waste Enforcement Officers for cases relating
- to serious criminal activity will be prioritised.
- Reducing red tape for industry to identify and reduce any unnecessary
- administrative burdens on the waste management industry.
- A review of the producer responsibility model will be initiated to assess and
- evaluate the operation of the model in Ireland.
- Significant reduction of Waste Management Planning

Following the above, the Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021 was published and provides a framework for the prevention and management of wastes in a safe and sustainable manner. The EMR Waste Management Plan 2015 – 2021 is the regional waste management plan for the Lissywollen area published in May 2015.

The strategy for the management of waste from the construction phase is carried out in line with the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* published in 2006. The guidance document *Construction and Demolition Waste Management: A handbook for Contractors and Site Managers* was also consulted in the preparation of this assessment.

Since 1998, the Environmental Protection Agency (EPA) has produced periodic 'National Waste (Database) Reports' detailing among other things estimates for household and commercial (municipal) waste generation in Ireland and the level of recycling, recovery and disposal of these materials. The 2016 National Waste Statistics, which is the most recent study published, reported the following key statistics for 2016:

- **Generated** – Ireland produced 2,763,166 t of municipal waste in 2016, this is a six percent increase since 2014. This means that each person living in Ireland generated 580kg of municipal waste in 2016

- **Managed** – Waste collected and treated by the waste industry. In 2016, a total of 2,718,298 t of municipal waste was managed
- **Unmanaged** –Waste that is not collected or brought to a waste facility and is therefore likely to cause pollution in the environment because it is burned, buried or dumped. The EPA estimates that 44,868 t was unmanaged in 2016.
- **Recovered** – the amount of waste recycled, used as a fuel in incinerators, or used to cover landfilled waste. In 2016, almost three quarters (74%) of municipal waste was recovered, this is a decrease from 79% in 2014
- **Recycled** – the waste broken down and used to make new items. Recycling also includes the breakdown of food and garden waste to make compost. The recycling rate in 2016 was 41%, the same as 2014
- **Disposed** – the waste landfilled or burned in incinerators without energy recovery. Just over a quarter (26%) of municipal waste was landfilled in 2016.

12.3. Existing Receiving Environment (Baseline Scenario)

The proposed development is located within the Local Authority administrative area of Westmeath County Council (WCC). In terms of waste management, the receiving environment is largely defined by WMCC as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the *Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021*. This plan replaces previous plans for the region due to changing National policy as set out in *A Resource Opportunity: Waste Management Policy in Ireland* and changes being enacted by the *Waste Framework Directive*. The waste management plan sets the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The plan does not set a specific target for construction & demolition (C&D) waste, however the *Waste Framework Directive* sets a target for Member States of *'70% preparing for reuse, recycling or other recovery of construction and demolition waste* (excluding natural soils and stones and hazardous wastes)*'* to be achieved by 2020 and this is highlighted in the regional waste plan.

The *National Waste Statistics* update published by the EPA in January 2017 identifies that Ireland's current progress against this C&D waste target is at 91% and our progress against *'Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)'* is at 45%. Both of these targets are required to be met by 12 December 2020 in accordance with the requirements of the *Waste Framework Directive*.

The Westmeath County Development Plan 2014-2020 also sets policies and objectives for the WMCC area which reflect those set out in the regional waste management plan.

In terms of physical waste infrastructure, the Lissywollen area is served by the Recycling Centre at the Rear of Golden Island Shopping Centre, located a short distance to the south east of the development and accepts household items including glass and textiles.

There are numerous waste permitted and licensed facilities located in the Eastern-Midlands Waste Region for management of waste from the construction industry as well as municipal sources. These include soil

recovery facilities, inert C&D waste facilities, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and a waste-to-energy facility.

12.4. Characteristics of the Proposed Development

The proposed development is described in Chapter 3 The following details are relevant for this Chapter.

12.4.1 Construction Phase

During the construction phase, materials will be generated from excavation of topsoil and subsoils across the site. This will primarily comprise soil and stones. Project engineers have estimated that there will be approximately 42,000m³ of material will require excavation consisting of 18,000m³ stripped topsoil and 24,000m³ excavated subsoil as part of the scheme proposals. All topsoil and subsoil materials will be re-used as part of the permanent works, such as landscaping and foundations. The existing topography of the site and the extent of construction are discussed in detail in Chapters 1 and 6. Site levelling works as well as new road layout construction and installation of underground services will generate excavation material. Where possible and where the material is shown to be suitable, soil and stones will be re-used on-site. If for some reason material is not deemed appropriate for reuse on-site, it will need to be removed off-site either as a waste or as a by-product.

Where the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the *European Communities (Waste Directive) Regulations 2011*. Article 27 requires that certain conditions are met and that by-product decisions are made to the EPA, via their online notification form. Similarly, in the event of any soils/stones being imported onto the site from another construction site as a by-product, this will also be done in accordance with Article 27. If the material 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 by the receiving facility. In order to establish the appropriate reuse, recovery and/or disposal route for the material 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*. Environmental soil analysis should be carried out prior to construction on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (*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.

The excavation waste if it cannot be reused onsite may be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in Ireland or, in the event of hazardous material being encountered, be transported for recovery or exported abroad for disposal in suitable facilities.

All excavations should be carefully monitored by a suitably qualified person to ensure that potentially contaminated soil is identified and segregated, if encountered. In the event that 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.

There are a number of licensed facilities in the region which are suitable to accept inert and non-hazardous excavated material. These facilities are currently active and have capacity to accept excavated materials

within the limits of their respective licenses. The environmental impact of recovery/disposal of soils and stones at these facilities has already been assessed in their facility applications. There are currently no hazardous soil waste disposal facilities in Ireland, in the event that contaminated material is encountered, and this material would have to exported to suitable facilities in Europe via Transfrontier Shipment of Waste (TFS) for disposal.

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. Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the Construction & Demolition Waste Management Plan enclosed separately. The CDWMP provides an estimate of the main waste types likely to be generated during the excavation and construction phase of the project and these are summarised in Table 12.1 below:

Waste Material	Waste Codes	Quantity (Tonnes)
Clay & Stones	17 05	75040t
Concrete	17 01 01	Nil
Masonry	17 01 02	Nil
Timber	17 02 01	8t
Steel	17 04 05	6t
Packaging	17 02 03	63t
Canteen Waste / Domestic	20 01	75t
Waste Oil & Oil Filters	13 01	1560 litres
Hazardous Materials	20 01	Nil
Paper / Cardboard	20 01 01	23t
Other Waste Materials	20 01	74t
Plastic	15 01 02	15t
Tarmacadam	17 09 04	nil
TOTAL Arisings		

Table 12.1 - On and Off-site Reuse, Recycling and Disposal Estimates for Construction Waste

An Outline/Preliminary Construction Management Plan (CMP) has also been prepared and is included with this planning application documentation. 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. However, the above estimates are calculated on the basis of the maximum permitted development are considered to be the worst case scenario.

12.4.2. Operational Phase

The proposed development will give rise to a wide variety of waste streams during the operational phase, i.e. when the project is completed, open and occupied. Operational waste will be generated on a daily basis by residents of the bouses and apartments.

The main waste types that will be generated on a daily basis will be:

- Dry mixed recyclables (DMR);
- Mixed non-recyclables (MNR) (general waste);
- Organic (food) waste; and
- Glass

In addition, the following waste types will also be generated in less quantities and less frequently across the development:

- Textiles;
- Green waste from landscaping;
- Batteries (typically non-hazardous but may include hazardous);
- Waste Electrical and Electronic Equipment (WEEE) (mainly non-hazardous); and
- Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents etc.).

Dedicated areas for waste storage have been allocated at apartment and duplex units. It is envisaged that waste storage for houses will be located in rear gardens or to the front of properties where rear gardens access is not possible from the street (i.e. for terrace units).

12.5. Construction Impacts, Mitigation and Monitoring Measures

12.5.1. Construction Impacts

The project will generate a range of non-hazardous and hazardous waste materials during construction. Construction activities will inevitably generate quantities of waste where materials are oversupplied, incorrect materials delivered or materials are cut to size on-site. General housekeeping and packaging will also generate waste materials as well as typical municipal wastes generated by construction employees including food waste.

As the project progresses, waste materials will be required to be temporarily stored on site pending collection by a waste contractor. Dedicated areas for waste skips and bins will need to be identified across the site. These areas will need to be easily accessible to waste collection vehicles who it's anticipated will need to collected waste on a near-daily basis during peak construction.

Construction wastes will need to be taken to suitably permitted waste facilities for processing and segregation. There are numerous licensed waste facilities in the region that can accept hazardous and non-hazardous waste materials and acceptance of waste from the proposed development would be in line with daily activities at the facilities. At present, there is sufficient capacity for the acceptance of construction waste materials at facilities in the region and, where possible, waste is segregated into recyclable and recoverable materials. The majority of construction materials are either recyclable or recoverable and Ireland's current recycling rate for C&D waste is at 91% as identified in Section 12.3.

Recovery and recycling of construction waste has a positive impact on sustainable resource consumption, for example where waste timber is mulched into a landscaping product or waste asphalt is recycled for use in new pavements. The use of recycled materials, where suitable, reduces the consumption of natural resources.

There is a quantity of soil and stone which will need to be excavated to facilitate the proposed development. Where possible, this material will be retained on site for reuse but in the event that unsuitable (or contaminated) material is encountered, this will need to be removed off-site. Being a

greenfield site it is unlikely that any significant contamination will be identified during the excavation works, however correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

Reuse of excavated material onsite will reduce consumption of natural quarry resources where infilling is required. Material not suitable for reuse will be deposited at soil recovery facilities/landfills in accordance with the conditions of the licenced facility to ensure there is no negative impact on the soil or groundwater environment at the facility. The impact of construction waste generated from the project is expected to be slight, negative and short-term. The opportunities for waste materials to be reused off-site will provide positive impacts in the resourcing of materials for other developments and reduce the requirement for raw material extraction.

12.5.2 Mitigation

A Construction & Demolition Waste management Plan (C&DWMP) has been prepared in line with the requirements of the guidance document issued by the DEHLG. Adherence to the high level strategy presented in this C&DWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the construction phase of the project.

The enclosed Outline / Preliminary CMP sets out the overall project construction strategy and identifies the need for storage areas for waste skips. Prior to commencement of construction, the contractor(s) will be required to ensure that both of these documents detail specific measures to minimise waste generation and resource consumption. It is estimated that all of the excavated material generated is expected to be suitable for reuse within the proposed development. This will be required to be investigated and verified by the contractor(s) subject to appropriate testing to ensure the material is suitable for its proposed end use. If for some reason excavation material cannot be reused within the site, the contractor(s) will endeavour to ensure that material is reused or recovered off-site insofar as is reasonably practicable.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to ‘design out waste’;
- Maximum segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated:
    - Concrete rubble (including ceramics, tiles and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and
    - Timber.

- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site. The waste storage area(s) will be assigned and all construction staff provided with training regarding the waste management procedures on commencement of the project;
- Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site where possible;
- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;

- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably
- registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Any nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if it requires removal off-site. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the *EC (Waste Directive) Regulations (2011)* as previously referred to Section 1.4 and detailed in the C&DWMP. These mitigation measures will ensure that the waste arising from the construction phase of 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 and will encourage sustainable consumption of resources.

12.5.3 Monitoring Measures

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. The CDWMP specifies the need for a waste manager to be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that the contractor(s) and sub-contractors are segregating waste. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

12.5.4 Cumulative Effects

Current development throughout the region is taking place. In a worst-case scenario, all developments could be developed concurrently or overlap in the construction phase. Due to the high number of waste contractors in the region there would be sufficient contractors available to handle waste generated from all of these sites simultaneously, if required. Similar waste materials would be generated by all of the developments.

12.6. Operational Impacts, Mitigation and Monitoring Measures

12.6.1 Operational Impacts

The proposed development is planned to accommodate a large number of residents. The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to significant volumes of waste being sent unnecessarily to landfill. In addition, the requirements of the County Development Plan along with the targets outlined in the EMR Waste Management Plan 2015 – 2021, would not be met.

The presence of residents within the development means the generation of waste materials during the operational phase is an unavoidable impact. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

The waste materials generated on a daily basis will require temporary storage within residential units with dedicated waste storage areas required for each residential dwelling. Collection vehicles will be required to service the development on a regular basis to remove waste.

The use of non-permitted waste contractors or unlicensed facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. 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 in line with a WMP.

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas. For a project that will be showcased to attract residents this would have a negative impact

The impact of operational waste generation from the development is expected to be moderate, neutral and permanent.

12.6.2 Mitigation

A Waste Management Plan will be prepared and submitted to the Planning Authority for agreement prior to commencement of development, to outline the strategy for management of waste from the operational phase of the proposed development. A strategy and the estimates of waste generation have been used to identify storage and equipment requirements for residential waste, which has been incorporated into the development design.

In addition the following mitigation measures will be implemented:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
    - Dry Mixed Recyclables;
    - Organic/catering waste (including garden waste from landscaping activities).
    - Mixed Non-Recyclable Waste;
    - Glass;
    - Textiles;
    - Batteries (non-hazardous and hazardous)
    - Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment;
    - Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.); and
    - Fluorescent bulb tubes and other mercury containing waste (if arising).
- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified 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.

These mitigation 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.

12.6.3 Monitoring Measures

There may be opportunities to reduce the frequency of collection for dwellings within the development where estimates have been too conservative. Waste legislation should also be consulted on a regular basis in case of any changes which may impact on waste management procedures.

12.6.4 Cumulative Effects

Existing surrounding developments will generate similar waste materials to those anticipated to be generated at the proposed development. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in Lissywollen will improve the efficiencies of municipal waste collections in the area.

It can be considered that increased development will present opportunities for waste contractors to increase efficiency in collection of waste and for more operators to provide collection services for residential customers.

12.7 Residual Impacts

The management of waste materials during the construction and operational phases of the project in accordance with the mitigation measures outlined above will ensure that there are minimal residual impacts from the proposed development.

Consumption of natural resources in the construction process is an unavoidable impact and will be minimised insofar as is possible. Reuse of excavated material within the proposed development will significantly reduce the consumption of resources from off-site.

All excavation, construction and operational waste materials removed from site will be taken to licensed or permitted waste facilities. The management of these facilities, and in particular the impact of soil recovery facilities, will have been assessed in the planning and authorisation of these facilities. This will ensure that the off-site reuse, recycling, recovery or disposal of waste is carried out in a manner which does not impact negatively on the environment.

The waste infrastructure in the Eastern-Midlands Region is constantly evolving and it is considered that there will be sufficient capacity within the Irish waste management industry to support the proposed development without any residual impact.

12.8. ‘Do Nothing’ Scenario

The resource and waste management impact assessment assumes that under the 'Do-Nothing Scenario' the proposed development would not be undertaken. Consequently, there will be a neutral impact on resource and waste management.

12.9. Reference List

Brundtland Commission, *Report of the World Commission on Environment and Development: Our Common*
Future (1987)
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Eastern-Midlands Waste Region, *Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021* (2015)
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European Commission, *Roadmap to a Resource Efficient Europe* (2011)
European Waste List – Council Decision 94/904/EC (as per Council Directive 75/4442/EC)
FÁS and the Construction Industry Federation (CIF), *Construction and Demolition Waste Management – a handbook for Contractors and Site Managers* (2002)
Hazardous Waste List – Council Decision 94/904/EC (as per Council Directive 91/689/EEC)
National Construction and Demolition Waste Council (NCDWC) and DEHLG, *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* (2006)
USEPA, *Municipal Solid Waste Generation, Recycling and Disposal in the United States; Facts and Figures for 2012* (2014)

Relevant Legislation:
Environmental Protection Act 1992 (No. 7 of 1992) as amended
Litter Pollution Act 1997 (No. 12 of 1997)
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. 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
- The European Communities (Transfrontier Shipment of Hazardous Waste) Regulations 1988 (S.I. No. 248 of 1988)
- 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)

13.0. Archaeology and Cultural Heritage

13.1. Introduction

It is proposed to develop a residential development and associated works at Lissywollen, Athlone, Co. Westmeath. The development is located in the townlands of Lissywollen and Retreat. The site is located at the edge of Athlone town in a largely green field site. Athlone town is located to the southwest and the M6 motorway bounds the site at the north.

This section of the EIAR assesses the impact of the development on the Cultural Heritage of the site and its environs. The report includes a desktop study and a site inspection. The desktop section of the report was compiled using: The Records of Monuments and Places; buildings of Ireland, Excavations Bulletin; historic maps; aerial photographs; place names and historic books and journals.

Field walking and archaeological testing was undertaken in July 2019. John Purcell Archaeological Consultancy undertook this chapter and archaeological testing at the site. This was undertaken under licence to the D.C.H.G. (Licence number 19E0330).

13.2. Assessment Methodology

13.2.1. Guidance and Legislation

As part of the assessment the following legislation and guidelines were consulted as part of the study:

- National Monuments Acts, 1930-2014
- The Planning and Development Act, 2000 (as amended)
- Heritage Act, 1995
- Environment Protection Agency: Advice Notes for preparing Environmental Impact Statements, 2015
- EPA: Draft Revised Guidelines on The Information to be Contained in Environmental Impact Assessment Reports, August 2017
- Frameworks and Principles for the protection of Archaeological Heritage 1999
- Architectural Heritage (National Inventory) and Historic Monuments and the Local Government (Planning and Development) Act 2000

13.2.2. Study Methodology

This assessment consists of a paper survey identifying all recorded sites within the vicinity of the proposed development and a site inspection. The methodology has been conducted based on the guidelines from the Department of Culture, Heritage and the Gaeltacht (DAHG).

13.2.3. Desktop Survey

The desktop survey undertaken consisted of a document and cartographic search utilising a number of sources including the following:

- Record of Monuments and Places (RMP); The RMP records known upstanding archaeological monuments, the original location of destroyed monuments and the location of possible sites identified through, documentary, cartographic, photographic research and field inspections.

- The RMP consists of a list, organised by county and subdivided by 6" map sheets showing the location of each site. The RMP data is compiled from the files of the Archaeological Survey.

- National Inventory of Architectural Heritage; The inventory of architectural heritage lists all post 1700 structures and buildings in the country. This includes structures of architectural, historical, archaeological, artistic, cultural, social, scientific or technical importance.

- County Development Plans; The Development plan was consulted to ascertain if any structures listed in the Record of Protected Structures (RPS) and/or any Architectural Conservation Areas (ACAs). The Record of Protected Structures lists all protected structures and buildings in Laois. This includes structures of architectural, historical, archaeological, artistic, cultural, social, scientific or technical importance.

- Cartographic Sources; The following maps were examined: Down Survey, 1st edition Ordnance Survey Maps (1836-1846) and 2nd edition Ordnance Survey Maps (1908), Rocque Map and the Cassini Map.

- Literary Sources; Various published sources, including local and national journals, were consulted to establish a historical background for the proposed development site. Literary sources are a valuable means of completing the written record of an area and gaining insight into the history of the environs of the proposed development. Principal archaeological sources include: The Excavations Bulletin; Local Journals; Published archaeological and architectural inventories; Peter Harbison, (1975). Guide to the National Monuments of Ireland; and O'Donovan's Ordnance Survey Letters.

  A comprehensive list of all literary sources consulted is given in the bibliography.

13.2.4. Site Inspection

An archaeological field inspection survey seeks to verify the location and extent of known archaeological features and to record the location and extent of any newly identified features. A field inspection should also identify any areas of archaeological potential with no above ground visibility. In certain cases archaeological test trenches can be excavated to examine the sub surface potential of a site. Many monument types do not leave surface markers. Wooden sites such as prehistoric house or burials may only be recorded through excavation works.

13.3. Receiving Environment

The proposed development consists of 7 interlocking fields at the east that are in use for agricultural purposes in the form of grassland. These are delineated by mature hedgerows containing earthen ditch and banks and by the M6 motorway at the north and a disused railway line forms the southern boundary. At the western section a disturbed area forms the western section of the site. This area has been previously excavated.

Athlone town is located to 1.5km to the west, the old railway line green way forms the southern border of the site. The Brawny Estate is located is located adjacent to the development.

13.4. General Archaeological and Historical Summary

13.4.1. Prehistory

The Sites and Monuments Record (SMR) lists a number of prehistoric sites in this part of Westmeath. These include a number of megalithic monuments located across the county. Evidence of prehistoric activity has been recorded along the M6 and M4 through Co. Westmeath. A number of Neolithic sites including evidence of domestic dwellings have been identified along these routes.

Barrows are a common form of monument across the country. These are associated with the Bronze/Iron Age burial tradition (c. 2400 BC - AD 400) and are defined by an artificial mound of earth or earth and stone, normally constructed to contain or conceal burials. These sites vary in shape and scale and can be variously described as bowl-barrow, ditch barrow, embanked barrow, mound barrow, pond barrow, ring-barrow and stepped barrow. The incidence and frequency of these sites in the area attests to the extent of prehistoric settlement in this area from earliest times.

13.4.2. Iron Age to Early Medieval Period

In late Bronze Age Ireland the use of the metal reached a high point with the production of high quality decorated weapons, ornament and instruments, often discovered from hoards or ritual deposits. The Iron Age however is known as a ‘dark age’ in Irish prehistory. Iron objects are found rarely, but there is no evidence for the warrior culture of the rest of Europe, although the distinctive La Tené style of art with animal motifs and spirals was adopted. Political life in the Iron Age seems to have been defined by continually warring petty kingdoms vying for power. These kingdoms, run on an extended clan system, had their economy based on mixed farming and, in particular cattle. Settlement was typically centred on a focal hillfort.

Another more domestic site common to the Bronze Age is the *fulachta fiadh*. These are located along the edges of streams or in damp areas. They consist of a mound of charcoal enriched soil with fragmented burnt rocks. They usually are accompanied by a wooden or stone lined trough. These were used seasonally possibly for cooking or may have been used for recreational purposes.

Settlement in the Early Medieval Period is defined by the ringfort. The country was a patchwork of competing kingdoms during this period numbering up to 150. Ringforts were a farmstead surrounded by one or more earthen banks. These are the commonest monument across the area and have been frequently recorded in the area. These are generally located in areas with commanding views over the countryside to provide security.

13.4.3. Ecclesiastical Settlement

The introduction of Christianity to Ireland in the fifth century had a profound impact on Gaelic society, not in the least in terms of land ownership and the development of churches and the development of a large number of religious houses. The earliest churches were constructed of wood and mortar and wattle walls. By the ninth and tenth centuries these were being replaced by stone structures including the construction of Round Towers. These settlements became very important around the country and became small towns. Many of these sites were surrounded large earthen enclosures.

13.4.4. Historic Period

Following the Norman Conquest of the country a series of tower houses and boroughs were built across the country. A series of medieval parish churches were also constructed to service the growing populations. A large number of tower houses and fortified houses were constructed to protect and consolidate settlement in the area.

13.4.5. Post Medieval Ireland

Seventeenth century Ireland saw massive upheaval a result of the Confederate wars, the Cromwellian response and the Wars of the two kings. The impact on the country was profound. Long established settlements in the area were affected by the Cromwellian Restoration and land settlements. All catholic property owners were affected, and large land and property confiscations took place. It has been estimated that up to a third of the population was wiped out because of famine, disease and war. Soldiers were given land as payment resulting in further upheaval of the local population and the establishment of large estates. These came to dominate the landscape from this period onwards. Religious intolerance in other parts of Europe resulted in the expulsion of the Huguenot from France which were welcomed by the English Crown into Ireland.

13.4.6. Industrial Period

The eighteenth century saw considerable industrial growth across the country. In Westmeath this was visible in the form of quarrying and the construction of numerous mills across the county. The area further grew with the arrival of the Grand Canal and the rail link to Dublin.

Cultural Monument	Townland	Distance to development	RMP
Children's Burial	Collegelands	50m	WM 029 023
Military Camp	Retreat	95m	WM 029 022
Holy Well	Loughdonning	500m	WM 029 021
Castle	Athlone	1.71m	WM 029 042099
Fortified House	Garrycastle	650M	WM 025029

Table 10.1 Archaeological Monuments Adjacent to the development

13.4.7. Recorded Archaeological Monuments

The wider environs of the site includes a number of historic monuments these are at a remove from the site. The closest archaeological monument is 50M from the boundary of the development (Table 13.1).

These monuments in the area are detailed below and visible in Figure 13.1 of the Chapter Appendix 13-1.

WM029-023----

Class: Children's burial ground

Townland: COLLEGELAND

Situated on flat, well drained pasture, on the E side of Athlone town. Lissahearin Grave Yard consisted of a roughly circular-shaped area (diam. 19m) enclosed by a low bank of earth and stone with is no trace of an external fosse. The perimeter of the earthwork is planted with mature beech and elm trees. The interior is relatively level with stones scattered on the surface and a low stony outcrop in the E quadrant. The monument resembles a small ringfort. According to Rev. J. Pinkman (1945, 47) 'Lissaherin' refers to Ahern's Fort which lies close to the S side of the Athlone to Mullingar railway line, about half a mile from Athlone town. It was previously used as a burial place for unbaptized children. The Ordnance Survey suggested that this monument may have been a small ringfort that was reused as a children's burial ground. Monument is visible today as a roughly circular-shaped tree-planted earthwork on Digital Globe aerial photography which is within a trapezoidal-shaped, undeveloped green area, within a modern housing estate.

WM029-022----

Class: Military camp

Townland: RETREAT

Situated in a low-lying area, now occupied by a housing estate, on the E side of Athlone town. Depicted on the 1837 ed. OS 6-inch map as a small oval-shaped pond, known locally as the 'The Doctor's Pool'. Depicted on the revised 1910 ed. OS 25-inch map as a perfectly circular-shaped feature. Area named 'Cannonsfield' on the revised 1953 OS 6-inch map. According to Murtagh (1970, 84, 87), the Williamites arrived in Athlone on 17 July 1690 and established a military camp about a quarter of a mile from the town. Strong local tradition confirms that the encampment was at a pond called 'The Doctor's Pool' where the troops washed their clothes and tended their wounds. Burials of soldiers killed in the siege were interred in the immediate vicinity of the pond. It is possible that the locality was similarly utilised during the second siege in 1691. Monument is described in 1983 as a natural depression which is currently dried out, yet is likely to be waterlogged in winter. Pond is not visible today on Digital Globe aerial photography as the area is occupied by a modern housing estate.

WM029-021----

Class: Ritual site - holy well

Townland: LOUGHANDONNING

Situated in a complex of buildings, on Brideswell Street, on the SE side of Athlone town. Annotated 'Brides Well' on the 1837 OS 6-inch map and the revised 1910 ed. OS 25-inch map where it is depicted as a circular feature. Well described in 1982 as no surface remains visible. The area where it is indicated on OS mapping is occupied by a small garage. A small stream lies c. 20m to SW and the land beyond to S is marshy. Monument is not visible today on Digital Globe aerial photography.

WM029-025----

Class: House - fortified house

Townland: GARRYCASTLE

Garrycastle also known as Caislean Barrcha or Carrick Castle as annotated on the 1654-7 Down Survey map of Brawny barony (NLI, MS 723-4). The terrier of this map recorded that in 1640 this castle stood on unforfeited lands belonging to Barnaby O'Bryan, who is listed as a Protestant landowner (ibid.). Castle situated on a slight rise, overlooking stream immediately to N, on the E edge of Athlone town. Depicted on the 1837 ed. OS 6-inch map as a rectangular-shaped building with its long axis aligned NE-SW, annotated 'Garrycastle'. A second L-shaped building annotated 'Garrycastle Old Ho.' is shown standing 70m to SW. No surface remains survive of this building annotated 'Garrycastle Old Ho.'. This latter site was archaeologically tested in 2001. On the revised 1910 ed. OS 25-inch map the NW side wall of the castle is no longer upstanding and the other three walls of the castle are shown intact. In 1837 the Ordnance Survey Letters recorded the tradition that the castles of Coosan (WM029-001----) and Garrycastle were built by the O'Breen's [O'Bryan] (OSL vol. 1, 67). According to N.W. English (1968), these are the ruins of a fortified house reputed to be the residence of the Galborne family constructed during the period 1660-1700. Pinkman (1945, 42, 45) recorded that the medieval castle at Garrycastle consisted of a 'site and some remains' which are still pointed out. It is possible that there was a medieval Gaelic castle located on or close to the site of the 17th century fortified house constructed by the Galborne [Golborne] family.

Castle ruins described in 1980 as the remains of a long rectangular-shaped building (dims. 15m NW-SE; 9m NE-SW) defined primarily by sod-covered wall footings. The line of the NW wall is difficult to determine due to dense overgrowth along this side of the monument. The best preserved portion of wall (H 4-5m) is at the S end of the SW wall. A substantial fireplace and a ruined chimney flue is visible on the inner face of this gable. Brick has been incorporated into the upper parts of this wall. Internal wall footings can be traced within the interior of the ruin. There is no cut stone visible and nothing to suggest a date earlier than the 16th or 17th century. Monument is not visible today on Digital Globe aerial photography due to mature tree cover.

In 2001 archaeological testing was undertaken by Martin E Byrne under licence No. 01E0130 in advance of a proposed development site within the IDA Industrial Estate in the eastern suburbs of Athlone. The results of the testing were summarised as following; 'The proposed development area is to the south-west of a castle. This castle was attacked in 1442 and apparently levelled, although one source (Stokes and Burgess 1897, 40) indicates that a part of the ruins was still extant in the late 19th century. However,

this source is generally recognised as dubious. The documentary evidence indicates that a fortified house was constructed at the site in the mid–late 17th century. The extant remains at the site are most likely those of this fortified house. Furthermore, it is probable that this house was constructed either on, or very close to, the previous castle.

The extant remains consist of a long stone building, measuring c. 9m by 15m. The south-west gable of this building stands to a height of c. 4–5m and incorporates a ruined fireplace with brick chimney flue. Much of the site and its immediate environs are overgrown and it was not possible to determine whether any further remains might exist.

To the south-west of the monument is an area of rough ground in which some wall footings can be traced. Initial testing within this area indicated that it is the location of a late 18th/early 19th-century farm building which was demolished in the first half of the 20th century. The area was subsequently used for the storage of silage in more recent years. A number of linear features in the immediate environs of the farmhouse were tested; the results indicated that these features were the remains of drive/ laneways which were subsequently disturbed by ploughing.

Additional testing undertaken in the area of the farmhouse indicated that the basal courses of the external walls, which were 0.6m wide, were of stone, with the remainder of the structure constructed in brick. All internal walls were 0.4m wide and were of brick. All walls stood to a height of 0.4–0.6m over foundation level. The house had a maximum length of 17.7m and a maximum width of 15m. There was evidence of an internal chimney along the western wall, and doorways on the southern, eastern and northern walls. In addition, there was evidence for brick, stone-cobbled and possibly timber floors on the inside of the house, with some external stone cobbling. No additional features, structures, deposits or finds of archaeological/historical interest were uncovered during the course of the testing' (www.excavations.ie).

WM029-042099-

Class: Castle – motte

Townland: ATHLONE

The Kingdom of Míde [Meath] was granted to Hugh de Lacy in 1172 (Mills and McEnery 1916, 177) and the process of sub-infeudation and settlement began soon afterwards but it is unlikely that any effective inroads were made as far west as Athlone for some time. The original Anglo-Norman grantee of Athlone was Geoffrey de Costentin who was granted a cantred in Connacht adjoining Athlone in 1200 (Cal. doc. Ire., no. 137; Orpen 1907, 259; Claffey 1970-1, 55). In this year, King John of England granted Geoffrey de Costentin, ‘a cantred in Connaught called Tirieghrachbothe’ (Cal. doc. Ire., 22). If a motte castle had been constructed in Athlone then Geoffrey would have been responsible for the construction of this earth and timber castle (WM020-042098-) between the years 1191 and 1199 (Orpen 1911-20, II, 129; Graham 1980, 53; Bradley et. al. 1985, 35). In 1199 the annals recorded that a 'depredation was comitted on the Foreigners by Cathal Crobhderg, who burned the bódhún [bawn] of Ath [Athlone], and killed many persons; and they carried with them many cows to their homes' (ALC). The use of the word bódhún [Cow fort] anglicised as bawn to describe an Anglo-Norman fortification suggests that the fortification may have been a ringwork type earthwork rather than a motte. Alternativey the bawn may have been a reference to the bailey or courtyard adjoining the motte castle. Graham (1980, 52-3) suggests that Athlone formed a part of the final western frontier of the Liberty of Meath, a frontier which also included the motte castles of Granard (LF010-080001-), Co. Longford, Kilbixy (WM011-041----) and Rathconrath (WM018-093----), Co. Westmeath. The construction dates of the latter two motte castles, in 1192 and 1191 respectively, dates the formation of this frontier in his view. Accordingly a date between 1191 and 1199 could be

proposed for the construction of the Athlone motte castle (Bradley et. al. 1985, 36). Claffey (1970-1, 55) has suggested that de Costentin may not have built a motte but merely reused the Ua Conchobhar [O'Conor] fortification (WM029-042098-) in Athlone. This suggestion finds some support in the Annals of Loch Cé reference to the Bishop of Norwich building in Athlone a new bridge (WM029-042004-) and a 'castle (WM029-042002-) instead of 'Ua Conchobhar's [O'Conor's] castle (WM029-042098-)' in 1210. Even if the survival of the Ua Conchobhar castle until 1210 were accepted, however, this does not exclude the construction of a motte because mottes were frequently built on top of ringforts and other pre-existing settlements (Graham 1980, 51). Claffey (1970-1, 55) further suggests that de Costentin's settlement was sited on the east bank of the Shannon but Orpen (1907, 263-4) was of the opinion that the original motte was built, and could still be detected, on the site of the present stone castle (WM029-042003-). The visit of King John to Ireland in 1210 marks a turning point in the development of Athlone. John de Grey, Bishop of Norwich, was appointed justiciar of Ireland as part of John's efforts to improve the administration of the colony and he appears to have recognized the strategic importance of Athlone as the gateway between the Anglo-Norman liberty of Meath and Connacht, still effectively in Irish hands (Orpen 1911-20, II, 281; Claffey 1970-1, 56). De Grey appears to have desired to establish Athlone as the joint seat (with Dublin) of English administration in Ireland (Claffey 1970-1, 56) and the first step in this plan was the construction of new stone castle (WM029-042002-) and bridge (WM029-042004-) at Athlone in 1210. The 13th century Anglo-Norman stone castle may have been built on the site of the 12th century motte castle which in turn was built on the site of the Gaelic earth and timber fortification of the O'Conor's.

Details taken from archaeology.ie.

13.4.8. Previous Archaeological Remains

A number of archaeological assessments have included excavation or testing in the environs of the proposed development. These are listed below (details taken from excavations.ie).

Testing was undertaken at Lissywollen, Athlone, Co. Westmeath, prior to a proposed residential development (Licence number 06E0713). This is located to the northwest of the proposed development. Test-trenching took place on 24 October 2006 using a 13-tonne mechanical excavator equipped with a flat, toothless bucket. Seven trenches were excavated within the area identified as Area of Archaeological Potential (AAP) 1 in the EIA (IAC Ltd 2004), which consisted of a mound depicted on the first-edition OS map (1838). The test-trenching did not identify any features of archaeological significance. The raised area identified as AAP1 is formed by a natural geological feature consisting of a sandy/stony ridge. This feature was then utilised as a demesne feature during the 19th and early 20th century. The remains of mature trees were noted around the periphery of the mound. A record of the accessible structures on site, such as the remaining walls of the walled garden associated with the retreat house, and its lodge, was carried out by Faith Bailey of IAC Ltd. It should be noted that rampant vegetation growth over these features prevented a detailed record being taken.

Test excavation was undertaken from 6 to 10 July 1998 (Licence number 8E0308). The site of the proposed development lies c. 500m east of the medieval walled town on the east bank of the River Shannon and contains an enclosure. The enclosure is probably the 'pond' site referred to in The Sieges of Athlone 1690 and 1691 (H. Murtagh 1973, 3). Murtagh states that on 17 July 1690 the Williamite army arrived at Athlone and encamped about a quarter of a mile from the town. According to the footnotes, 'Strong local tradition says the encampment was in the townland of Retreat at a pond called the "Doctor's Pool". Here the troops washed their clothes, tended their wounds, and in the immediate area buried their dead. Local farmers have discovered skeletons when digging drains etc. It is possible the locality was similarly utilised at the second siege in 1691'. The pond is shown in open countryside in the estate grounds

of Retreat House on the 1st edition of the OS 6-inch map (1841). The area now forms part of the suburbs of the modern town.

The site comprises a subrectangular green-field area measuring c. 170m north-south by 85m. A shallow depression near the centre of the park was pinpointed as representing the site of the pond. Test excavation comprised the mechanical excavation of two trial-trenches in this area. A mid-brown, loose, silty clay topsoil (0.2m thick) overlay a compacted, redeposited, yellowish-brown, silty clay and grey, silty, sand subsoil (0.3m). The redeposited subsoil overlay natural stratified layers of orange, silty clay and grey silty sand subsoil. The topsoil and redeposited subsoil contained occasional modern pottery sherds and glass fragments. It appears that the pond was drained and backfilled when the surrounding lands were developed in recent times.No archaeological deposits or features were encountered. A couple of post-medieval pottery sherds were recovered during subsequent monitoring of topsoil removal in advance of development.

Although the remains uncovered are at a remove from the proposed development it shows potential for sub surface remains to be uncovered as a result of development.

There may be other archaeological material in the area that has not yet been recorded. Houses constructed in the Medieval Period were generally made of stone and wood once this decayed the remains can be detected during excavation works. Similarly, burial sites may not have any surface markers and remain undetected below the surface. Ground disturbance may uncover buried archaeological sites, features or artefacts.

13.5. Cultural Heritage Impacts

13.5.1. Site Survey

Field walking and archaeological testing was undertaken in July 2019. This did not reveal any surface remains or sub surface remains of unrecorded archaeological monuments. A series of 17 test trenches were excavated across the site, these were excavated to the natural boulder clay. No features or finds indicative of archaeological remains were recorded.

13.5.2. Recorded Monuments

The proposed development will have no impact on the archaeological landscape or on any recorded monuments (Figure 13.1). No recorded monuments exist in the environs of the site and none will be affected by its development. The closest monuments are 50m and 60m to the south. The visual amenity of the wider cultural heritage landscape will be unaffected by the proposed development due to the existence of mature hedgerows surrounding the area and the low visibility of the site in the wider landscape.

13.5.3. Cartographic Evidence

William Petty's Down Survey Map, 1654-56

This map does not show the area in great detail. The proposed development area is within a rural setting. No features or structures are marked within the study area (Figure 13.3).

First edition OS Map, 1837

This is the first detailed mapping of the study area. This shows the site laid out in a series of smaller fields. These are largely intact still today with some internal hedging removed (Figure 13.4).

Ordnance Survey Map, 1911

By the early 20th century land improvements in the form of hedgerow removals had taken place. The fields had been enlarged into the layout that still exists (Figure 13.6). No features indicative of archaeological remains were visible on the maps or the aerial photographs for the area.

Place name Evidence

Townland names can give an indication of previous activities at the area that have since been forgotten and leave no trace at ground level. They can contain information on previous ownership, land use or archaeological monuments such as churches or settlement sites. Townland boundaries may reflect ancient territories, and some have been associated archaeological features. Townland names and boundaries were first recorded in the 17th century and lay down the land divisions from this period. The development is located in the townland Garrans, or An Garrain in Gaelic, which translates as the Grove and may relate to the small areas of woodland within the townland.

13.6. Cultural Heritage Potential

13.6.1. Archaeological Potential

The site does not include any archaeological remains and none were recorded during field walking or archaeological testing. The potential for remains to exist within the site are not significant.

13.6.2. Architectural Heritage

The study area does not include any upstanding structures and is not adjacent to any structures listed in the Buildings of Ireland website. Jabla House is located 450m to the southwest and is the closest listed site. No impact on this structure is predicted during the construction or operational phase of the development.

13.6.3. Impact on the Cultural Heritage landscape

Pre Construction Measures

Archaeological testing has already been undertake at the site. No remains were identified within the site and no registered monuments are located in its vicinity. As a result there are no pre construction measures required.

Construction Impacts

Land improvements works have taken place at the site in the form of hedgerow removals and drainage works. Archaeological testing has been undertaken and no remains were identified. No registered monuments are located within the area. As a result the impact on the cultural heritage landscape is not significant.

Mitigation Strategies Construction

There are no further mitigation required at construction stage.

Operational Impact

No operational impacts are predicted upon the cultural heritage resource. The development will not be visible from any of the recorded archaeological monuments or listed architectural remains.

Mitigation

No mitigation strategies are required.

Visual Impacts

The proposed development is surrounded by mature hedgerows that will be maintained as part of the development. The Athlone railway green line forms the southern boundary of the site, this is delineated by mature trees and removes any visual impact of the development on the identified remains closest to the study area.

Residual Impacts

There will be no residual impacts on the cultural heritage resource as a result of this development proceeding as planned.

'Do Nothing' Scenario'

If the proposed development were not to proceed there would be a neutral impact on the cultural heritage resource as the works will, have no impact on the cultural heritage section.

13.7. References

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Chapter 13 Appendices:

Appendix 13-1 : Figures

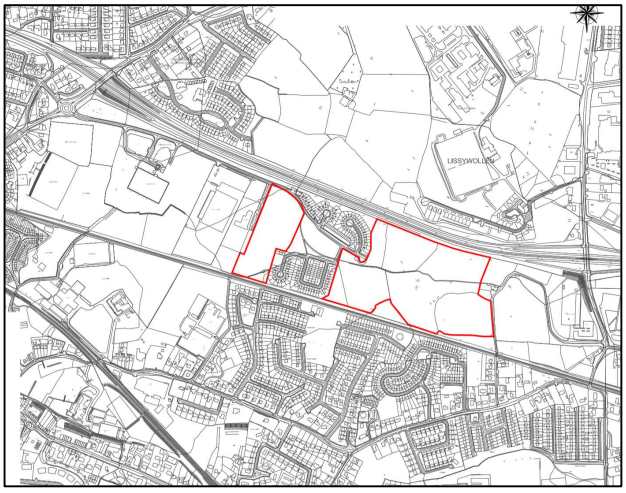

Figure 13.1 Location of the site

Figure 13.2: Study area and recorded archaeological sites

Figure 13.3: Downe survey extract for the area

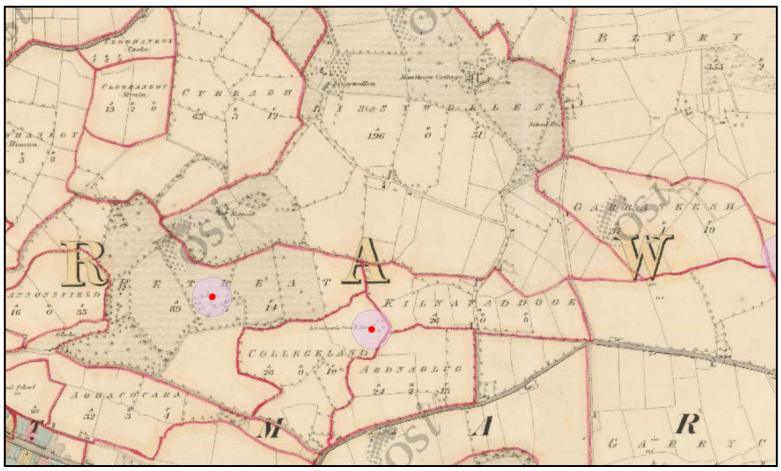

Figure 13.5: First edition OS map with the development marked

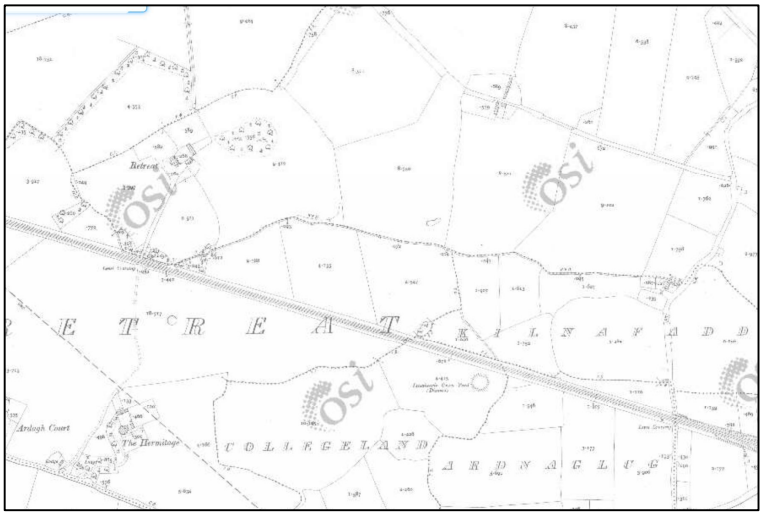

Figure 13.6: 25" map (1897-1913) with the location marked

Figure 13.7: Aerial Photograph for the site with the disturbed area marked

Figure 13.8: Location of the test trenches excavated in 2019

Appendix 13-2: Plates

Plate 1: Excavation of test trench 3, looking west

Plate 2: Excavation of test trench 4, looking west

Plate 3: Excavation of test trench 5, looking west

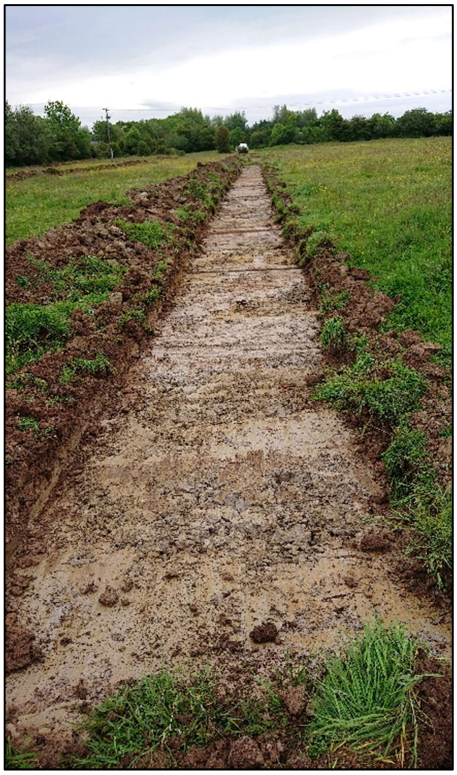

Plate 4: Excavation of test trench 5, looking east

Plate 5: Excavation at the site looking east

Plate 6: Modern disturbance at the site

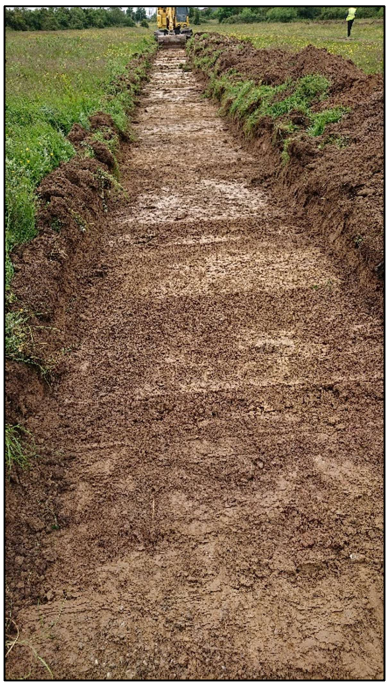

Plate 7: Excavation of test trench 11, looking west

Plate 8: Excavation of test trench 12, looking west

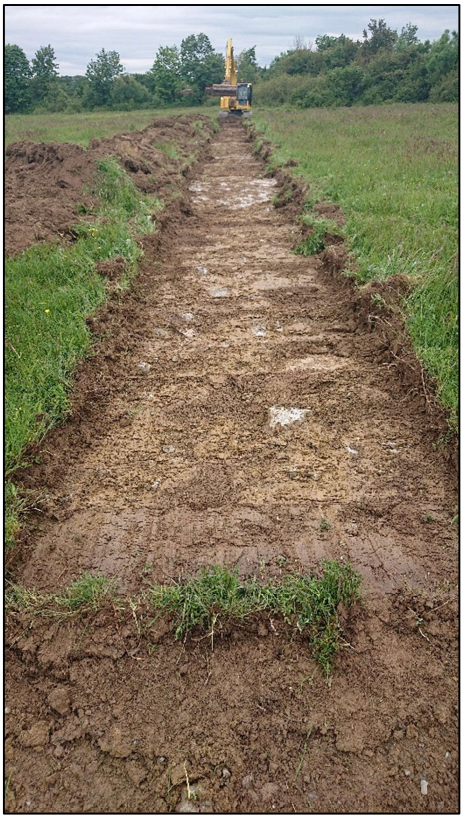

Plate 9: Excavation of test trench 13, looking west

Plate 10: Excavation of test trench 14, looking east

Plate 11: Excavation of test trench 16, looking north

Plate 12: Excavation works at the site

Plate 13: Modern disturbance at the west of the site

Plate 14: Disturbed area at the west

Fig 01 - Landscape Masterplan.

14.0. The Landscape

14.1 Introduction

This Landscape and Visual Impact Assessment (hereafter LVIA), prepared by Ronan MacDiarmada & Associates Ltd (hereafter RMDA), was informed by a desktop study, and a survey of the site and receiving environment in June 2020. The assessment is in accordance with the methodology prescribed in the Guidelines for Landscape and Visual Impact Assessment, 3rd edition, 2013 (GLVIA) published by the UK Landscape Institute and the Institute for Environmental Management and Assessment.

This report identifies and discusses the landscape and visual constraints effects in relation to the proposed development at Lissywollen South, Athlone, Co. Westmeath. RMDA has been commissioned by the applicant, Alanna Roadbridge Developments Ltd,. to prepare a Landscape and Visual Impact Assessment to accompany a Strategic Housing Development (SHD) planning application on a site measuring circa 17.64 hectares within the lands designated for the Lissywollen South Framework Plan 2018-2024 at Lissywollen, Athlone, County Westmeath. The site is bisected by the existing Brawny residential estate and bounded to the north by the N6, Athlone Relief Road, to the south by the Old Rail Trial Greenway, to the west by Scoil na gCeithre Máistrí and to the east by undeveloped lands, further east of which are the ESB Regional Headquarters.

This assessment should be read in conjunction with Chapter 3: Description of Project & Alternatives. Photomontages have been prepared for the scheme which are included in the separate A3 document "LVIA Viewpoints" prepared by RMDA, which should also be read in conjunction with this chapter. In addition, please also refer to section 14.7 and Fig.s 14.12 and 14.13 of this chapter for an assessment of the viewpoints..

Fig. 14.1 - Landscape Masterplan.

14.1.2 Statement of Authority

RMDA provides specialist landscape and visual services for projects from inception, through site/route selection, environmental impact assessment (EIA) and the planning process, to detailed design and construction. The company specialises in landscape character assessment (LCA) and landscape and visual impact assessment (LVIA) – for a wide variety of projects.

Ronan MacDiarmada is the chapter's main author, and Peter Lynch provided oversight and review. Ronan MacDiarmada, B.Agr. Sc. (Land. Hort.) is the director of Ronan MacDiarmada & Associates Ltd, and is graduate of University College Dublin. He is a qualified Landscape Architect and a Corporate Member of the Irish Landscape Institute. He has specialised in Landscape and Visual Assessment (LVIA) and has over twenty years' experience in a range of projects, from large scale strategic design, master planning and detailed design to LVIA and landscape planning, including Strategic Housing Developments throughout Ireland.

14.2 Methodology Used

Landscape and Visual Assessment Methodology: -

This assessment is based on the following guidelines:

- "Advice Notes on Current Practice in the preparation of Environmental Impact Statements", Environmental Protection Agency (2015)
- "Guidelines on the Information to the Contained in Environmental Impact Statements", Environmental Protection Agency (2002).
- "*Draft 2017 EPA Guidelines on Environmental Impact Assessment",* Environmental Protection
- Agency.
- "Advice Notes for Preparing Environmental Impact Statements" Draft (September 2015)
- *"Guidelines for Landscape and Visual Assessment"*, 3rd Ed., Landscape Institute and Institute of Environmental Management and Assessment, 2013.

The following Methodology was used in this assessment:

1. A desk top study of the proposed site and its environs, including reviewing aerial photography and ordinance survey documents.
2. A site survey was undertaken to determine the character of the landscape and the surrounding area, including site visits during the months of June 2019
3. An assessment of the proposed development was carried out by examining the layout plans, elevations, and sections to determine the impacts of the development.
4. An evaluation of these impacts was carried out in accordance with the criteria set out in the EPA guidelines.
5. A review of statutory planning and other documentation in order to ascertain the local and wider significance; and visiting the site and surrounding area during the winter of 2020 and preparing a photographic record of views and landscape features.

14.2.1 Definition of Landscape

Ireland is a signatory to the European Landscape Convention (ELC). The ELC defines landscape as *'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'*. This definition is important, as it defines that the landscape is not only a physical and visual amenity but provides for a range of functions. As a cultural resource, the interaction of man and landscape has formed the basis of much of our cultural heritage and values. The rhythms of the land as it was settled has informed what Lissywollen is today. The landscape provides opportunities for passive and active recreation. It contributes to the sense of place, as over time and place, various histories and interactions have formed a sense of place for the local populations. The landscape provides a historic record, it is also a resource for food production, sources of energy and in the natural cycle, oxygen, water. as the source for materials for living. In particular the landscape has the ability to renew itself.

14.2.2 Forces for Landscape Change

The landscape in Lissywollen is not unchanging. It has changed with the settlement pattern over the last several hundred years. It has progressed from wilderness to agriculture and settlement. The patterns of settlement have been driven primarily by economic need and the requirement to provide shelter and a food resource. In this frame, it has to be accepted that change shall occur and it requires finding an appropriate balance between economic, social and environmental forces and values. In this, the current/subject landscape proposals have focused on natural interventions, retention of hedgerows and trees, woodland planting and extensive tree planting, i.e. bringing nature into the urban realm so that the residents may have a sense of value and place in the location in which they reside. This shall encourage the growth of community in Lissywollen.

Climate change was also one of the factors, that informed this proposed design consideration, i.e. the need to mitigate and offset issues associated with urban development. In this, the approach to surface water run-off is integrated with landscape solutions in the SUDS requirements. It was considered very important to be able to manage the water and more extreme weather and rainfall patterns. The use of natural falls, existing ditches, woodland planting, extensive tree planting, have been adopted as part of this new landscape and is considered to be a positive visual impact upon the landscape and the environment.

14.2.3 Nature of Impacts

Impact on the landscape arising from development has two distinct but closely related aspects. The first impact is in the form of change to the character of the landscape that arises from the insertion of the proposed development into the existing context. The second aspect is the visual impact; which depends on the degree and nature of change in the visual environment. It is recognised that the combined impact on character and views will draw responses, the significance of which will be partly informed by an individual's subjective perception of how much the changes matter.

The assessment of landscape and visual impacts include:

- Direct impacts upon specific landscape elements and buildings within and adjacent to the site;
- Effects on the overall pattern of the landscape elements that give rise to the character of the site and its surroundings;
- Impacts upon any special features or interests in or around the site;
- Direct impacts of the scheme upon views in the landscape / townscape;
- Overall impact on townscape character and visual amenity.

In determining the Visual Impacts, the following definitions were used to assess the significance of the impacts:

14.2.4 Impact Significance Criteria

No Impact: There are no changes to views in the visual landscape.

Imperceptible Impact: An impact capable of measurement but without noticeable consequences.

Slight Impact: An impact which causes noticeable changes in the character of the environment without affecting its sensitivities.

Moderate Impact: An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends.

Significant Impact: An impact which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment.

Profound Impact: An impact which obliterates sensitive characteristics.

Terms used to describe quality of visual impact:

- **Neutral Impact:** A change which does not affect the quality of the landscape.
- **Positive Impact:** A change which improves the quality of the environment or landscape.
- **Negative Impact:** A change which reduces the quality of the environment or landscape.

14.2.5 Terms used to describe the Duration of visual impact:

▪ Momentary	Effects	Seconds to Minutes
▪ Brief	Effects	Less than a day
▪ Temporary	Effects	Less than a year
▪ Short-term	Effects	Lasting 1 to 7 years
▪ Medium-term	Effects	Lasting 7 to 15 years
▪ Long-term	Effects	Lasting 15 to 60 years
▪ Permanent	Effects	Lasting over 60 years
▪ Reversible	Effects	Effects that can be undone
▪ Frequency of	Effects	Describe how often the effect will occur

14.3 Receiving Environment

14.3.1 Description of the Receiving Environment

The Lissywollen lands (of which the current proposal forms part) comprises some 78 hectares of lands located east of Athlone Town. The lands are located between the N6 National Primary Route to the north, with existing suburban and other development to the south east and west, as well as the Old Rail Trail Greenway abutting the southern boundary of the subject site.

Fig. 14.2 - General Site Location and Study Area - Outlined in Red

Fig. 14.3 - General Site Location and Study Area Outlined in Red

To the west, is a leisure and amenity hub comprising Athlone Town Football Club's ground and Leisure Centre. Towards the centre of the lands is the existing Brawny housing development which is a well-established housing development. East of Brawny, the lands are made up of a number of fields bounded by hedgerows of varying condition. The boundary with the Old Rail Trail comprises good quality hedgerows on both sides of the trail. The eastern extents of the lands terminate at Garrycastle and the

proposed Lissywollen Avenue links to the existing road network at this location where an ESB depot and convenience store are located.

The subject development is bounded by an existing lane, known locally as Blackberry Lane. Lands east of Blackberry Lane are earmarked for other commercial and education uses in the Lissywollen South Framework Plan. A derelict house is also located on this lane (outside the current study area / application site).

The proposed development site is approximately 17.64 hectares, the subject lands were originally used for agricultural purposes. However, at present it is unkempt with the hedgerows encroaching onto the open spaces, rubbish and litter in the hedgerows, deposits of spoil and other material in the open spaces and horses roaming the area.

It is located adjacent to the existing Brawny residential estate, bounded to the north by the N6, Athlone Relief Road, to the south by the Old Rail Trial Greenway, to the west by Scoil na gCeithre Máistrí and to the east by undeveloped lands, further east of which are the ESB Regional Headquarters.

Athlone town is an area characterised by expanding developments on the banks of the River Shannon. Most of the town's development lies on the east bank of the river with a variety of amenities. There are many hotels, shops, public houses, sports facilities, and housing developments surrounding the subject lands.

There are several amenities in the area, Athlone Town Centre Golden Island Shopping Centre, Athlone IT, River Shannon, Athlone GAA Club, Athlone Town Football Club, golf courses, and Lough Ree. The town of Athlone is expanding to the east along the N6, Athlone Relief Road. The development is located close to the centre of the county 89km east of Galway City and 119km west of Dublin City.

Situated east of the Town Centre, the subject lands are relatively flat with the level of the lands between 42m and 45m OD above sea level. The lands in question are considerably screened from both the north and south by existing hedgerows and trees that are being retained.

14.3.2 Character Areas

The lands the subject of this assessment can be divided into a number of character areas as follows:

1. Lissywollen Village
2. Brawny existing residential development
3. Existing Agricultural Lands – east of Brawny
4. The Old Rail Trail

A number of images are provided below to show the nature of the existing / receiving environment both within and around the subject lands.

1. Lissywollen Village

This area comprises disturbed undeveloped lands located bounded by the existing football stadium to the west and the Brawny residential development to the east.

a. View east from the R915, the Leisure Centre is visible.

b. View south at junction of Brawny Road and the School Access Road

The view east from R915 is on the approach road, Brawney Road into the Brawney development. This development consists of approximately 160 no. dwellings.

Existing Housing on Brawny Road, the lands to the right will accommodate Lissywollen Village

View across the proposed lands, the lands are in non - use and as such deteriorating with materials being dumped on site.

Existing disturbed but undeveloped lands located west of the lands adjoining the Old Rail Trail

2. Brawny existing residential development

This area comprises the existing residential development known as Brawny which comprises relatively low density, residential development, mainly two storey houses with some three storey units at corners.

The Brawny development can be divided into two main areas i.e. the smaller area located to the south of the existing public open space which is bounded (but backs onto) the Old Rail Trail and that located to the north which is bounded by the N6 National Primary Route. The northern portion includes a creche/ community facility.

There is a considerable amount of litter and debris in the adjoining hedgerows.

	
Brawny Road looking west, note existing dwellings (right) and MUGA and public open space (left)	*Brawny (south) existing residential development is comprised mainly 2 storey dwellings with 3 store units at prominent corners*

3. Existing Agricultural Lands – east of Brawny

These lands comprise a number of smaller agricultural fields bounded by hedgerows of varying quality. These lands area accessed from Garrycastle (east) via an existing road and a laneway. An ESB depot is located nearby. The lands are bounded to the west by the Brawny residential development.

	
View from Garrycastle Roundabout west towards the lands.	*View from existing lane/ track*

View east from Brawny residential development

4. The Old Rail Trail

The Old Rail Trail abuts the southern boundary of the subject lands and is recognised as a significant local and regional amenity. Locally, it provides an amenity resource for existing Brawny residents and those in the wider vicinity, while also providing pedestrian / cycle access to Athlone Town and the various services and amenities therein. It has the capacity to contribute positively to the setting of the proposed development and in turn, the proposed development offers the opportunity for overlooking and passive surveillance of the Trail making it safer and more user friendly. The existing Brawny dwellings tend to turn their "backs" on the Trail and there is an opportunity to address this as part of the proposed development.

Along the interface with Area 2, the existing hedgerows are retained and make a positive contribution towards the quality of the Trail whereas within Area 3 rear garden walls are extant in the existing Brawny residential development. At Area 1, hedgerows have been removed and replaced with stud rail fence reflecting the disturbed nature of this area.

View east along Old Rail Trail from proposed Lissywollen Village. Note Brawny in middle ground

Access from Lissywollen to Athlone Community College and lands to the south

	
Old Rail Trail viewed to west from former railway overbridge at Garrycastle	*Typical view of Rail Trail with mature hedgerows where it interfaces with Area 3 – Existing Agricultural lands*

	
View of Area 3 generally from former railway overbridge at Garrycastle	*Blackberry lane where it terminates at the Old Rail Trail*

14.3.3 Policy Context of Receiving Environment

The following section outlines the policies and objectives from the Westmeath County Development Plan 2014-2020 (hereafter referred as the Plan) and the Athlone Town Development Plan 2014-2020 (hereafter ATDP) which relate to the site, including policies relating to the core strategy, landscape, views and prospects, and green infrastructure. The Plan includes policies relating to landscape character, protected views and general landscape policies, whereas the ATDP includes more specific policies including a Local Area Plan for the vicinity of the proposed development site, i.e. the Lissywollen South Framework Plan 2018-2024.

14.3.3.1 Westmeath County Development Plan 2014-2020.

The Plan includes a number of policies and objectives relating to landscape and natural heritage:

P-NH7: *To provide for the creation of a network of green infrastructure to serve the Gateway Towns of Athlone and Mullingar and their environs and to prepare Green Infrastructure Strategies for these areas, in conjunction with adjacent local authorities.*

P-TWH 1 : *To preserve and enhance the amenity and biodiversity value of the county, by promoting the protection of trees, groups of trees and woodlands, in particular native and broadleaf species. The felling of trees and the removal of hedgerows will be discouraged in new developments. A Management Plan will be required for all new developments to ensure that all trees to be retained on a site are adequately protected during development.*

P-TWH 3: *To discourage the felling of mature trees to facilitate development and to encourage tree surgery rather than tree felling, where possible.*

P-TWH 4: *To protect and preserve existing hedgerows in new developments and seek their replacement with new hedgerows with native species indigenous to the area, where their removal is necessary during the course of road works or other works.*

P-TWH 5: *To protect hedgerows in all new developments, particularly species rich roadside and townland boundary hedgerows*

Chapter 6 of the Plan contains a map of Landscape Character Areas, which divides Westmeath into 11 Landscape Character Areas (LCAs) The site and the eastern portion of Athlone is located within LCA 6 Lough Ree/Shannon Corridor. The LCA map is shown as Fig. 14.4:

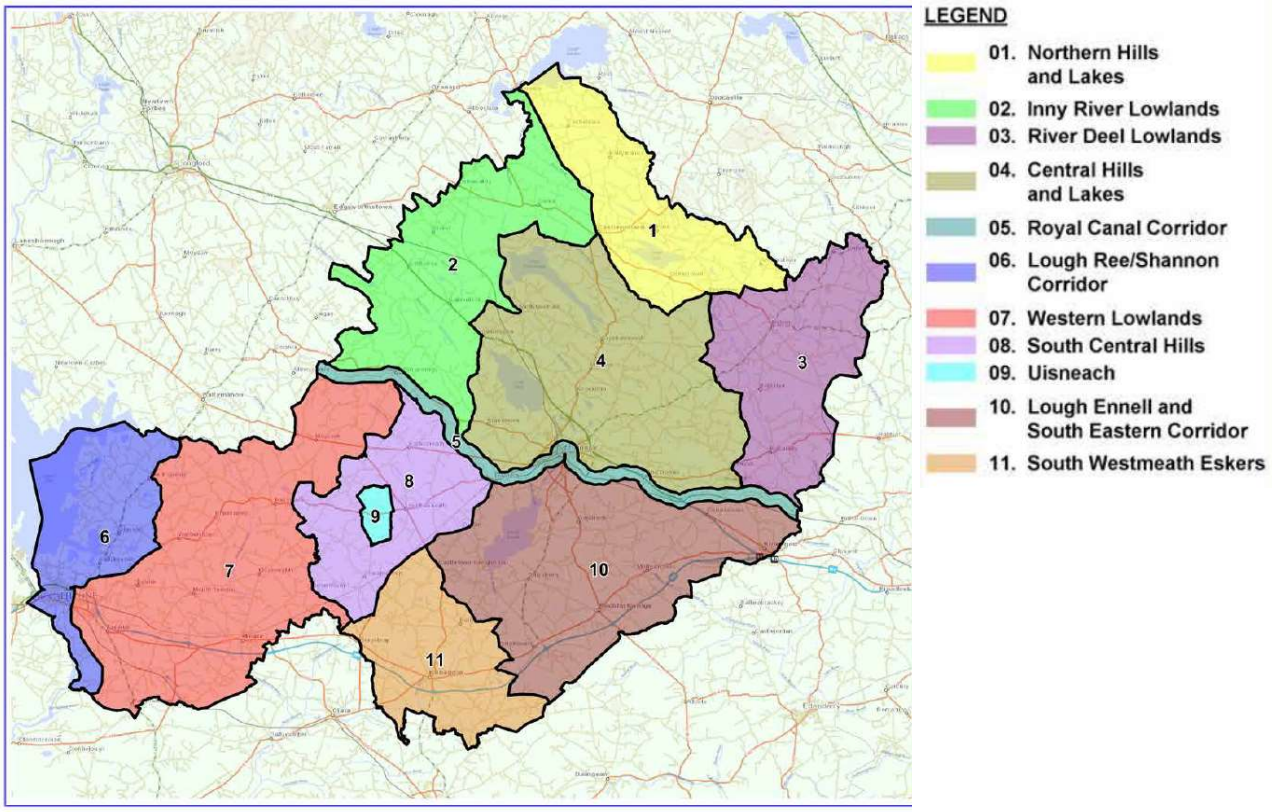

Fig. 14.4 - Landscape Character Assessment Map

The Character Area 6 is described as the area including Lough Ree, the Shannon corridor north and south of Athlone town and the associated Callows. The Plan notes that there are lakes and some villages to the east, with areas of pastureland scattered around the remainder of the area with small inland marshes, coniferous forestry and other agricultural uses. The Plan notes the importance of the Shannon and Lough Ree in terms of natural heritage, recreation and amenity value, and notes the development pressure around the lakeshore and floodplain and the associated risk of landscape deterioration. There is one Objective relating to this area regarding Lough Ree. To the east of the site, on the other side of the N55, lies LCA 7 Western Lowlands, characterised by eskers, lakes and bog, which also has similarity to the site's characteristics.

14.3.3.1.1 High Amenity Areas

The Plan designates areas of High Amenity in the County. The site is not within a High Amenity Area. The boundary of nearest High Amenity Area (Lough Ree) is located approximately 800 metres to the north of the site.

14.3.3.1.2 Protected Views

The County Development Plan includes a map of protected views, also listed in Appendix 7. While there are no views in the immediate vicinity of the site, the closest protected views to the site include the following:

- View of Lough Ree and Inner Loughs from Coosan Point and Local Road L-1478
- View of Lough Ree from the N55 and Local Road L-1459 overlooking the lake

These viewpoint locations are approximately 3.19 and 2.75 kilometres north and northwest of the site respectively and are unlikely to have any visibility of the proposed development.

14.3.3.1.3 Built Heritage

There are two number Protected Structures within the Plan area, however, they are outside of the proposed site area. The structures, namely Our Lady's Hermitage (Marist College,RPS 149 refers) is a building built around 1810 and extended around 1900, and is of regional importance and architectural, artistic and social interest. The other, a gateway to the Marist College is also listed; RPS No.226 refers and is of local importance.

There are no sites recorded on the Sites and Monuments Record (SMR) within the plan area

14.3.3.2 Athlone Town Development Plan 2014-2020

The Athlone TDP contains several Local Area Plans (LAP) to further guide the spatial development of the town. The site is located within the Lissywollen South Framework Plan 2018-2024 area, which establishes a framework that allocates land uses including residential uses (comprising low and medium density residential) as well as open space, community and commercial uses. There are 25ha of land zoned residential use in this LAP.

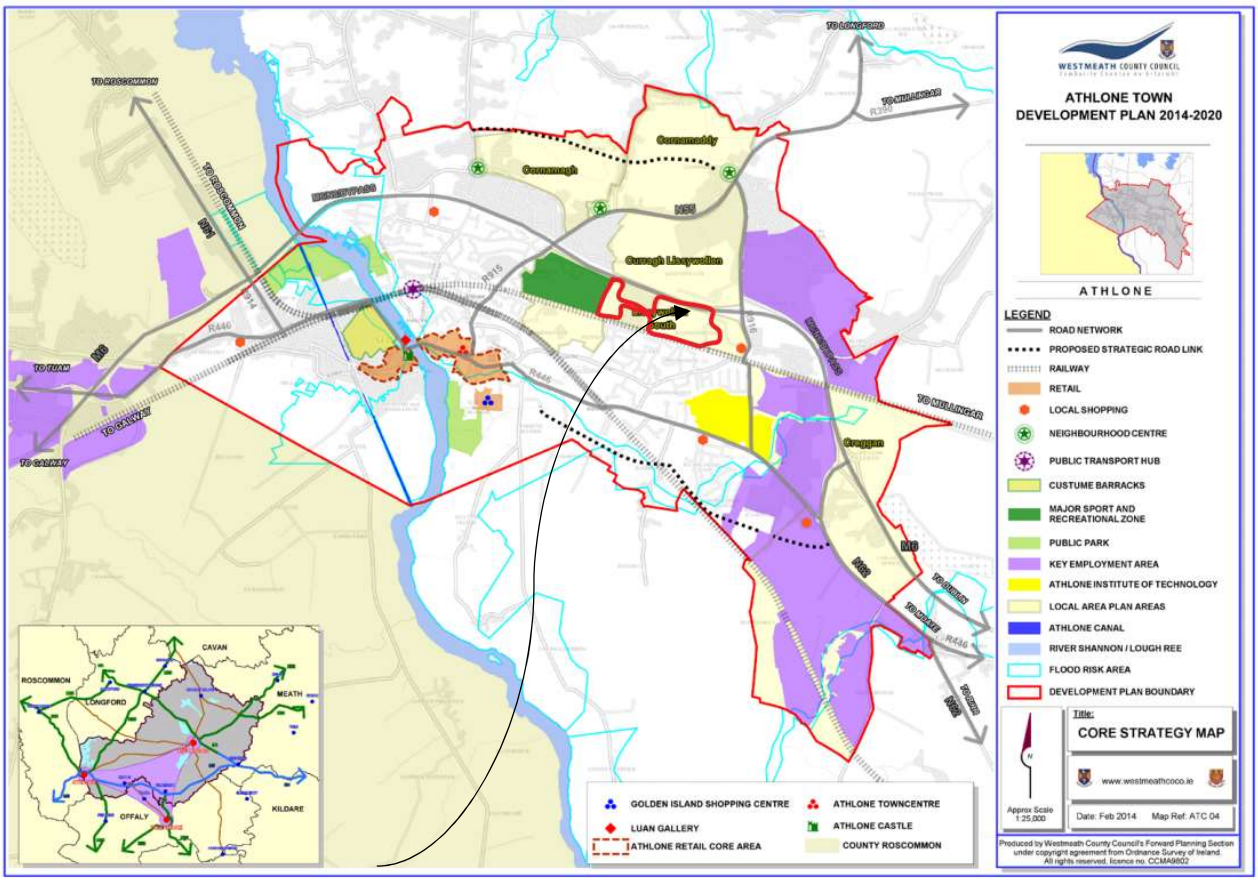

Fig. 14.5 – Core Strategy Map from Athlone Town Development Plan 2014-2020 – identifying Lissywollen South LAP lands – Site indicatively outlined in Red.

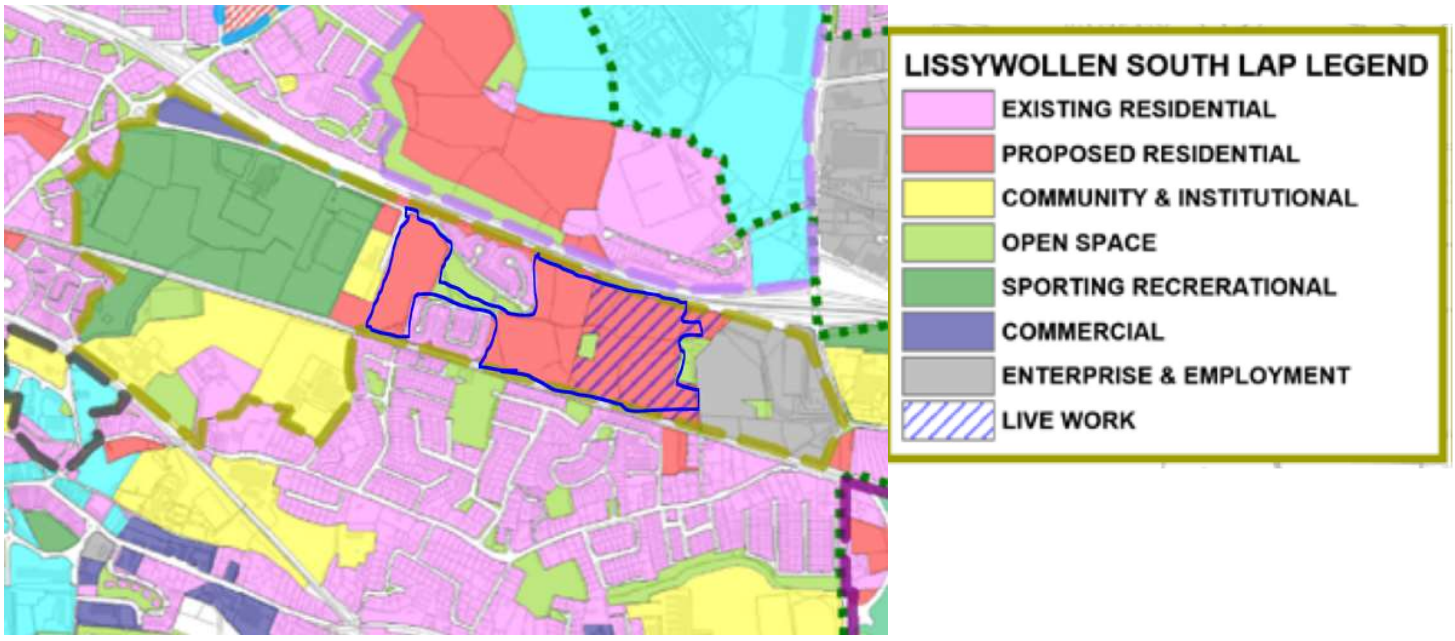

Fig. 14.6 – Site indicatively outlined, with LAP zoning

The site lies south of the N6, north-east of the town centre, and north of the Old Rail Trial Greenway . The site of the proposed development (shown indicatively in a red) is a greenfield site, and zoned for proposed residential and open spaces uses. This is shown in in Fig. 14.5.

Residential Development Policies and Objectives contained in the ATDP include the following:

P-SR6 *To ensure that new Greenfield residential estate development should be in accordance with the spatial framework established in the relevant Local Area Plan for the subject area.*

0-SR1: *To promote connectivity and linkages between open spaces and existing residential developments in the town.*

P-RLS3: *To require that appropriate provision is made for amenity and public open space as an integral part of new residential or extensions to existing developments*

The Athlone TDP contains a number of policies and objectives of interest. The Strategic Aims which are listed under the Core Strategy include the following:

(viii) *Protecting the town's natural assets by preserving the quality of the River Shannon and its callows, landscape, parks, open spaces and the architectural, archaeological and cultural heritage of Athlone.*

Chapter 10 of the Athlone Town Development Plan includes policies and objectives relating to Amenity, Open Space and Recreation, while Chapter 11 relates to Natural Heritage. The following policies are relevant:

P-AOR2: *To employ a strategic approach to the delivery of open space, recreation and amenity facilities, thus ensuring that existing and future residents and visitors to the town are appropriately provided for and that such amenities are accessible by all members of society.*

P-AOR10: *To integrate and link open space amenities within the town and to the surrounding countryside.*

P-AOR12: *To develop and facilitate the provision of public open spaces in accordance with standards described in the Sustainable Residential Development in Urban Areas –Guidelines for Planning Authorities 2009.*

P-NH17: *To promote the provision of green infrastructure in Athlone, in the form of linear parks, nature trails, wildlife corridors, and urban woodlands.*

0-NH1: *To ensure that existing biodiversity features such as watercourses, streams, hedgerows, trees, ecological corridors and linkages are incorporated appropriately into the design of new developments.*

P-TWH22 *To provide continuity of tree cover throughout the town, promoting the use of native species where possible, with varied species and age distribution.*

P-TWH4 *To preserve and enhance the amenity and biodiversity value of the town by preserving as far as possible trees, woodlands and hedgerows.*

0-TWH5: *To protect and preserve existing hedgerows in new developments particularly species rich roadside and townland boundary hedgerows and seek their replacement with new hedgerows with native species indigenous to the area, where their removal is necessary during the course of road works or other works.*

Below, shown in Fig. 14.7 is an illustration from the ATDP of open space in Athlone. This includes areas zoned for green space on the site of the proposed development

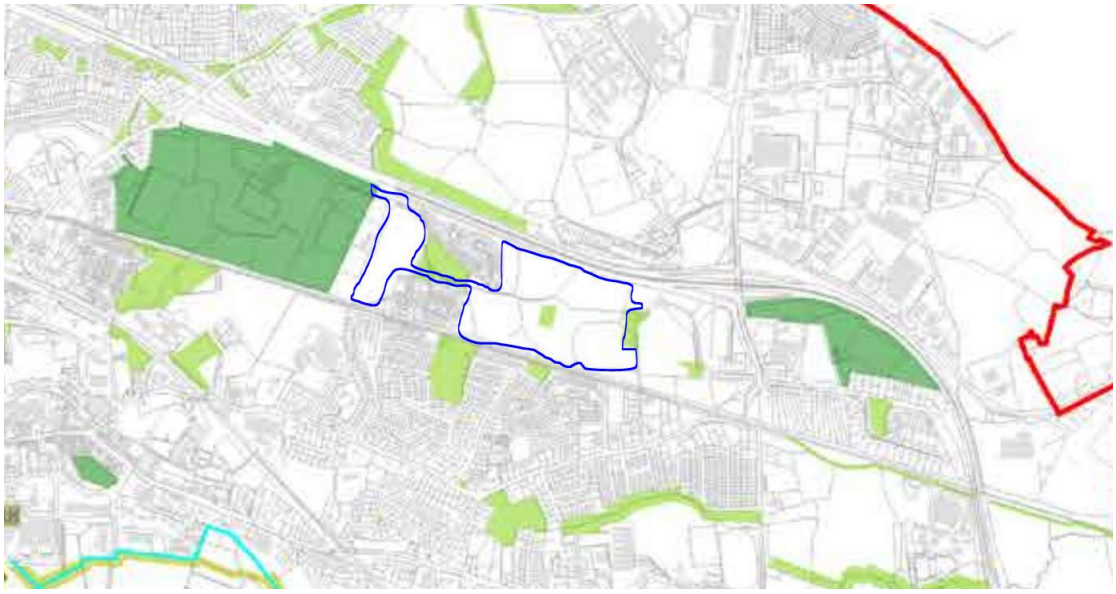

Fig. 14.7 – Open Space Map – extract from Athlone TDP – with overlay of blue line denoting approximate subject site outlined in blue

Chapter 12 Development Management contains policies and objectives relating to sustainable site design:

"The proposal should address how existing natural features of the site will inform sustainable urban design by exploring the potential for the integration of existing natural features of merit such as watercourses, mature planting and topography. Such an approach ensures that the landscape character of the area is maintained whilst also assisting biodiversity maintenance and more natural forms of surface water drainage.

Effectively, the layout of the proposed development will be informed by the inherent natural characteristics of the site. Connectivity between proposed open spaces and adjoining existing open space or natural features should also be considered in the site design".

Chapter 12 Development Management includes the following in relation to landscape:

"Trees and shrubs help blend new houses and buildings into the landscape and enhance the amenity, aesthetic quality and wildlife value of a development. Where possible, existing trees and fences/ hedgerows should be preserved and incorporated into the design. Detailed proposals providing for a mix of both hard and soft landscaped areas should form part of the development application. In the interests of sustainable development, existing trees or hedgerows should be retained. Additional planting should be selected from native species. Applicants may refer to Council Publications in this regard".

14.3.3.2.1 Protected Views

Section 121.2 of the ATDP notes that the Planning Authority will generally require Visual Impact Assessments (VIAs) to be completed to illustrate the visual impact of proposals likely to have an impact on protected views.

The ATDP identifies a number of protected views within Athlone, with the majority being located along the River Shannon close to the town centre. The only view close to the site is located c. 700 metres south of the site, along the R446 at Bonavalley, and on the map is indicated as in the direction towards the town's skyline and not towards the proposed development. This is illustrated on the Natural Heritage Map, but the view is not described in the Plan.

14.3.3.2.2 Implications of Development Plan Policy

The Plan policy identifies a number of policies which should be considered as part of this Assessment. These include:

- The site is within the Athlone Town boundary, located close to the eastern boundary.
- The site is zoned for residential development - low to medium and medium density - in the Lissywollen South LAP as part of the Athlone TDP.
- The LAP also indicates areas on the site zoned for open space, with an objective to deliver the Lissywollen Avenue east -west road through the lands.
- A number of policies and objectives relate to the retention of trees and hedgerows, and the provision of watercourses and streams on development sites where possible.
- The provision of linked open spaces is also encouraged, within the town and to the surrounding countryside, as well as between open spaces and existing residential areas in the town.
- The nearest protected view in the ATDP is located c. 700 metres from the proposed development in the direction of the town but not in the direction of the proposed development Views and prospects in both the ATDP and County Development Plan are unlikely to be affected

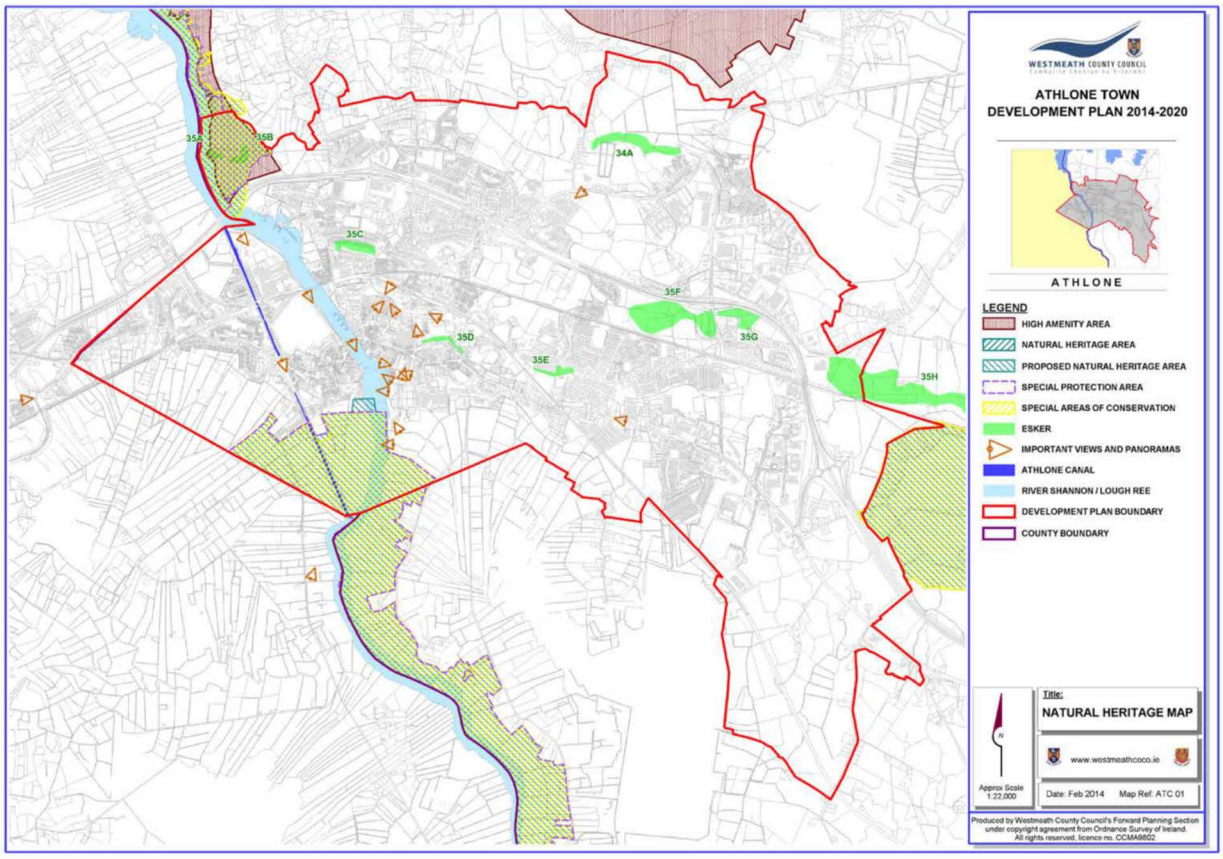

Fig. 14.8 – Natural Heritage Map of Lissywollen South LAP (Athlone Town Volume 2 Book of Maps)

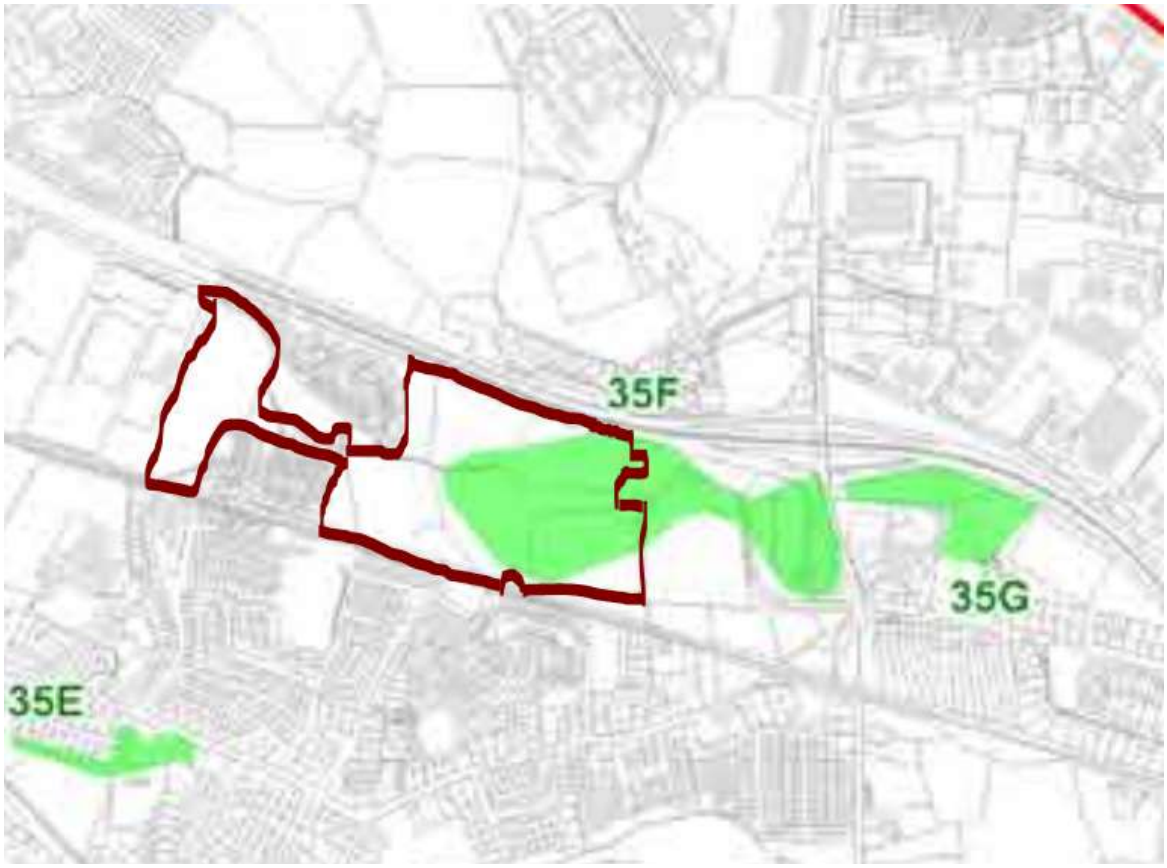

Fig. 14.9 - Indicative outline of Development showing location of Esker 35F

14.3.3.2.3 Eskers

There is an Esker located on the subject site: 35f "Kilnafadoge Low hills"

"The flat landscape is punctuated by esker ridges of sand and gravel which run east west across the countryside.

ESKERS

The relationship of the Shannon and the local esker system has contributed to and dictated Athlone's position and its development, and resulted in defining the town's character and distinctiveness. There are areas of undisturbed esker in the town that remain undeveloped, in part due to access constraints. The undisturbed eskers have facilitated flora growth and habitat creation that may not typically be found elsewhere in the town or county. The esker network in the town has amenity, heritage and cultural value".

Appendix 10 lists the esker systems worthy of protection in Athlone, and on the proposed development sit at Lissywollen, it is Esker 35F i.e. 35f "Kilnafadoge Low hills".

11.9 ESKER POLICY & OBJECTIVES

It is a policy of the Councils:

P-ESK1 *To protect and conserve the landscape, natural heritage and geodiversity value of esker systems in Athlone.*

It is a objective of the Councils:

O-ESK1 *To assess any proposals for development in proximity to esker sites with reference to the scientific amenity and landscape value and groundwater vulnerability of the esker landscape.*

O-ESK2 *To Increase pedestrian access to the eskers and opportunities to support local amenities and environmental education to maintain esker heritage.*

In 2005, Athlone Town Council undertook an esker survey of the town, in conjunction with Westmeath County Council which identified the nature, extent and condition of eskers and the conservation value of each of those esker systems. Athlone Town contains seven segments of an overall extensive esker system that runs from the River Shannon to Mount Temple and Moate. These esker segments offer spectacular views over the town and provide important reservoirs for esker biodiversity.

14.3.3.3 Lissywollen South Framework Plan 2018-2024

The Lissywollen South Framework Plan (hereafter LSFP) provides a development strategy for the proper planning and sustainable development of the Lissywollen South area in Athlone, in accordance with the policies and objectives of the Athlone Town Development Plan 2014-2020.The subject site is located within "Area 1 East end" and "Area 2 Brawny" of the LSFP, which describes these areas as follows:

Fig 14.10 – LSFP Map – showing indicative outline of proposed development in blue.

Area 1 East End – " *This area comprises approximately 30 ha and is characterised by a landscape typical of the rural countryside, with small, irregular and enclosed field patterns. The limits of the area are clearly defined by roads and the Old Rail Trail (formerly the disused Athlone – Mullingar rail line). There are notable remnant hedgerows and trees enclosing the fields. An old boreen provides access to a former residence in this area and links back to Retreat Road".*

Area 2 Brawny – " *This area comprises approximately 13 ha and is characterised by the existing residential development (approximately 160 units). There is a large area of unused open space between the Gaelscoil and Brawny development. The western flank of the open space area is defined by a recently constructed cycleway running along the perimeter, providing a strategic link to the Old Rail Trail Greenway. Neighbourhood facilities and social infrastructure to support this residential area are very limited. The landscape character of the area is largely non-descript and would benefit from significant improvement works".*

Section 3.5 **"Landscape and urban form"** of the LAP states that *"The landscape and urban form of Lissywollen South varies greatly from very large independent structures on generous plots (education and sporting buildings and facilities) to the tightly grained suburban style development of Brawny to the undeveloped rural landscape encompassing c. 30 that retains a network of mature field boundaries and natural landscape features. Map 2 contained within the attached Appendix highlights the Landscape & Urban Form structure within the Plan area, which is based upon the retention of key landscape features, provision of an open space network and greening of existing and new road infrastructure and open spaces, whilst promoting high quality innovative design led urban forms and layouts".*

Section 3.5.1 ***Retention of Key Landscape Features*** states: *"The ability to achieve a sense of place and character will at first be influenced by the integration of particular landscape elements such as tree groupings, hedgerows, contours and defined boundaries. Such elements will influence the overall layout of the plan area by positively responding to the receiving environment and capitalising on the mature landscape elements on the ground".*

The Landscape focus of this Framework Plan is contingent upon the retention and supplementing of key landscape features such as mature trees and hedgerows. The mature field boundaries to the eastern end of the Plan area add to the character of the area and should be incorporated into new development proposals. Existing trees and hedgerows adjoining the Old Rail Trail corridor visually enhance this important cycle link. However, in a number of places along the route, hedgerows have been removed and the resultant views are of unsightly backland areas. Accordingly, the existing Old Rail Trail Corridor should be supplemented with native trees and hedgerows.

"The future development of the Plan Area should, where feasible, incorporate and improve existing boundaries, trees and hedgerows, where reasonably practical and all proposals should seek to conserve and enhance natural habitats and ecosystems in an effort to protect and improve biodiversity".

Section 3.5.2 Open Space Network of the LAP states that *"the retention of existing landscape features will provide the context for the creation of an open space network across the plan area. Successful urban landscapes have a network of interconnected open and green spaces that not only respect and respond to natural features, but are accessible, serving the needs of children, the elderly and mobility impaired. All access routes and public open spaces shall be adequately overlooked".*

Section 3.5.3 Greening of new & existing Roads states that *"the existing Brawny Road currently acts a distributor road and lacks character. The plan provides that this road shall function as an urban avenue and accordingly should be suitably landscaped to visually enhance this important route".*

Section 3.5.5 Landscape & Urban Form Objectives sets out the following objective:

"Objective Ref: O-LUF1 To protect and supplement existing landscape features of amenity and biodiversity value such as established field boundaries, significant hedgerows and stands of trees, and to incorporate same into the new urban structure.

Section 4 of the Lissywollen South LAP sets out the site framework strategies for each of the of the residentially zoned development parcels within the Plan. The subject site includes Parcels 1-3 of same.

Parcel 1 is on the western part of the subject site, and is characterised by a largely non-descript tract of open space that is bounded by a 3metre wide cycleway to the west and the Old Rail Trail Greenway (NCN) to the south. The LSFP's guiding principle for this Parcel 1 is that *"The layout and landscape design of Parcel 1 shall reinforce a sense of place and present a clearly defined urban edge along the Old Rail Trail and the existing pedestrian/cycle link along the western boundary as well as the Brawny Road to the north".*

Parcel 2 forms the majority of the application site, and represents the largest undeveloped land bank in the plan area (11.65ha). It is characterised by a network of enclosed fields with notable hedgerows and trees. Access to these lands is currently limited to an old narrow boreen that loops from the Retreat Road to the R916 via new roundabout spur off the R916 in Garrankesh (between Garrycastle Stores and the ESB building). One of the guiding principles for development in this parcel is *"to create a central east-west avenue/urban boulevard, Lissywollen Avenue, in the form of a Main Street or boulevard linking the Brawny scheme to the R916. The route shall be dictated by the existing landscape character to provide a distinctive urban form with landmarks and vistas to provide ease of orientation".*

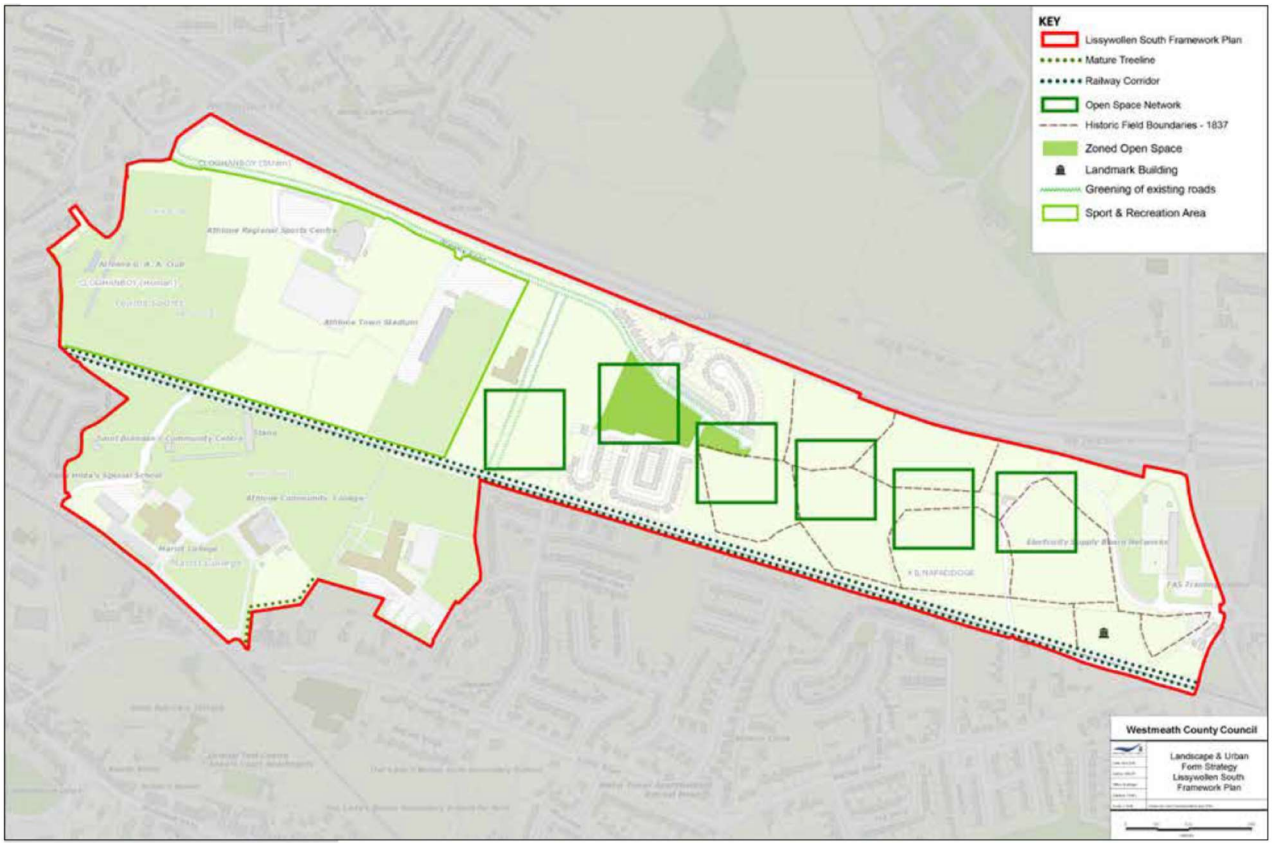

Fig. 14.11 – Map 2 of the Lissywollen South Framework Plan: Landscape and Urban Form Strategy, showing the Open Space Network.

Parcel 3 is also included in the subject application site and comprises of the northernmost section of residential zoned lands and lies between the Brawny housing development to the west and Enterprise and Employment lands to the immediate east. Parcel 3 extends to 4.3ha in area. One of the guiding principles for Parcel 3 is *"The treatment of the northern boundary is thereby critical to ensure that residential amenity of future residents is protected and to ensure that all new development at this location presents an attractive and visually pleasing urban edge. In this regard, a landscaped buffer, utilising indigenous native planting, shall be created along the entirety of the northern boundary".*

14.4 Summary of Landscape Characteristics and Values

14.4.1 Landscape Values

The GLVIA Guidelines sets out the methodology for assigning landscape sensitivity. This is based on combining judgements on landscape value, and landscape susceptibility.

Landscape values are derived from both indications of value as seen in national and local policy, as well as other indications that a landscape or landscape element, is valued. The ATDP has designated the site for low and low-medium density residential along with open spaces. There is also an objective for an east-west road running through the lands. The site is not covered by any landscape designations.

In addition to formal designations at international, nation and local level, the GLVIA refers to criteria which can help to describe landscape values in landscapes that are not covered by designations. These include the following:

Landscape Quality/Condition: The quality of the landscape and the condition of individual elements is considered to be good. The tree survey indicates the majority of the hedgerows on site are of moderate quality, typical native hedgerows. Along the greenway, they have extended beyond the original line and are suckering and encroaching into the site as pioneer woodland. There are a number of mature trees located within existing hedgerows, There are groups of trees that have encroaching from the existing hedgerows due to inactivity on the site. These are pioneer trees, and shall gradually take over the open space due to the stoppage of agricultural activity on the lands.

Cultural Heritage/Conservation value: The townland boundary on the site, delineated by a mature tree line and a stone wall, can be considered an element of cultural heritage. There are no sites recorded on the Sites and Monuments Record (SMR) within the plan area. Two recorded monuments lie outside the plan area south of the disused railway line (WM-029-22 Enclosure at Retreat, WM-029-23 Graveyard at Collegeland). There is an esker, Esker 35F "Kilnafadoge Low hills, considered worthy of conservation and appear in the ATDP. It has been compromised by construction of a training centre and bisected by the R916 and cut off from its hinterland by the N6.

Aesthetic/Scenic Quality: The site has mature hedgerows and tree lines and semi natural grassland which give a pleasant open visual quality to the site. However, the site and context is not considered to have an overall high quality of visual amenity.

Perceptual aspects: A landscape may be valued for its perceptual qualities, such as wildness or tranquillity. The site is an area of pastureland adjacent to a built up area with no particular perceptual aspects, and while pleasant and pastoral in sections, without a sense of wildness or tranquillity.

Public Accessibility and Recreation Value: The site is in private ownership and not publicly accessible. These values can further be categorised in two ways – values which should be conserved, and those that provide opportunity for enhancement. It is proposed to reinforce and manage the existing inventory of natural habitats , i.e. hedgerows.

14.4.2 Conservation Values

The conservation values indicate those aspects of the receiving environment which are sensitive and could be negatively impacted on by the proposed development. These values form the potential landscape and visual constraints to the proposed development. These include:

- Relatively open, undulating character.
- Trees and hedgerows contribute to the character of the site and shall be retained where possible.

The Greenway to the south shall be made accessible, with path and piers announcing formal access to the greenway. The existing vegetation shall be managed – i.e. cut back to make the green way accessible and safe for residential use.

Calcareous grassland on site shall be retained and augmented with the introduction of wild meadow and wild flower mixes suitable for the existing soil type.

14.4.3 Enhancement Values

The enhancement values reflect change that is occurring in the landscape and its inherent robustness. These include:

- The land is zoned for development and there is an opportunity to create a positive frontage onto the Old Rail Trail Greenway as well as a positive interface with the surrounding built up areas;

- Improve boundary treatment – the western boundary, in some cases, consists of block walls, which shall be absorbed into the overall proposed development. The boundaries to the Greenway and the N6 shall be improved with additional planting and habitat renewal;

- The street hierarchy shall be of a high quality leading to greater sense of place and to a greater sense of well-being. This shall influence the adjoining housing developments;

- Opportunity to increase permeability with adjacent built up areas. The proposed circulation has been devised to provide access throughout the development and into adjoining access points, greenways and public paths and roads. The access to the green way is well organised and many of the paths are located within open space areas leading to greater recreational use and permeability;

- Opportunity to provide ecological enhancement with any new development. This shall include the planting of a large number of trees, far in excess of the existing number on site. The retention and augmentation of existing hedgerows, and the hedgerows shall be managed to ensure that they shall survive into the future;

- The open spaces shall be developed with habitat renewal to the fore, it is proposed to retain the grassland native to the location. This shall be augmented by wild meadow grasses and wild flower mixes. Bulb planting to aid pollination is also proposed.

14.5 Characteristics of the Proposed Development

The development proposal consists of the construction of a residential development of 576 no. dwellings, a community hub and 2 no. crèches.

Access to the subject site will be from the Ballymahon roundabout (on the R915) to the west and the Garrycastle roundabout (on the R916) to the east. The development proposal includes for road development works from Ballymahon roundabout (on the R915) to the west via and Garrycastle roundabout (on the R916) to the east, and the development of an east-west access route through the subject site as envisaged by the Lissywollen South Framework Plan 2018-2024. The proposed development also provides for pedestrian and cyclist connectivity to Old Rail Trail Greenway to the south.

It is intended that the site shall retain many of the existing native trees and hedgerows. Upon completion of the development, there shall be a very high standard of landscaping, with tree planting and paving that shall characterise the external open spaces and shall feature a high standard of landscape development. The open spaces shall contain, green areas, paths, public plazas, and extensive tree, shrub, wildflower and bulb planting.

Many of the proposed species will be pollinator friendly in order to create biodiversity within the scheme. The range of plants have been taken from the All Ireland Pollinator Plan 2015 – 2020.

Although the existing green fields and some internal vegetation shall be removed in the construction of the development, much of the character of the site at present shall be retained with the retention of the key internal hedgerows, that shall be protected and kept in order to add to the appearance of the development.

The soft landscape proposals shall compliment the development aesthetically and functionally and shall tie in with the existing and surrounding landscape. The proposed and existing trees, hedges and shrubs shall sit the development into the landscape and provide a large element of screening. It is intended to tie in with and assimilate the development into the local landscape befitting of its suburban background, as follows:

1. To retain and augment existing vegetation with planting suitable to the local & new proposed environment;

2. To create new landscape features that will complement and enhance the Landscape;

3. To provide a new landscape feature in the form of a development that will significantly enhance and retain the character of the area.

14.6 Analysis

14.6.1 Likely Significant Impacts and Associated Mitigation Measures

14.6.1.1 Potential Visual Impact

The proposed development respects the natural attributes of the site, retaining the existing hedgerows, notably the hedgerows surrounding the site. This hedgerow shall form an important visual barrier to the surrounding roads, so the development sits into the landscape.

The existing trees and hedgerows shall be retained to the boundaries as much as possible. Any hedgerows being removed are to facilitate both roads and residential units but the loss of these will be offset with native hedgerow species, a range of semi mature trees and whips across the site in the open spaces.

In terms of development, this proposal respects the natural hedgerows and trees and provides a Positive impact to the area.

There shall be 576 no. dwellings, a community hub and 2 no. crèches within the landscape scheme, both hard and soft, accompanying them to provide a highly developed and coherent design.

The proposed buildings and planting shall be clearly identified and developed in an organised manner.

The potential visual impact shall be negative in the short term and shall change to neutral / positive development for the long term, as the newly designed landscape matures and assimilates with eh receiving environs.

The development shall therefore be a maturing site, becoming increasingly knitted to the fabric of the landscape in this area, which in isolation has a suburban feel but increasingly urban to the west.

The retention of existing hedgerows and the planting of trees and shrubs shall mitigate the impact of the buildings providing an organised and well-developed scheme in the landscape.

The planting shall provide visual relief and add to the amenity of the current landscape. It shall have a negative impact in the short term on the surrounding landscape.

However, as the development matures over a significant period, the upgrade and improvement of the external spaces shall have a positive impact on the landscape and reduce the visual impact upon the rural feel of the location.

14.6.1.2 Visual Impacts due to introduction of new structures & buildings

The introduction of the proposed buildings shall be the vertical elements of the proposal. However, existing trees and hedgerows shall reduce the visual impact as it has established vertical elements, i.e. trees. The main visual impact shall be the mass of the proposed structures.

The new structures and associated works will reduce the amount of current open space and remove several trees and hedgerows internally.

The proposed development will require little regrading of the site, which will generate limited impacts to the existing topography. In the short term and long term, the visual impact of the development will be moderate, due to the level topography of the site and the proposed extensive landscape development, utilising existing vegetation and proposed new trees and planting.

14.6.1.3 Visual Impacts due to access road

The internal roads are deliberately designed so that straights and bends are incorporated into them to reduce a visual line to the uses and shall have tree planting either side in order to provide a comfortable human scale to the development.

Internally there shall be one main link road for vehicle access and internally, a series of secondary and tertiary roads to access the dwellings/units and carparking – these shall be heavily planted with semi mature trees and hedges, reducing the impact of the road on the environment. Pedestrian footpaths are offset from the kerb lines where possible to create a planted green verge and become more pedestrian friendly. A palette of different surface materials will also be used to vary the experiences within the development.

14.6.1.4 Visual impacts due to telecommunications/power lines

On this site, the development shall be served from existing services, telecommunications, and power lines. The services on site shall be underground. The opportunity to organise and reduce the telecommunication and services shall be utilised to reduce the visual impact, if any of the development.

14.6.1.5 Visual Impact of lighting

The lighting of the new development shall be limited and shall be typical of a similar scheme with roads, footpaths, carparking and the main open spaces lit up by the overspill of street lighting.

Internally the roads shall be lit by individual columns, which shall visually change the character of the landscape. Therefore, the impact of lighting on the existing landscape shall be moderate in the medium term. Negative for the short term and shall become neutral in the medium to long term.

14.6.1.6 Visual Impact of Landscaping Proposals

The landscape proposals shall consist of retention of much of the existing planting, new planting of a variety of tree species, including native trees, being introduced along with shrubs in specified areas. These proposals shall enhance the landscape character of the development. The site will change from an agricultural use to a completed residential development with an associated landscape scheme.

The landscape scheme shall impact on the development in a positive way, working with the landscape through the use of and retention of trees and hedging to create an environment maintaining desirable aspects of the existing landscape and accentuating them through introduction of new elements.

Where existing hedgerows are removed to accommodate the roads and units, new native planting shall be planted to establish a new hedgerow. The development of an augmented hedgerow on the northern boundary will create a stronger visual barrier to the N6 and also add the biodiversity of the scheme while creating an interesting linear open space.

There shall be an increase in the species and varieties of plants, notably trees on the existing landscape which was primarily a monoculture of grass.

The landscape proposals shall include for a range of pollinator plants, trees, hedges, and shrub planting. The flowering of these plants shall enable bees to flourish but also increase the texture and colour in the landscape. This shall be a positive and long-term visual impact.

14.6.2 Potential Impact of the Proposed Development

The potential effects of the proposed development relate to the potential effects without the consideration of mitigation or proposed landscape works. This enables recognition of potential, rather than actual, effects which facilitates the identification of suitable landscape mitigation measures.

The visual impacts of the proposed development on the landscape are considered in the context of the construction and operational stages. Generally, the development shall reduce the amount of green space, replacing it with the proposed residential units, community hub, crèches, roads and parking. Notably the removal of existing hedgerows shall provide the greatest initial impact. This shall be moderate in the short term, with large lengths being retained, on the boundaries north and south of the proposed development.

The main visual change shall be the height and extent of the proposed buildings and associated works to the landscape. The redesign and organisation of the buildings and open space shall ameliorate the impact of this development and of this decrease in spatial area. This shall be aided through provision of extensive mature tree planting, native hedge planting and mounding. The hedge and tree planting shall sit the buildings into the landscape as per the proposed landscape design.

The lines and the height of the buildings shall be reduced through the retention of existing trees and hedgerows, the proposed use of more soft landscape materials shall further reduce the impact of the development.

Mature trees and shrub planting shall give an immediate effect tying in with the surrounding landscape. The impact of the landscape intervention on the existing development shall be positive and long term, the impact on the suburban nature of the surrounding landscape shall be moderate in the long term.

At the construction phase, potential landscape and visual effects will result as the site changes from an area of open agricultural fields, to a construction site of considerable size. While this is expected to be carried out in four main phases, will last approximately 3.5 – 5 years.

Potential landscape effects include vegetation removal, earthworks, and a change in character. These effects will include permanent negative effects, where vegetation is removed, and the land is re-graded, and short term effects such as the activities of machinery, noise and dust in the landscape. Construction phase visual effects include potential negative effects on the nearby visual receptors as a result of the vegetation removal, earthworks and machinery. These visual effects will be most pronounced in the immediate vicinity of the site, where there are several residential areas. The effects will be short term in duration.

Potential landscape effects during the operational phase are a result of the change in character of the areas from open agricultural fields on the edge of the urban area, to a built up residential area with areas of open space, with a new road running east west through the site. This will cause relatively localised negative effects on the character of the landscape. Visual effects during the operational phase have the potential to be less intrusive than the operational phase. These effects are likely to be localised.

The overall impact with the existing housing estates and encroaching areas of Athlone shall be slight to moderate in the short term and slight in the long term.

14.6.3 Potential Cumulative Impacts

Cumulative effects are considered as those effects which result from additional changes caused by the proposed development in conjunction with other similar developments. The list of projects considered in the cumulative assessment is included in Chapter 3 of this EIAR.

There are a number of permitted housing developments within approximately 600 metres of the site of the proposed development. As the proposed timescale is not known it is only proposed to assess operational phase effects (that is, when the proposed development and other developments have been completed). There are no permitted developments immediately adjacent to the site.

During the construction stages, traffic movement, excavation operations and construction works will have a slight impact on the site. There may be some moderate - significant visual impacts during the construction stage.

Existing agricultural lands form the groundcover over a portion of the site with native hedges and trees providing screening and boundary treatment. These lands at present are not functioning as agricultural use and as such are becoming as wasteland, with litter, dumped materials in the hedgerows, unkempt hedgerows and deposits of material on the land.

The removal of the existing agricultural lands will be necessary for the development to commence. Large lengths of the native hedge and tree lines within the development are to be retained with some removed to accommodate both roads and residential units.

Although the portion of 'Green' land will be reduced, no loss of botanical significance shall be incurred, however, the native hedge line and some mature trees shall be removed as per the arborist and ecological reports. The visual impact upon the area shall be moderate to the short to medium term.

14.6.4 Operational Phase Cumulative Landscape Effects

The cumulative landscape effects of the development may result in Slight to Moderate, adverse effects on the wider landscape in Lissywollen and Brawny, as more areas in the vicinity change from open fields to built-up areas, with potential loss of landscape elements such as vegetation and hedgerows which define the field patterns. Loss of landscape features such as areas of calcareous grassland is also possible. However, the grassland shall be preserved within open space areas and allowed to be retained rather than at present subject to neglect.

The ATDP has zoning objectives for several areas to the east, west and north of the site, with existing residential development at Brawny abutting the proposed development, and a new east-west link road "Lissywollen Avenue" proposed as part of the subject development. Therefore, the Plan clearly envisages residential areas of considerable size on the subject lands. The development of the site is consistent with the ATDP and LSFP zoning. The cumulative effects of the development of the entire LSFP lands with the proposed development would depend on the nature, scale and design of those developments to the east. However, the potential cumulative landscape effects of the proposed development, in conjunction with the development of lands within the LSFP area, may have a moderate effect on the landscape in the immediate vicinity of the site.

14.6.5 Operational Phase Cumulative Visual Effects

Based on the Viewpoints 1, 5, 7, and 11, it is not likely that any development would be visible in the aforementioned viewpoints.

A permission was granted for a residential development to the southwest of the site, along the Coosan Road, in the vicinity of Viewpoint 4, however, this is likely to have lapsed. Cumulative visual effects are therefore not likely in the immediate vicinity of the site, and further residential developments to the east at Cornamaddy may be visible from locations such as Viewpoint 9 but viewed in the other direction. Therefore, cumulative visual effects arising from the proposed development are considered to be imperceptible.

The extensive planting, retention of trees and hedgerows, particularly at the north and south of the development shall reduce the visual impact of the proposal. Combined with the existing developments that are already present to the south, internally – Brawny and the N6 to the north, with associated temporary housing and accommodation, the operational visual effect shall be moderate in the short term and neutral to positive in the long term

14.6.6 Do Nothing Impact

Should the development not proceed it is likely that the site would remain in its present state.

At present the site has been partially developed and is neither functioning as grass, agricultural or amenity. If the site remains undeveloped; the site in time shall become waste ground framed by the housing developments to the South and at Brawny. The function of agriculture has ceased some time ago due to the partial development of the lands, proximity of the town and surrounding developments.

If the site remains partially developed, the area becomes unmanaged and in particular, the existing roads would fall into disrepair as they are not maintained or used. Pioneer trees and scrub would begin to establish. Therefore, as development continues on all sides of the site, the agricultural function having ceased, being cut off from its' hinterland. The open space, undeveloped lands are ceasing to function as grassland and as such shall fall into disrepair and into waste ground. Visually and functionally the lands become unkempt and are limited in the range of amenity and use.

Therefore, were the site to remain vacant, it would probably attract anti-social behaviour resulting in generally negative environmental impacts

Fig 14.12 – Visual Receptors – Close to proposed Development Visual receptors 2,3,4,5,6,7,9,10 & 11

Fig 14.13 – Visual Receptors – Long range to the Development Visual receptors 1 & 11

14.7 Visual Selector Interaction

The 12 no. visual receptors have been assessed and presented to the design team. Seven internal receptor views have been also included. They represent the most significant and sensitive location points. RMDA in conjunction with the Architects & Planners at Delphi Design, and 3d Design Bureau provided locations for the visual receptors. They were based upon the sensitivity of the locations and typical criteria is listed on Table 1, below.

14.7.1 Sensitivity

A visual receptor is a human user of the landscape. The practice has adopted the principle that the sensitivity for each type of visual receptor is inherent to the nature of the activity they are undertaking rather than the view itself.

14.7.2 Photomontages

A collection of 12 no. photomontages have been prepared surrounding the site to fully illustrate the physical and visual nature of the proposed development. Please note the proposed photomontage photo location points were prepared by 3D Design Bureau & Delphi Design from publicly accessible viewpoints around the location of the subject lands and internal to the development.

Table 14.1: Visual Receptor Sensitivity

Sensitivity	Typical Criteria for Visual Receptors
High	Users of residential properties, public rights of way, named viewpoints and scenic roads or railways. Users of cultural heritage features including World Heritage Sites, Registered Parks and Gardens, Scheduled Monuments, Listed Buildings and Conservation Areas where they are known to be tourist destinations or places used by local communities.
Medium	Users of public rights of way (urban or industrial areas) play areas, sporting and outdoor active recreational facilities and rural roads.
Low	Users of office and employment areas, industrial areas and the main road and rail network.

View 1	
Existing View	View west from Garrycastle Roundabout towards the lands.
Proposed View	The image shows the extent and height of the proposed development from a distance. The image shows the visual impact the development shall have on the landscape. Dense vegetative screen on both sides of the road lends the street a particular character and minimize the development visibility.
Sensitivity	Low
Magnitude of Change	Low
Significance of Effects	Slight, Neutral

View 2	
Existing View	View west of lands
Proposed View	The image shows the tree lined approach to the proposed development in the background. Visual impact on the view from adjacent lands, mitigated by proposed planting to integrate into existing environs.
Sensitivity	High
Magnitude of Change	Medium
Significance of Effects	Significant change to the view

View 3	
Existing View	View west of site, from adjacent lands
Proposed View	The image shows proposed residential units at the east entrance to the site. Visual impact mitigated by integrating the proposal into the existing green infrastructure, retaining hedgerows where possible.
Sensitivity	High
Magnitude of Change	High
Significance of Effects	Very significant change to the view

View 4	
Existing View	View west of proposed development
Proposed View	The image shows proposed residential with screen planting to parking areas and defensive planting to building perimeter.
Sensitivity	High
Magnitude of Change	High
Significance of Effects	Moderate, positive

View 5	
Existing View	View west from N6 overpass
Proposed View	The image shows the proposed development screened by existing boundary planting buffer to N6
Sensitivity	Low
Magnitude of Change	Low
Significance of Effects	Negligible

View 6	
Existing View	View south across the N6
Proposed View	The image shows the proposed development screened by existing vegetative buffer to the N6, which is to be supplemented by an augmented hedgerow on the northern site boundary, creating a stronger visual barrier along the road.
Sensitivity	Low
Magnitude of Change	Low
Significance of Effects	Slight, Neutral

View 7	
Existing View	View south across the N6
Proposed View	The image shows the proposed development screened by existing vegetative buffer to the N6.
Sensitivity	Low
Magnitude of Change	Not visible
Significance of Effects	No effect

View 8	
Existing View	South-easterly view along Brawney Road
Proposed View	The image shows the proposed development at a scale that is harmonious with the existing infrastructure and neighbouring Athlone Town Football Club and leisure facilities.
Sensitivity	Low
Magnitude of Change	Medium
Significance of Effects	Slight, No significance to the character or quality of the view

View 9	
Existing View	View of existing housing on Brawny Road
Proposed View	The image shows the proposed Lissywollen Village development, a new landmark on the approach from the West.
Sensitivity	Medium
Magnitude of Change	Medium
Significance of Effects	Moderate, positive

View 10	
Existing View	View from the south west corner of the site
Proposed View	The image shows the Old Rail Trail from proposed Lissywollen Village. Proposed Open spaces and access points create a sensitive transition between the existing trail and the proposed development.
Sensitivity	High
Magnitude of Change	High
Significance of Effects	Significant, positive

View 11	
Existing View	View east along the Old Rail Trail
Proposed View	The image shows the proposed development outlined beyond the existing housing, without visually impacting this public amenity.
Sensitivity	High
Magnitude of Change	Not visible
Significance of Effects	No effect

View 12	
Existing View	View along the Old Rail Trail
Proposed View	The image shows the proposed development directly adjacent to the trail, with minimal oversight from the proposed housing units.
Sensitivity	High
Magnitude of Change	High
Significance of Effects	Significant

14.8 Avoidance Remedial and Mitigation Measures

14.8.1 Construction Phase

During the construction of the development, the area shall be changed from agricultural use lands to a residential development with a community hub and 2 no. crèches. The introduction of the built structures, roads, carparking and landscaped open spaces will be carried out while maintaining most of the existing hedges and trees of the site. During construction there will be a change to the landscape and there will be negative visual impacts for residents and visitors to the areas adjacent to the site associated with construction activity.

Tree protection shall be provided to retain the character of the existing trees and hedgerows.

The development shall be carried out in an organised basis, thus reducing the visual impact upon the environment; however, the impact on the initial area of construction shall be moderate to significant. The remedial measures proposed include the implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking, etc. Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site rubbish.

Site hoarding will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compound, and scaffolding visible during the construction phase are of a temporary to short term nature only and therefore it is expected that this will require no remedial action other than as already stated.

The retention of the hedgerows surrounding the site combined shall reduce the visual impact of the proposal during construction.

As the development increases and phasing continues, the improvement in terms of landscape elements, trees etc., growth shall reduce the visual impact and in the long term be positive, as other developments in the area grow.

The greatest impact shall be the views through the site as they will become determined by the existing landscape elements of trees and hedges. As these are being retained and augmented by the introduction of new trees and planting. The predicted impact during construction shall be moderate in the short term depending on the length of time on site.

14.8.2 Operational Phase

The mitigation measures, including measures taken during the design stage, which have evolved throughout the design process, that have been adopted in the proposed scheme and are detailed in the Landscape Plan, are as follows:

- The retention or replacement of some of the existing landscape structure of field boundaries, where possible, as well as boundary trees and an area of wet woodland to the north-west corner. A large, cohesive area of open space has been provided consistent with that set out in the LAP.

- The architectural layout aims to address visual impacts by proposing variety in scale, massing and elevational treatment of buildings and by creating positive frontage onto the proposed Lissywollen Avenue and the Old Rail Trail Greenway.

- The extensive planting of additional trees and shrubs throughout the site and on the site boundaries in keeping with the wider landscape character, will over time, reduce the visual mass of the buildings, soften the development over time from various viewpoints and assist in integrating the development into the landscape.

- Native and pollinator species (as per The All Ireland Pollinator Plan 2015 – 2020) planting for biodiversity has been incorporated into the scheme and this includes a native tree belt / woodland wetland area, wildflower meadows and semi natural grassland.

- It is proposed that the topsoil from the calcareous grassland to the south of the site is retained, stored appropriately and re-spread and allowed to recolonise naturally to form the semi-natural grassland and meadow areas denoted in the Landscape Plan. This is to retain the existing species on site.

- Several connected public open spaces have been designed as part of an overall design strategy that focuses on creating a distinctive ‘sense of place’ and individual character for the development area. The design of public open space that forms part of a network of spaces that includes areas for passive and active recreation, social / community interaction and play facilities catering for all ages. This area of open space corresponds to that as indicated in the LSFP.

- The hedgerows that are to be removed shall and reinstated with additional native tree planting and a replacement stone wall re-using existing stone will be provided.

- Connections to the Greenway to the south of the proposed development forms an integral part of the landscape proposals, with formal links and piers to announce the access points.

Application of best practice horticultural methods to ensure that mitigation measures establish and grow appropriately.

Landscape works are proposed to reduce and offset any adverse impacts generated due to the proposed development, where possible. The planting of substantial numbers of new trees and other planting in the open spaces the site boundaries and internal roads, both native and ornamental varieties, will enhance the overall appearance of the new development and compensate for the removal of hedgerows and trees where needed for the construction works, and increase the overall landscape capacity of the site to accommodate development.

14.9 Predicted Impact of the Proposed Development

14.9.1 Construction Phase

During the construction of the development, the area shall be changed from a field to a housing development. The introduction of the built structures, driveways boundaries and landscape will be carried out while maintaining the existing hedge and trees along the centre of the site. Tree protection measures shall be provided to retain the character of the existing trees and hedgerows.

The development shall be carried out in an organised basis, thus reducing the visual impact upon the environment; however, the impact on the initial area of construction shall be moderate to significant.

The retention of the hedgerows surrounding the site combined with maintaining of the most significant hedgerow in the centre of the site shall reduce the visual impact of the proposal during construction.

As the development increases and phasing continues, the improvement in terms of landscape elements, trees etc., growth shall reduce the visual impact and in the long term be positive, as other developments and Athlone town grows to meet this area.

The greatest impact shall be the views through the site as they will become determined by the existing landscape elements of residential units, walls, trees and hedges which will be augmented by the introduction of new trees and planting. The predicted impact during construction shall be moderate in the short term depending on the length of time on site.

14.9.2 Operational Phase

Initially, on completion of the development, the introduced shrubs will be at early stages of establishment and the trees shall be semi-mature at planting. As time progresses the plants and trees will grow and stabilise in their new environment creating better defined avenues and spaces.

The number and quality of landscape elements shall be an addition to the built environment of Lissywollen providing quality amenity for the residents.

The extensive development of the external spaces shall provide an improvement on the existing landscape. The ordered design shall be visually positive and long term. The visual impact on the

surrounding landscape shall be slight and moderate in the short term and with maturity of the trees, hedges and plants it shall be neutral to positive in the long term.

14.10 Monitoring

A Landscape Architect shall be appointed to oversee and monitor the project at construction and operational stage. They shall liaise with other project members in relation to any existing and proposed trees.

The landscape architect shall overview all hard and soft landscape works and liaise with resident engineer, project team and contractor. The landscape architect shall also inspect the trees; however, most of the monitoring works shall be during and post-civil construction stage. The landscape architect shall review and instruct on details of soft planting, trees, shrubs and of paving materials, walls and railings.
During the operational stage, the Landscape Architect and Arborist shall review the state of all planting and trees, The landscape architect shall review for period of 18 months, from practical completion of each stage the standard and quality of the materials and workmanship. A final certificate of completion shall be issued by the landscape architect in respect of this.

14.11 Interactions and Cumulative Impacts

Inter-relationships are the interaction / interrelations between the impacts and proposed mitigation for one discipline with another associated discipline.

14.11.1 Traffic

Traffic in the proposed development will have landscape and visual effects on properties in proximity to the proposed development. These effects were taken into account during the design process of the proposed development. Mitigation measures have been proposed, in the form of landscape planting, street trees, width of new streets and roads. The organised planting of street trees along roads and parking spaces, all provide a new environment and sense of place. The new traffic from the existing R916 Road to the east connecting to the Brawny Road through the development site provides the opportunity to propose an organised and varied design that shall provide a positive landscape and visual impact along the proposed roads and streets. This shall reduce the visual impact of Traffic.

14.11.2 Soils & Geology

The construction of the proposed development will involve excavation of existing soils, primarily soft in nature, with spoil material being placed in material deposition areas within the landtake. The development of the proposal, both horizontal and vertical, takes account of landscape and visual impacts on residential properties.

14.11.3 Hydrogeology

As a result of the redistribution of traffic, there is a risk to water quality through pollution and spillage accident risk. The construction phase of the project has the potential to impact on groundwater and habitats. Mitigation measures have been put in place to avoid and/or minimise these effects. During

the operational stage, sealed drainage systems will be used and stormwater drainage will be suitably treated prior to discharge. The SUDS (Sustainable Urban Drainage System) proposed will be a significant improvement over the traditional drainage regimes and with the distribution of the traffic onto the new roads is likely to result in an improvement during the operation stage for hydrogeology. The SUDS proposed aim to utilise a two-step intervention of surface water, cleaning and temporary storage, prior to release to the system.

14.11.4 Material Assets & Land – Property

Landscape and visual effects may impact on residential properties located near the proposed development. Likely landscape and visual effects will be most pronounced during the construction and initial operation stages, causing initial visual impacts, after which landscape mitigation measures will be increasingly effective in integrating the proposed development within the landscape and in reducing landscape and visual impacts on properties.

14.11.5 Biodiversity

The scheme has been developed to minimise the removal of existing hedgerows and trees in Lissywollen. Open spaces have been selected to retain the trees and hedgerows. However, some parts of hedgerows and scrub vegetation will be removed in the construction – generally for access roads .This shall have a negative effect on landscape quality visual amenity and biodiversity.

Landscape mitigation proposals have been developed to be complementary with the ecological requirements. These include planting of native, naturalised and indigenous species to augment existing hedgerows. The hierarchy of street tree planting shall help in reconnecting ecological networks resulting in a positive effect on biodiversity and a positive long term impact for Lissywollen.

14.11.6 Population & Human Health

Negative temporary visual impacts will arise for residents located close to or adjoining the construction boundary. A Construction Management Plan (CMP) shall be drawn prior to construction and implemented. Specific mitigation measures include the provision of hoarding around construction compounds during the construction phase for properties particularly impacted by the works.

During the operational phase, landscape and visual impacts will arise from the built physical presence of the roads and streets. Mitigation measures will include general measures such as retention of existing hedgerows and trees, the augmentation of existing hedgerows established throughout the development, and the planting of a range of trees and species. Landscape and visual mitigation measures have been utilised in the design of the proposed development to reduce impacts on property.

The impacts of the new development shall be offset by the further potential to enhance sustainable green links through the site and to surrounding employment and housing areas. The engagement with the natural landscape environment and renewed habitat areas are beneficial to the health and wellbeing of the local population. The facilitating of sustainable alternative transportation is positive for human health and aids in the forming of a sense of place in Lissywollen.

14.12 Difficulties Encountered in Compiling

Lissywollen is an open site with easy access to the site . There were no difficulties encountered on visiting the development area.

14.13 Conclusion

The visual impact of the development shall be negative at first, due to the reduction in open space and the removal of the some of the hedgerows. The visual impact of the proposed development shall be mitigated by the retention of most of the existing native hedgerows. The impacts, due to the removal of existing agricultural lands, reduction in open space and the removal of several internal trees and hedgerows shall be mitigated by the retained natural vegetation. However as Lissywollen provides more accommodation for future residents, the well-designed layout, which is sympathetic to the surrounding landscape and emerging settlement trends, shall become a positive visual impact.

The increase and coherent design of external spaces, shall replace the existing field systems. Direct access to the Greenway to the south, utilising the existing hedge line shall provide a positive visual amenity.

The retention of the existing native hedgerows and proposed planting shall tie the proposed development with the natural landscape.

Although the character of the environment shall change, it is in line with emerging patterns of development in Lissywollen and Athlone. The proposal is, however, sympathetic to the surrounding landscape and shall present a positive visual impact in the long term.

The increased tree cover shall also enhance and increase the biodiversity of the existing landscape and tie it in with the existing hedgerows and trees.

The duration of construction shall have a negative visual impact in the short term but as development increases in Athlone, Lissywollen, the emerging and existing trends shall view this development as positive in the long term, as the proposal is well designed and sympathetic to the natural landscape.

The proposed development retains elements of the existing rural character, hedgerows and trees ensuring a level of continuity / connectivity with the landscape. This enables a creation of local identity as it enshrines the retention of the main internal hedgerows, provides valuable amenity space and interacts with the Greenway to the south. The proposed connections create important pedestrian links to the open space, habitat areas of the original fields and to existing developments and circulation routes

The proposed development shall influence the surrounding land use, providing organised open space and a new urban environment that is sympathetic to the natural environment. This development shall be a large residential development to the existing urban fabric of Athlone, and in the long term have a positive impact upon the landscape and its usage.

The development shall provide a coherent ordering of buildings and external spaces and present a positive visual impact upon the existing development and shall not detract from the local landscape.

Therefore, the visual impact upon the nature of the landscape shall be moderate in the short term, with slight effects in the medium term. The overall proposed housing in the interaction with the surrounding developments shall result in a neutral visual impact in the medium term. As a new town emerges with associated landscape development, it shall form a positive visual impact in the long term.

14.14 References

- British Standard BS5837:2012 Trees in Relation to Design, Demolition and Construction. Recommendations.
- Landscape Institute and Institute of Environmental Management & Assessment (2013).
- Lissywollen South Framework Plan 2018-2024.
- Athlone Town Development Plan 2014-2020
- Athlone Town Development Plan 2014-2020 - Volume 2 Book of Maps
- Westmeath County Development Plan 2014-2020
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- Revised Guidelines on the information to be contained in Environmental Impact Statements Draft **(**September 2015)
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- Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports Draft (August 2017)
- Landscape Institute and Institute of Environmental Management & Assessment (2013). Guidelines for Landscape and Visual Impact Assessment.
- Planning and Development, Act 2000, as amended.
- EPA EIAR Guidelines (August 2017)

15.0. Identification of Significant Impacts / Interactions

15.1 Identification of Significant Effects

The purpose of this section of the EIAR is to draw attention to significant interaction and interdependencies in the existing environment. In preparing the EIAR, each of the specialist consultants have and will continue to liaise with each other and will consider the likely interactions between effects predicted as a result of the proposed development during the preparation of the proposals for the subject site and this ensures that mitigation measures are incorporated into the design process.

This approach is considered to meet with the requirements of Part X of the Planning and Development Act 2000 and Part 10, and schedules 5, 6 and 7 of the Planning and Development Regulations 2001, as amended. The detail in relation to interactions between environmental factors will be covered in each chapter of the EIAR.

All environmental factors are interlinked to a degree such that interrelationships exist on numerous levels. Interactions within the study area can be one-way interactions, two-way interactions and multiple-phase interactions which can be influenced by the proposed development. As this EIAR document has been prepared by a number of specialist consultants, an important aspect of the EIA process is to ensure that interactions between the various disciplines have been taken into consideration. This chapter of the EIAR was prepared by Tracy Armstrong, BA, MRUP, Dip EIA/SEA Mgmt, MIPI, MRTPI, Director of Delphi Design.

All of the potential significant effects of the proposed development and the measures proposed to mitigate them have been outlined in the preceding chapters of this EIAR. However, for any development with the potential for significant environmental effects, there is also the potential for interaction amongst these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects or ameliorate them, or have a neutral effect.

The purpose of this requirement of an EIAR is to draw attention to significant interaction and interrelationships in the existing environment. Delphi Design Architects and Planners, in preparing and co-ordinating this EIAR ensured that each of the specialist consultants liaised with each other and dealt with the likely interactions between effects predicted as a result of the proposed development during the preparation of the proposals for the subject and ensuring that appropriate mitigation measures are incorporated into the design process.

Having regard to the approach taken, the aspects of the environment likely to be significantly affected by the proposed development, during both the construction and operational phases, have been considered in detail in the relevant Chapters of this EIAR document. In addition, likely interactions between one topic and another have been discussed, where relevant, by the relevant specialist consultant(s).

The primary interactions can be summarised as follows:

- Engineering road design with biodiversity;
- Landscape design, engineering services with biodiversity;
- Visual impact with biodiversity;
- Biodiversity with water and soils;
- Noise and vibration and traffic; and
- Air quality and climate and traffic.

The relevant consultants liaised with each other and the project architects, engineers and landscape architects, where necessary, to review the proposed scheme and incorporate suitable mitigation measures, where necessary. As demonstrated throughout this EIAR, most inter-relationships are neutral in impact when the mitigation measures proposed are incorporated into the design, construction or operation of the proposed development.

Where appropriate, the relevant impact areas are considered in grouped form, as set out below.

15.2 Impact Interactions

Where any potential negative effects have been identified during the assessment process, these impacts have been avoided by design or reduced by the proposed mitigation measures.

Table 15.1 over provides a summary of the potential interactions anticipated from the proposed development.

Table 15.1 – Summary of Potential Interactions / Inter-relationships

Subject	Interaction With:	Interactions / Inter-Relationships
Population & Human Health	**Air Quality**	The completed development will generate additional emissions to the atmosphere associated with the development, and due to plant equipment within the development. However, air quality in the region of the site is expected to be within the limits set by the air quality standard. During construction there may be potential for slight dust nuisance in the immediate vicinity of the site. However, dust control measures, as set out in the Air Quality Management Plan which include a range of measures such as wheel washes and covering of fine materials will minimise the impact on air quality. The submitted CEMP also outlines that a dust management plan will be formulated for the site. The effect of construction on air quality will not be significant following the implementation of the proposed mitigation measures. It is proposed to adhere to good working practices and dust mitigation measures to ensure that the levels of dust generated will be minimal and are unlikely to cause an environmental nuisance. There is no significant impact from dust once the development is completed. Overall, it is envisaged that the proposed development will not have a significant impact on air quality.
Population & Human Health	**Noise**	The greatest potential for noise and vibration impact arising from the proposed development will be in the construction phase. However, following the implementation of the proposed mitigation measures in relation to noise, the impact associated with the construction phase of the proposed development is predicted to be temporary and intermittent in nature. No significant impacts on the local noise and vibration climate are predicted during the operational phase of the proposed development.
Air Quality	**Soils**	Exposed soil during the construction phase of the proposed development may give rise to increased dust emissions. However, the implementation of the dust management plan and dust control measures will ensure that the proposed development will not give rise to the generation of any significant quantities of dust.
Material Assets	**Air Quality**	The proposed development is located in a semi-urban area, being greenfield in nature but within the town development boundary. The production of dust during construction, however, the proposed mitigation measures for dust control and dust suppression, the potential for dust to impact upon neighbouring properties in Brawny are considered to be very low.

Subject	Interaction With:	Interactions / Inter-Relationships
Water	**Biodiversity**	During the construction phase, surface water quality would be protected through the implementation of mitigation measures, which include the regular maintenance and inspection of construction plant, the appropriate storage of potentially polluting substances, the supervision of all concrete works and use of appropriate silt control features where required. Therefore, no potential significant impacts upon water quality is anticipated during the construction phase. There would be no potential impacts to water quality during the operational phase of the development, as all domestic wastewater would be directed to the Athlone Waste Water Treatment Plant for treatment prior to discharge.
Material Assets – Resource & Waste Management	**Water**	Should waste be incorrectly handled or stored at the development site during construction works, it has the potential to cause an adverse impact upon water quality in the area through leaching of materials to groundwater or surface water. However, waste is to be segregated and stored in suitably contained waste receptacles at the site compound, considerably reducing the potential risk of pollution to water. It is not considered that there would be any significant risk to water quality as a result of waste management during the operational phase, given that waste would be collected by private, licenced waste contractors and recovered, recycled or disposed of at appropriately licenced waste facilities, which would have environmental controls in place as standard
Material Assets Waste	**Biodiversity**	Waste has the potential to impact upon biodiversity during the construction phase, by causing pollution to soils and water and by potentially attracting pests / vermin to the site. However, wastes would be stored in suitably contained waste receptacles at the site compound, reducing the potential of pollution to soils and water. Furthermore, the majority of wastes generated during the construction phase would be inert materials, which would reduce the potential for issues regarding pests / vermin. It is not considered that there would be any significant impact upon biodiversity due to waste management during the operational phase, given that waste would be collected by licenced waste contractors and recovered, recycled or disposed of at appropriately licenced waste facilities, which would have environmental controls in place as standard.
Water	**Material Assets – Resource & Waste Management**	There is an interaction between the water environment and waste management as there may be the requirement for removal of contaminated soil off site to a suitable licensed facility to prevent contamination of water. This is dealt with in Chapter 12 Material Assets - Resource Waste Management.

Subject	Interaction With:	Interactions / Inter-Relationships
Material Assets – Resource & Waste Management	**Human Beings**	Should waste be incorrectly handled or stored at the development site, it has the potential to cause an adverse impact upon human beings through nuisance, including visual, odour and pests, and pollution to soils and water. It should also be noted that given the inert nature of the majority of C&D waste types, it is unlikely that issues regarding odour or pests would arise. During the operational phase, suitably contained wheelie bins / waste receptacles would be provided to the residential area and childcare facility by private waste contractors, thus there would be no significant risk of pollution to soils. Waste would be collected on a regular basis, typically on a two-weekly basis alternating between recyclables and municipal waste. Therefore, waste would not be envisaged to accumulate to high enough volumes to cause nuisance.
Material Assets – Resource & Waste Management	**Landscape**	Waste and litter have the potential to adversely affect the appearance of the landscape. However, as waste management measures would be implemented as part of the proposed development, it is considered that there would be no significant adverse impact upon the landscape
Air, Population and Human Health	**Biodiversity**	An adverse impact on air quality has the potential to impact upon human health, cause dust nuisance and cause disturbance to fauna. However, the risk to air quality as a result of the proposed development would not be considered significant, both at the local community level and on a broader national / global scale. During the construction phase of the development, there would be potential for dust emissions, which could impact upon the communities and residents on the roads to the site and fauna in the surrounding area. The potential impact of dust would be temporary, given the transient nature of construction works. Dust control would be an integral part of construction management practices, with mitigation measures implemented where required, including sweeping of roads and hardstand areas, appropriate storage and transport of material and dust suppression measures where required. It should be noted that an important interaction exists between air quality and flora, whereby vegetation can play an important role in acting as an air purifier by absorbing carbon dioxide and giving out oxygen. It would therefore be anticipated that potential carbon dioxide emissions generated by home heating systems and discharged from vehicle exhausts would be somewhat mitigated by vegetation in the environs of the site.

Subject	Interaction With:	Interactions / Inter-Relationships
Air & Climate	**Surface Water / Groundwater**	The interactions between Air & Climate and surface water and groundwater will be mainly limited to the construction phase and are mitigated by the drainage design and proposed mitigation measures.
Air Quality	**Biodiversity**	An increase in dust emissions during the construction phase has the potential to adversely impact upon flora by blocking leaf stomata, interfering with photosynthesis, respiration and transpiration processes. However, given the transient nature of construction works, and given that standard dust control measures would be implemented, no significant impact would be anticipated.
Air & Climate	**Biodiversity**	During construction there are potential issues for biodiversity if the trees were to be covered in dust during construction. However, this will be mitigated by the implementation of a proposed dust minimisation plan and then there should be no impacts on nearby trees.
Noise	**Population and Human Health/Biodiversity**	Increased noise levels during the construction phase will be temporary only and are not expected to have a long-term significant adverse effect upon Population and Human Health in the general area. Furthermore, the application of binding noise limits and hours of operation, along with the implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum. There will be no significant increase in ambient noise levels arising during the operational phase of the proposed development. Noise generated during the construction and operational phases of the proposed development has the potential to impact upon Population and Human Health and fauna within the vicinity of the site. During the construction phase, noise may be generated due to increased vehicle movements and the operation of construction plant. It is anticipated that there would be a moderate impact, for limited periods of time, on the nearest local residences and fauna within the vicinity of the development. Control and mitigation measures would be implemented to reduce noise and vibration, including measures relating to equipment operation and timing of activities. Given the transient nature of construction works, and provided mitigation measures are implemented, noise from construction would not be considered to pose a significant impact upon human beings or biodiversity.

Subject	Interaction With:	Interactions / Inter-Relationships
Landscape	**Population and Human Health**	Changes to the landscape character of the site itself will include the development of new buildings and associated landscape. The landscape and visual impact associated with Population and Human Health focuses on the effects to dwellings. The settlement pattern comprises residential development to the west and south, with the town centre located to the south-west. The proposed development generates visual effects, and the effects and associated amelioration of these effects is discussed in the impact section of the chapter.
Landscape	**Biodiversity**	The long-term effects of the proposed development will have a positive effect on the tree cover associated with the development. The long-term effects of the retention and enhancement of existing hedgerows and the planting of new native trees will have a slightly positive effect. Further consultation with the Ecological Consultant will take place at detailed design, implementation and monitoring stages to ensure adherence to best practice and sound ecological principles.
Surface Water / Groundwater	**Soils/Geology/Waste Management**	There is a close link between soils & geology and water (hydrogeology and hydrology). For example, surface water runoff during the construction phase may contain increased silt levels (e.g. runoff across areas stripped of hardstanding) Impacts on the geological environment include stripping of topsoil which will result in exposure of the underlying subsoil layers to the effects of weather and construction traffic and may result in subsoil erosion and generation of sediment laden runoff. Waste Management and dust management is also considered in interactions as soil removal will be required for this development. Interactions between soils/geology will be mainly limited to the construction phase due to material excavation
Material Assets	**Biodiversity**	The proposed development would alter flora cover and the species of fauna supported due to land take and soil disturbance works. This impact would be slight, given that the majority of the existing habitats are modified and of low ecological value.
Material Assets - Utilities	**Material Assets - Waste Management, and Water (hydrogeology)**	The proposed works result in an increase in surface water runoff, if not catered for adequately this may have an effect on the hydrogeology.

Subject	Interaction With:	Interactions / Inter-Relationships
Material Assets – Resource & Waste Management	**Traffic and Transportation/Soils and Geology**	Waste management interacts with traffic and transportation, soils and geology. The direct and indirect effects of waste-related transport are considered in Chapter 11, Traffic and Transportation and the geotechnical characterisation of the scheme is considered in Chapter 6 - Soils and Geology.
Material Assets – Traffic	**Population and Human Health**	Temporary negative impacts to human health may be likely during the construction phase due to noise, dust, air quality and visual impacts which are discussed in other chapters within this EIAR. The traffic impacts, which would also be temporary in duration are not considered to be significant due to the implementation of the mitigation measures identified in section 10.6.1.

15.2.1 Summary of Interaction of Impacts

Schedule 6 Item 2(b) of the Planning and Development Regulations, 2001-2015 requires that proposed developments are examined with regard to the inter-relationship of aspects referred to in Item 2(b) of Schedule 6. The matrix incorporated in Table 15.2 over inter-relates the various Chapters of this EIAR to the various impact headings referred to in Schedule 6 Item 2(b) of the Planning and Development Regulations, 2001 - 2015. The matrix also indicates where these statutory information requirements have been incorporated in this EIAR. It should be emphasised that this matrix does not represent a form of relative assessment of impacts, but merely identifies and amalgamates areas of principal interaction and significance.

Table 15.2 – Interactions Matrix

Chapter No.	Chapter Headings in EIAR	Interaction of Impacts / Identification of Significant Effects									
		Population & Human Health	Biodiversity	Land & Soils	Water	Air Quality & Climate	Noise & Vibration	Material Assets	Waste Management	Cultural Heritage	Landscape
4	Population & Human Health					✓	✓	✓	✓	✓	✓
5	Biodiversity			✓	✓	✓		✓	✓		✓
6	Land, Soils & Geology		✓		✓	✓	✓	✓	✓		
7	Water		✓	✓				✓	✓		
8	Air Quality & Climate	✓	✓	✓				✓			
9	Noise	✓						✓			
10	Material Assets: Built Services		✓	✓	✓	✓					
11	Material Assets: Transportation	✓		✓	✓	✓	✓		✓		
12	Material Assets: Resource & Waste Management	✓	✓	✓	✓				✓		✓
13	Archaeology & Cultural Heritage	✓									
14	The Landscape	✓							✓		
✓	Area of Principal Interaction										

15.3 Other Impacts

15.3.1 Direct and Indirect Effects Resulting from the Use of Natural Resources

Schedule 6 Item 2(c) of the Planning and Development Regulations, 2001 - 2015 requires that an EIAR contains a description of the likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative) of the proposed development on the environment resulting from the use of natural resources. No likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative) of the proposed development on the environment are expected to arise from the use of natural resources.

15.3.2 Direct and Indirect Effects Resulting from Emission of Pollutants, Creation of Nuisances and Elimination of Waste

Schedule 6 Item 2(c) of the Planning and Development Regulations, 2001 - 2015 requires that an EIAR contains a description of the likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative) of the proposed development on the environment resulting from the emission of pollutants, the creation of nuisances and the elimination of waste. No likely significant effects on the environment are expected to arise from the emission of pollutants, the creation of nuisances or the elimination of waste.

15.4 Residual Impacts and Cumulative Impacts

Residual impacts can be defined as the final impacts that occur after proposed mitigation measures have taken effect. Many of the findings of the EIA have been incorporated into the design of the development and have contributed to the reduction or amelioration of potential impacts. Where residual impacts arise, they are detailed in the relevant chapters and further mitigation measures detailed where necessary.

Cumulative impacts are defined as: *"The addition of many small impacts to create one larger, more significant, impact"* (EPA 2002). Cumulatively, these impacts may be significant if they occur close together in terms of location and time. The cumulative impact of the proposed development is categorised as neutral and moderate.

As outlined in Chapter 3 this EIAR, where relevant, the EIAR also takes account of other development(s) within the area. These impacts have been addressed in the relevant chapters of the EIAR.

To determine traffic impacts in Chapter 11, the traffic generated by the proposed development is combined with the baseline traffic generated by the traffic on the road network in the area. The potential traffic impacts from other developments were also considered in the assessment (e.g. primary school - adjacent to the site).

For the noise impact assessment in Chapter 9, the potential noise emissions arising from the proposed development during construction and operation are combined (using cumulative AAWT figures from Traffic chapter) with background noise levels (predominantly road traffic) were assessed.

Each of the relevant specialists has considered the potential for cumulative impact in preparing their assessments. While there is the potential for negative impacts to occur during the construction stage of

the scheme, with the implementation of the appropriate mitigation outlined in the EIAR, the residual cumulative impact is not considered to be significant.

15.5 Environmental Commitments and Mitigation Measures

Mitigation measures to be adopted during the construction and operational phases of the proposed development are detailed within each chapter. These measures should be implemented through planning conditions imposed by the planning authority / An Bord Pleanála.

Mitigation measures will be managed by the contractor(s) as part of the Construction Management Plan and by the developer/ landowners thereafter.

15.6 Conclusion

This EIAR has regard to and builds on the Strategic Environmental Assessment prepared with the Westmeath County Development Plan 2014-2020 and the Strategic Environmental Assessment prepared with the Athlone Town Development Plan 2014-2020.

The EIAR has considered the likely, significant, adverse effects of the proposed project on the receiving environment.

Mitigation measures are included, to avoid and / or reduce impacts on the environment where considered necessary. This includes mitigation measures incorporated into the design of the proposed development.

The EIAR concludes that there are no material or significant environmental issues arising which were not anticipated by both the Westmeath County Development Plan 2014-2020 and the Athlone Town Development Plan 2014-2020 and considered in their Strategic Environmental Assessments.

16.0 Summary of EIA Mitigation and Monitoring Measures

16.1 Introduction

The central purpose of EIA is to identify potentially significant adverse impacts at the pre-consent stage and to propose measures to mitigate or ameliorate such impacts. This chapter of the EIAR document has been prepared by Delphi Design and sets out a summary of the range of methods described within the individual chapters of this EIAR document which are proposed as mitigation and for monitoring. It is intended that this chapter of the EIAR document will provide a useful and convenient summary to the competent/consent authority of the range of mitigation and monitoring measures proposed. This chapter of the EIAR was prepared by Tracy Armstrong, BA, MRUP, Dip EIA/SEA Mgmt, MIPI, MRTPI, Director of Delphi Design.

EIA related conditions are normally imposed by the competent/consent authority as part of conditions of planning consent and form a key part of the Impact Anticipation and Avoidance strategy. Conditions are principally used to ensure that undertakings to mitigate are secured by explicitly stating the location, quality, character, duration and timing of the measures to be implemented. A secondary role of EIA related conditions is to ensure that resources e.g. bonds / insurances will be available and properly directed for mitigation, monitoring or remedial action, in the event that the impacts exceed the predicted levels.

Monitoring of the effectiveness of mitigation measures put forward in the EIAR document, both by the competent authorities and the developer, is also an integral part of the process. Monitoring of environmental media and indicators arise either from undertakings or from conditions.

In the case of mitigation and monitoring measures it is important for all parties to be aware of the administrative, technical, legal and financial burdens that can accompany the measures proposed. It is also important to ensure that, where monitoring is provided for, it is clearly related to thresholds, which, if exceeded, cause a clearly defined set of actions to be implemented.

16.2 Mitigation Strategies

16.2.1 Introduction

There are three established strategies for impact mitigation - avoidance, reduction and remedy. The efficacy of each is directly dependent on the stage in the design process at which environmental considerations are taken into account (i.e. impact avoidance can only be considered at the earliest stage, while remedy may be the only option available to fully designed projects).

16.2.2 Mitigation by Avoidance

Avoidance is generally the fastest, cheapest and most effective form of impact mitigation. Environmental effects and consideration of alternatives have been taken into account at the earliest stage in the project design processes. The consideration of alternatives with respect to the development of the subject lands has been described in Chapter 3.

16.2.3 Mitigation by Reduction

This is a common strategy for dealing with effects which cannot be avoided. It concentrates on the emissions and effects and seeks to limit the exposure of the receptor. It is generally regarded as the "end

of pipe" approach because it does not seek to affect the source of the problems (as do avoidance strategies above). As such this is regarded as a less sustainable, though still effective, approach.

16.2.4 Reducing the Effect

This strategy seeks to intercept emissions, effects and wastes before they enter the environment. It monitors and controls them so that acceptable standards are not exceeded. Examples include wastewater treatment, filtration of air emissions and noise attenuation measures.

16.2.5 Reducing Exposure to the Impact

This strategy is used for impacts which occur over an extensive and undefined area. Such impacts may include noise, visual impacts or exposure to hazard. The mitigation is effected by installing barriers between the location(s) of likely receptors and source of the impact (e.g. sound barriers, tree screens or security fences).

16.2.6 Mitigation by Remedy

This is a strategy used for dealing with residual impacts which cannot be prevented from entering the environment and causing adverse effects. Remedy serves to improve adverse conditions which exist by carrying out further works which seek to restore the environment to an approximation of its previous condition or a new equilibrium.

16.3 Mitigation and Monitoring Measures

The following provides a list, for ease of reference, of the mitigation and monitoring measures recommended in each chapter of the EIAR.

16.3.1 Project Description and Alternatives Examined

Construction Phase

It is envisaged that the development of the lands subject of the proposed development will occur over a five year period. Given the nature of the project and the need for flexibility to respond to market demand, the development phases are indicative. An Outline/Preliminary Construction Management Plan has been prepared and reviewed by the relevant EIAR consultants and is included in the SHD application. A Construction and Environmental Management Plan has been prepared by DBFL Consulting Engineers which addresses noise and vibration, traffic management, working hours, pollution control, dust control, road cleaning, compound/public health facilities and staff parking associated with the construction works, and is submitted as part of this SHD planning application.

Operational Phase

Not applicable.

Monitoring

Not applicable.

16.3.2 Population and Human Health

Construction Phase

A range of construction related remedial and mitigation measures are proposed throughout this EIAR document with reference to the various environmental topics examined and the inter-relationships between each topic. These remedial and mitigation measures are likely to result in any significant and likely adverse environmental impacts on population and human health during the construction phases being avoided. Readers are directed to Chapter 16 of this EIAR document which summarises all of the remedial and mitigation measures proposed as a result of this EIA.

During the Construction Phase a number of mitigating measures should be considered, including *inter alia:*

- Maintain a Construction Environment Management Plan (CEMP) in effect for duration of works;
- Restrict working hours from 07:00 to 18:00; Monday to Friday and from 08:00 to 14;00 on Saturdays. No general works are envisaged to be carried out on Sundays. Should there be a need to work Sundays/Bank Holidays, a written request will be made to WCC for permission to do so. Any conditions from WCC relating to out of hours working will be followed including any required notifications to relevant parties;
- Maintain a Traffic Management Plan (TMP) in effect for duration of works;
- Schedule arrivals and departures of vehicles to the site, where practical, so that they do not coincide with times when children are entering and leaving the nearby schools;
- Where practical restrict Heavy Goods Vehicles (HGVs) to outside the period where school children are entering or leaving the schools and their environs;
- The CEMP will be agreed with the Planning Authority upon receipt of planning permission. The construction of the Proposed Development shall adhere to the relevant provisions of this Plan; and;
- As part of the CEMP, maintain a Dust and Noise abatement plan in operation.

Operational Phase

Where relevant, mitigation measures to address the potential impacts of noise, air traffic etc. on people are included in the appropriate chapters of this EIAR. No likely significant impacts have been identified for population, or land use, accordingly no mitigation measures are required for the Operational Phase.

The proposed development has been designed to avoid significant impacts in relation to local amenities and recreational facilities by:

- Incorporating the provision of a new community hub facility within the design proposal;
- Incorporating the provision of 2 no. childcare facilities within the design proposal;

- Not obstructing the extensive recreational and amenity facilities located at the Regional Sports Centre to the west
- Not obstructing the operation of the existing primary school to the west and;
- The provision of c. 22,373.7sq.m / 2.23 ha area of public open space.

Monitoring

In relation to the impact of the development on population and human health it is considered that the monitoring measures outlined in regards to the other environmental topics such as water, air quality and climate and noise etc. sufficiently address monitoring requirements.

16.3.3 Biodiversity

Construction Phase

The proposed development provides that some of the central hedgerow will be maintained and augmented planting will occur to the north of the site using native tree and plant species. The central segment of the hedgerow will be maintained as it has a full canopy and complex understory. Connectivity to the wider landscape will be maintained to the north of the site and augmented supplementary planting of native trees will increase the condition of the existing hedgerow to the north. Overall, 36% of the available hedgerows will be lost due to the implementation of the project.

Where hedgerow removal is required all works in that regard will be constrained to outside 1st March and the 31st August. Should hedgerow removal be required within this time then a relevant derogation licence must be sought. In addition to this an Ecological Clerk of Works (EcOW) will be appointed to monitor all hedgerow removal for disturbance to potential badger setts, bat roosts and/or bird nests. The EcOW will ensure that none of the hedgerows to be maintained, identified above, are interfered with in any way that impacts their ecological integrity throughout the implementation of the construction works.

The CEMP details measures to prevent accidental spill offs and to enact a Surface Water Urban Drainage System (SUDS) scheme across the site. Interactions with surface water are therefore thought to be minimal as there are no existing water courses across the site or in the immediate vicinity.

The CEMP dictates that a dust control strategy must be implemented for all construction works. The existing site is agricultural and amenity grassland and there are no habitats present on site that are of any ecological value. The earthworks proposed within the project description will not have effects beyond the site boundary.

The construction phase and movement of heavy vehicles across the site could cause localised disturbance of breeding birds that may use the perimeter vegetation. Given the low quality of habitat available this is expected to be very low. This would be expected to have a probable, short-term impact at a local level but there is likely to be an existing degree of habituation to regular traffic on the site so this impact may not be across the whole area. Bird species are particularly sensitive to disturbance effects due to increased noise and on-site activity.

Operational Phase

Not applicable.

Monitoring

The impacts are foreseen to be low due to the characteristics of the project, and the ecological value of the receiving environment is also low. Monitoring measures are proposed during construction phase and compliance with the CEMP, with compliance with same required by all contracted workers. All vegetation removal will be supervised by an Ecological Clerk of Works who will be responsible for ensuring the hedgerows to be maintained are left intact. This process is foreseen to be sufficient monitoring with regard to ecological impacts and the integrity of the wider landscape ecology.

16.3.4 Land and Soils

Construction Phase

Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development. At any given time, the extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas.

Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter existing surface water drains.

Topsoil stockpiles will also be located so as not to necessitate double handling.

Surface water runoff from areas stripped of topsoil will be directed to temporary on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.

On-site settlement ponds are to include geotextile liners and riprapped inlets and outlets to prevent scour and erosion.

Excavation of existing subsoil layers has been minimised as far as reasonably practicable. Cut type earthworks operations will not be required to achieve designed site levels, however, some cut type earthworks will be required to construct block basements and attenuation features. Cut material is considered likely to be suitable to be reused as non-structural fill elsewhere on site.

Disturbed subsoil layers will be stabilized as soon as practicable (e.g. backfill of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping). The duration that subsoil layers are exposed is to be minimised in order to mitigate against weather effects.

Similar to comments regarding stripped topsoil, stockpiles of excavated subsoil material will be protected for the duration of the works. Stockpiles of subsoil material will be located separately from topsoil stockpiles.

Measures will be implemented to capture and treat sediment laden surface water runoff (e.g. sediment retention ponds, surface water inlet protection and earth bunding adjacent to open drainage ditches).

Importation of fill to site will be required, and as such, the source of aggregate, fill material and topsoil imported to site will be carefully selected and vetted in order to ensure that it is of a reputable origin and that it is "clean" (i.e. will not contaminate the environment). Project contract and procurement procedures will be developed to ensure that aggregate, fill material and topsoil are acquired from reputable sources with suitable environmental management systems as well as regulatory and legal compliance.

No large or long-term stockpiles of fill material will be held on the site. At any time, the extent of fill material held on site will be limited to that needed in the immediate vicinity of the active work area.

Smaller stockpiles of fill, where required, will be suitably protected to ensure no sediment laden runoff enters existing surface water drains. Such stockpiles are to be located in order to avoid double handling.

A construction traffic management plan will be developed and implemented in order to minimise the disturbance caused by large vehicles. This management plan shall include and detail:

- Predetermined haul routes for earthworks plant and vehicles delivering construction materials to site.
- Vehicle wheel wash facilities in the vicinity of any site entrances and road sweeping to maintain the road network in the immediate vicinity of the site.
- Dust suppression measures (e.g. dampening down)

Due to the presence of a locally important aquifer beneath the site, it will be necessary to employ mitigation measures at the construction site in order to prevent spillages to ground of fuels, and to prevent consequent soil or groundwater quality impacts. These measures are outlined in the Construction & Environmental Management Plan (CEMP) and are listed here as follows:

- Over Ground Oil / Diesel Storage – Only approved storage system for oil / diesel within the site will be permitted, (i.e. all oil / diesel storage to be located within a designated area placed furthest away from adjacent watercourses and contained within constructed bunded areas e.g. placed on 150mm concrete slab with the perimeter constructed with 225mm solid blockwork rendered internally);
- The bunded area will accommodate the relevant oil / diesel storage capacity in case of accidental spillage. Any accidental spillages will be dealt with immediately on site however minor by containment /removal from site;
- All hazardous substances on-site shall be controlled within enclosed storage compounds that shall be fenced-off and locked when not in use to prevent theft and vandalism;
- Fixed plant shall be self-bunded; mobile plant must be in good working order, kept clean, fitted with drip trays where appropriate and subject to regular inspection; water runoff from designated refuelling areas shall be channelled to an oil-water separator, or an alternative treatment system, prior to discharge; and,
- Spill kits and oil absorbent material shall be carried with mobile plant and located at vulnerable locations around the site to reduce risk of spillages entering the sub-surface or groundwater environment; booms shall be held on-site for works near drains or dewatering points.

No mitigation measures are proposed in relation to the geological environment.

In terms of reinstatement, the following mitigation measures are proposed:

- All temporary construction compounds are to be removed upon completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawings.
- All construction waste and / or scrapped building materials are to be removed from site on completion of the construction phase.
- Oil, fuel etc. storage areas are to be decommissioned on completion of the construction phase. Any remaining liquids are to be removed from site and disposed of at an appropriate licenced facility.
- All sediment control measures (e.g. sediment retention ponds) are to be decommissioned on completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawings.

Operational Phase

Not applicable

Monitoring

Proposed monitoring during the construction phase in relation to the soil and geological environment are as follows:

- Adherence to the CEMP
- Construction monitoring of the works (e.g. inspection of existing ground conditions on completion of cut to road formation level in advance of placing capping material, stability of excavations etc.).
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities.
- Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill, protection of soils for removal from site from contamination)
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.)

No ongoing monitoring is proposed on completion of the construction phase.

16.3.5 Water

Construction Phase

The following measures are proposed during the construction phase to mitigate against risks to the surrounding hydrological environment:

- A site-specific Construction Management Plan will be developed and implemented during the construction phase. Site inductions will include reference to the procedures and best practice as outlined in the Construction Management Plan.
- Rain water pumped from excavations is to be directed to on-site settlement ponds.
- Surface water runoff from areas stripped of hardstanding and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- Weather conditions and seasonal weather variations will also be taken account of when planning stripping the site and excavations, with an objective of minimizing soil erosion.
- In order to mitigate against spillages contaminating the surrounding surface water and hydrogeological environments, all oils, fuels, paints and other chemicals shall be stored in a secure bunded hardstand area. Refuelling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any surface water inlets (where not possible to carry out such activities off site).
- Concrete batching will take place off site and wash out of concrete trucks will take place off site (at authorized concrete batching plant in full compliance with relevant planning and environmental consents).
- Discharge from any vehicle wheel wash areas is to be directed to on-site settlement ponds.
- Any groundwater pumped from excavations is to be directed to on-site settlement ponds.
- It is proposed to implement a programme for monitoring water quality at the outfall as part of the construction of this development, in agreement with the Planning Authority.
- The construction compound will include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be tankered off site to a licensed facility until a connection to the public foul drainage network has been established.
- The construction compound's potable water supply shall be protected from contamination by any construction activities or materials.

Operational Phase

The design of proposed site levels (roads, plaza, finished floor levels etc.) has been carried out in such a way as to replicate existing surface contours, break lines etc. as closely as reasonably practicable and avoid concentrating additional surface water flow in any particular location. However, some localised areas have been raised in order to enable gravity foul drainage and provide sufficient depth of cover. In these areas the levels have been designed to provide overland flow paths have been designed to ensure that during exceedance events, runoff is directed away from buildings to soft landscaped areas.

Following the Site Specific Flood Risk Assessment, it has been determined that the entire site / zoned developable area is located in Flood Zone C as defined by the Guidelines (i.e. proposed development is considered to have the required level of flood protection up to and including the 1% AEP flood event.)

Surface water runoff from the site will be attenuated to the greenfield runoff rate as outlined in the Greater Dublin Strategic Drainage Study (GDSDS). Surface water discharge rates will be controlled by Hydrobrake type vortex control devices in conjunction with attenuation storage.

The following methodologies are being implemented as part of a SuDS surface water treatment train approach:

- Permeable paving in driveway areas.
- Surface water runoff from roofs will be routed to the proposed surface water pipe network via the porous aggregates beneath permeable paved driveways and filter drains in rear private gardens.
- Attenuation of the 30-year return period rainfall event and below will be contained below ground and 100-year return period return period event (plus 10% climate change) within below ground storage and surface level detention basins located in public open spaces.
- Installation of hydrobrakes limiting surface water discharge from the site to greenfield runoff rates.
- Surface water discharge to pass via a Class 1 bypass fuel / oil separator (sized in accordance with permitted discharge from the site).

A contract will be entered into with a suitably qualified contractor for maintenance of the attenuation system, Hydrobrake and by-pass fuel / oil separator noted above.

No specific mitigation measures are proposed in relation to foul drainage however, all new foul drainage lines will be designed, installed and tested in accordance with Irish Water Code of Practice.

No specific mitigation measures are proposed in relation to water supply. However, all new watermain will be designed, installed and tested in accordance with the Irish Water Code of Practice.

The potential impact of climate change has been allowed for as follows;

- Pluvial flood risk - attenuation storage design allows for a 10% increase in rainfall intensities, as recommended by the GDSDS.
- Pluvial flood risk - drainage system design allows for a 10% increase in flows, as recommended by the GDSDS.
- Provision of min. freeboard (500mm) from 1% AEP as required by GDSDS (mitigation against impact of climate change).

Monitoring

Proposed monitoring during the construction and operational phase in relation to the water and hydrogeological environment are as follows:

- Adherence to Construction Management Plan.
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and vehicle wheel wash facilities.
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.).
- Monitoring of discharge from sediment retention ponds (e.g. pH, sediment content).
- During the operational phase an inspection and maintenance contract is to be implemented in relation to the proposed Class 1 fuel / oil separators, hydrobrakes, SuDS and attenuation facilities.

16.3.6 Air Quality and Climate

Construction Phase

In conformance with P-NAL2 and P-NAL3 of the Athlone Town Development Plan 2014-2020, any activities associated with construction of the residential development, which are likely to give rise to dust emissions (e.g. construction activities, extractive industry) shall make suitable arrangements, and take precautionary measures, to suppress and control dust arising from the activity or the handling and transportation of materials. The deposition of dust on surrounding lands, or spillage onto public roads shall be prevented at all times. This would be particularly applicable to:

- residents around Brawney Road;
- the single dwelling to the west of ESB Networks;
- users of Athlone Town Football Club;
- Old Rail Trail Greenway users; and
- residents to the south of the greenway.

Negative air quality impacts can come from many sources during construction. Mitigation measures (as described below) would be required so that construction works are carried out in such a manner that emissions of dust and other pollutants are limited, and that best practicable means are employed to minimise disruption, risks to human health, and to avoid unnecessary impacts on sensitive ecological habitats.

Operational Phase

Not applicable

Monitoring

Not applicable

16.3.7 Noise

Construction Phase

With reference to Table 9-24 the construction noise assessment has shown that construction noise threshold values would be exceeded, and adverse impacts identified at a number the existing residential properties located around the development Site, therefore mitigation measures are considered necessary.

Several safeguards exist to minimise the effects of construction and demolition noise and include:

- the various EC Directives and UK Statutory Instruments that limit noise emissions of a variety of construction plant;
- guidance set out in BS5228-1:2009+A1:2014, that covers noise control on construction and open sites; and
- the powers that exist for local authorities under Sections 60 and 61 of the Control of Pollution Act 1974 to control environmental noise and pollution on demolition sites.

It is recommended that the precise mitigation measures to control noise from the works are agreed with the local authority prior to the works starting. Generic measures below are given to illustrate the range of techniques available.

The adoption of Best Practicable Means, as defined in the Control of Pollution Act 1974, is usually the most effective means of controlling noise from sites. Within the constraints of efficient site operations and the requirements of the relevant British Standards, the following is advisable:

- limit the use of particularly noise plant, i.e. do not use particularly noisy plant early in the morning;
- limit the number of plant items in use at any one time;
- plant maintenance operations should be undertaken as far away from noise-sensitive receptors as possible;
- phasing the works to maximise the benefit from perimeter structures;
- any compressors brought on to site should be silenced or sound reduced models fitted with acoustic enclosures
- reduce the speed of vehicle movements;
- all pneumatic tools should be fitted with silencers or mufflers;
- ensure that operations are designed to be undertaken with any directional noise emissions pointing away from noise-sensitive receptors where practicable;
- when replacing older plant, ensure that the quietest plant available is considered wherever possible; any deliveries/spoil removal vehicles should be programmed to arrive and depart during daytime hours only.
- drop heights must be minimised when loading vehicles with rubble.
- care should be taken when loading vehicles to minimise disturbance to local residents. Vehicles should be prohibited from waiting within the site with their engines running;
- all plant items should be properly maintained and operated according to the manufacturers' recommendations in such a manner as to avoid causing excessive noise. All plant should be sited so that the noise impact at nearby noise-sensitive properties is minimised
- local hoarding, screens or barriers should be erected as necessary to shield particularly noisy activities; and
- any problems concerning noise from construction works can sometimes be avoided by taking a considerate and neighbourly approach to relations with local residents. Works should not be undertaken outside of the hours agreed with the local authority.

Experience from other sites has shown that by implementing these measures, typical noise levels from construction works can be reduced by 5dB(A) or more.

Due to the very close proximity of a number of the receptors to the site it may prove difficult to reduce construction noise levels at all the properties to below the threshold values for the entirety of the construction period.

It is recommended that a Construction Environmental Management Plan ('CEMP') is drafted and implemented during the construction phase.

The CEMP would include input from the Local Planning Authority (LPA) regarding the levels of noise acceptable at the boundaries which may require a programme of noise monitoring at the start of each phase or for the entirety construction programme, it is envisaged that this noise monitoring scheme would be agreed in writing with LPA prior to the commencement of the construction works.

Operational Phase

Amenity Space Mitigation

The external amenity space noise assessment has shown that in a number of the areas of the site moderate and high impacts have been predicted, therefore mitigation measures are considered necessary.

The installation of acoustic barriers around the relevant amenity areas would reduce the noise levels within the outdoor amenity spaces. Assuming the barriers have been correctly installed there would be Negligible or Minor impacts in majority of the external amenity spaces.

There are a small number of areas, i.e. the amenity space adjacent to Block L and the open area located adjacent to the N6 where Moderate and High impacts are still predicted; however it should be noted that the existing properties located close to the N6 gained Planning Permission despite noise levels within the amenity spaces predicted to be in excess of the limits contained in BS8233:2014.

Internal Levels – Façade Mitigation

Noise levels incident upon the façade will require mitigation to meet the internal noise limits stipulated in BS8233:2014.

Windows do not reduce noise equally across the entire frequency spectrum, so the frequency content of the sound will influence the overall sound reduction performance of a given window and by extension, the resulting noise levels within the receiving room.

However, many glazing manufacturers test their products under laboratory conditions using a typical road traffic noise frequency spectrum source. The resultant measured noise attenuation, in dB, gives a very useful guide to in-situ sound reduction performance of the window for situations where road traffic noise dominates. This performance index is known as the $R_W + C_{tr,}$ and the sound reduction requirement set out above should be considered as an $R_W + C_{tr}$ noise level.

From an analysis of the available daytime and night-time ambient noise level predictions the highest glazing specification is required to meet the night-time maximum noise limit of 45dB(A) in a habitable room.

The glazing requirements on each floor, of each proposed building to meet the internal limits, outlined below, are shown in Appendix 9-3.

- An internal ambient daytime limit of 35dB(A) for living rooms; and
- An internal night-time maximum limit of 45dB(A) for bedrooms.

The night-time ambient glazing requirements have not been considered as the glazing requirements associated with the maximum noise levels are greater.

In each Figure in Appendix 9-3 the decibel reduction required by the glazing at each façade can be seen by the numbering, it must be noted that the figures and façade reductions include the attenuation provided by the barriers recommended in Section 9.7.3.1.

For the purpose of selecting the appropriate ventilator the reader should refer to the Dn,e,w (Ctr value).

As referenced in ISO 717-1:2013 *Acoustics – Rating of Sound Insulation in Buildings and of Building Elements* the Dn,e,w is a single number quantity of airborne sound insulation and is a weighted element-normalized level difference that includes a correction for low frequency noise such as noise from road traffic. The number is standardised to a reference area of $10m^2$ and therefore gives a value higher than the actual insertion loss. Consequently, it is standard practice, when selecting an appropriate ventilator, to select a ventilator that has a $D_{n,e,w}$ (C_{tr} value) up to 6dB(A) higher than the required R_{W+Ctr} dB value.

At this stage it is not appropriate to advise on suitable ventilators as the ventilation strategy for the Site has not been developed. The strategy adopted however must have a $D_{n,e,w}$ (C_{tr} value) 6dB(A) higher than the required R_{W+Ctr} dB value.

Monitoring

Not applicable

16.3.8 Material Assets: Built Services

Construction Phase

The construction works contractor shall liaise with the relevant utilities provider prior to works commencing, with on-going consultation throughout the proposed development. Where new services would be required, the construction works contractor shall apply to the relevant utility provider and adhere to the requirements outlined in the connection permit / licence.

The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services unless this has been agreed in advance with the relevant service provider.

All works in the vicinity of utilities apparatus will be carried out in ongoing consultation with the relevant utility company or local authority and will be in compliance with any requirements or guidelines they may have.

Where new services or diversions to existing services are proposed, the Contractor will apply to the relevant utility company for a connection permit where appropriate, and will adhere to their requirements.

Mitigation measures proposed in relation to the drainage and water infrastructure include the following:

A detailed *"Construction Management Plan"* will be developed and implemented during the construction phase. Site inductions will include reference to the procedures and best practice as outlined in the "Construction Management Plan".

Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.

In the event of groundwater being encountered during the construction phase, mitigation measures will include dewatering by pumping to an appropriate treatment facility prior to discharge. Other measures would include excluding contaminating materials such as fuels and hydrocarbons from sensitive parts of the site i.e. highly vulnerable groundwater areas.

In order to reduce the risk of defective or leaking sewers, all new sewers should be laid in accordance with Irish Water standards, pressure tested and CCTV surveyed to ascertain any possible defects.

The construction compound will include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be removed off site to a licensed facility until a connection to the public foul drainage network has been established.

The construction compound's potable water supply shall be protected from contamination by any construction activities or materials.

Where possible backup network supply to any services will be provided should the need for relocation or diversion or existing services be required otherwise relocation or diversion works will be planned to incur minimal impact, with users notified in advance of any works.

Connections to the existing gas and telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.

Operational Phase

Chapter 7 of this EIAR "Water" sets out mitigation measures associated with the surface water treatment. All new drainage lines (foul and surface water) will be pressure tested and will be subject to a CCTV survey to identify any possible defects prior to being made operational.

Chapter 7 includes the mitigation measures associated with the surface water system for the development.

Water conservation methods such as the use of low flush toilets and low flow taps should be incorporated into dwellings to reduce water volumes and related treatment and abstraction costs of the development.

Similarly, water conservation methods would reduce the loading on the foul sewer network. As part of the development, a number of different SuDS measures are proposed to minimise the impact on water quality and quantity of the runoff and maximise the amenity and biodiversity opportunities within the site.

The measures detailed below have been designed to take account of potential percolation, but have not been incorporated into any storage calculations. This will result in additional storage being available in extreme events.

The proposed SuDS measures will include a combination of Source Control, Site Control and Regional Control measures as part of a Management Train whereby the surface water is managed locally in small sub-catchments rather than being conveyed to and managed in large systems further down the catchment. The combination of the SuDS measures outlined below will maximise the potential for surface water infiltration to the subsoil, reducing the impact on the existing surface water drainage network. The proposed techniques will offer a high level of treatment processes and nutrient removal of the turnoff, particularly during the "first flush".

On completion of the construction phase no further mitigation measures are proposed in relation to the electrical, gas and telecommunications infrastructure.

The proposed development is located within an area designated for the type of development proposed. As such the services pertaining to the development are required to facilitate the proposed scheme. It is not possible to not provide the services required. Notwithstanding this, the potable water, foul and stormwater services have all been designed in accordance with the requirements of the various stake holders, notable Irish Water for the foul potable water utilities and Westmeath County Council for the surface water services.

Monitoring

All internal potable water and drainage services within the proposed building will be monitored by the local authority / management firm and their maintenance personnel will routinely inspect and carry out maintenance as required. The external potable water and foul effluent (and the combined outfall including restricted storm water flows) connections to the public system will be maintained by Irish Water.

16.3.9 Material Assets: Transportation

Construction Phase

All construction activities on-site will be governed by a Construction Traffic Management Plan (CTMP), the details of which will be agreed in full with Westmeath County Council(WCC) prior to the commencement of construction activities on site.

A Preliminary Construction Management Plan is submitted as part of the subject SHD planning application which will incorporate a range of integrated control measures and associated management activities with the objective of minimising the construction activities associated with the development. The following initiatives will be implemented to avoid, minimise and/or mitigate against the anticipated construction period impacts:

- During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads;
- Appropriate on-site parking and compound area will be provided to prevent overflow onto the local network;
- It is likely that some numbers of the construction team will be brought to/from the site in vans/minibuses, which will serve to reduce the trip generation potential;
- Delivery vehicles to and from the site will be spread across the course of the working day, therefore, the number of HGVs travelling during the peak hours will be relatively low;
- Truck wheel washes will be installed at construction entrances and any specific recommendations with regard to construction traffic management made by Westmeath County Council will be adhered to;
- Potential localised traffic disruptions during the construction phase will be mitigated through the implementation of industry standard traffic management measures. These traffic management measures shall be designed and implemented in accordance with the Department of Transport's Traffic Signs Manual "*Chapter 8 Temporary Traffic Measures and Signs for Roadworks*" and "*Guidance for the Control and Management of Traffic at Roads Works – 2nd Edition*" (2010); and
- Site entrance point/s from the public highway will be constructed with a bound, durable surface capable of withstanding heavy loads and with a sealed joint between the access and public

highway. This durable bound surface will be constructed for a distance of 10m from the public highway.

- Material storage zone will be established in the compound area and will include material recycling areas and facilities;
- 'Way finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas;
- Dedicated construction haul routes will be identified and agreed with Westmeath County Council prior to commencement of activities on-site; and
- On completion of the works, all construction materials, debris, temporary hardstands etc. form the site compound will be removed off-site and the site compound area reinstated in full on completion of the works.

Operational Phase

A package of integrated mitigation measures has been identified to off-set the additional local demand that the proposed residential development at the subject site could potentially generate as a result of the forecast increase in vehicle movements by residents of the scheme. The identified measures and associated timescale for their implementation are summarised below.

- **Management** – A Mobility Management (MMP) has been compiled by DBFL with the aim of guiding the delivery and management of coordinated initiatives by the scheme promotor to be implemented upon occupation of the site, and is submitted as a separate document as part of the subject SHD planning application. The MMP will ultimately seek to encourage sustainable travel practices for all journeys to and from the proposed development.

- **Car Parking Management Strategy** - A management regime will be implemented by the development's management company to control and actively manage the availability of on-site car parking for residents. The signing of a rental agreement for one of the proposed residential apartments will NOT include access to a designated on-site parking space. All potential residents (prior to signing rental agreement) will be notified that the proposed scheme is a 'low car allocation' development with no access (or guarantee thereof) to either (i) the limited on-site residents car parking provision or (ii) apply to Westmeath County Council for a residents parking permit (to park on-street in one of the neighbouring streets). Nevertheless, all residents of the proposed residential apartment scheme will have the opportunity to apply to the on-site management company for both a (i) residents car parking permit (updated weekly, fortnightly, monthly, quarterly or annually) and subsequently access to a dedicated (assigned) on-site basement car parking space or (ii) a visitor's car parking permit for a short period of time. A charge will be applied to obtain a permit with the objective of covering the associated management costs and discouraging long term usage of the car parking space.

- **Infrastructure** – Infrastructure measures identified to reduce reliance of private vehicles include the provision of ample secure cycle parking on site and ensuring a design which promotes permeability for pedestrians and cyclists to, through and from the development. The level of parking provision for the development will also act as a powerful mobility management measure, ensuring against an overprovision of parking and a resultant over reliance on the private vehicle.

  Development proposed provision of dedicated pedestrian footpaths and cycle paths throughout the development site.

- **Car Sharing –** The provision of 2 no. dedicated car share (GoCar) spaces in the basement parking facility for the sole use of the scheme's residents. The availability of these on-site provide a viable alternative to residents owning private vehicles whilst still having access to a car when required.

As part of the MMP process, bi-annual post occupancy surveys are to be carried out in order to determine the success of the measures and initiatives as set out in the proposed MMP document. The information obtained from the monitoring surveys will be used to identify ways in which the MMP measures and initiatives should be taken forward in order to maintain and further encourage sustainable travel characteristics.

Monitoring

During the construction stage, the following monitoring exercises are proposed:

- Compliance with construction vehicle routing practices;
- Compliance with construction vehicle parking practices;
- Internal and external road conditions; and
- Timing of construction activities.

16.3.10 Material Assets: Resource and Waste Management

Construction Phase

A CDWMP has been prepared in line with the requirements of the guidance document issued by the DEHLG. Adherence to the high level strategy presented in this C&DWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the construction phase of the project.

The enclosed Outline/Preliminary CMP sets out the overall project construction strategy and identifies the need for storage areas for waste skips. Prior to commencement of construction, the contractor(s) will be required to ensure that both of these documents detail specific measures to minimise waste generation and resource consumption. It is estimated that all of the excavated material generated is expected to be suitable for reuse within the proposed development. This will be required to be investigated and verified by the contractor(s) subject to appropriate testing to ensure the material is suitable for its proposed end use. If for some reason excavation material cannot be reused within the site, the contractor(s) will endeavour to ensure that material is reused or recovered off-site insofar as is reasonably practicable.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to 'design out waste';
- Maximum segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated:
  - Concrete rubble (including ceramics, tiles and bricks);
  - Plasterboard;
  - Metals;

- Glass; and
- Timber.

- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site. The waste storage area(s) will be assigned and all construction staff provided with training regarding the waste management procedures on commencement of the project;
- Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site where possible;
- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably
- registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Any nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if it requires removal off-site. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the *EC (Waste Directive) Regulations (2011)* as previously referred to Section 1.4 and detailed in the *C&DWMP*. These mitigation measures will ensure that the waste arising from the construction phase of 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 and will encourage sustainable consumption of resources

Operational Phase

A WMP will be prepared to outline the strategy for management of waste from the operational phase of the proposed development. This strategy and the estimates of waste generation presented in the report have been used to identify storage and equipment requirements for residential waste, which has been incorporated into the development design. The strategy also presents the proposed collection arrangements for waste from the development.

In addition the following mitigation measures will be implemented:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):

  - Dry Mixed Recyclables;
  - Organic/catering waste (including garden waste from landscaping activities).
  - Mixed Non-Recyclable Waste;
  - Glass;
  - Textiles;
  - Batteries (non-hazardous and hazardous)
  - Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment;
  - Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.); and
  - Fluorescent bulb tubes and other mercury containing waste (if arising).

- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified 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.

These mitigation 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.

Monitoring

For the "Construction Phase", the objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. The CDWMP specifies the need for a waste manager to be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that the contractor(s) and sub-contractors are segregating waste. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

For the "Operational Phase", there may be opportunities to reduce the frequency of collection for dwellings within the development where estimates have been too conservative. Waste legislation should also be consulted on a regular basis in case of any changes which may impact on waste management procedures.

16.3.11 Archaeology and Cultural Heritage

Construction Phase

In terms of pre-construction measures, archaeological testing has already been undertake at the site. No remains were identified within the site and no registered monuments are located in its vicinity. As a result there are no pre construction measures required. Land improvements works have taken place at the site in the form of hedgerow removals and drainage works. Archaeological testing has been undertaken and no remains were identified. No registered monuments are located within the area. As a result the impact on the cultural heritage landscape is not significant. Therefore, no further mitigation required at construction stage

Operational Phase

Not applicable.

Monitoring

Not applicable.

16.3.12 The Landscape

Construction Phase

During the construction of the development, the area shall be changed from agricultural use lands to a residential development with a community hub and 2 no. crèches. The introduction of the built structures, roads, carparking and landscaped open spaces will be carried out while maintaining most of the existing hedges and trees of the site. During construction there will be a change to the landscape and there will be negative visual impacts for residents and visitors to the areas adjacent to the site associated with construction activity.

Tree protection shall be provided to retain the character of the existing trees and hedgerows.

The development shall be carried out in an organised basis, thus reducing the visual impact upon the environment; however, the impact on the initial area of construction shall be moderate to significant. The remedial measures proposed include the implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking, etc. Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site rubbish.

Site hoarding will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compound, and scaffolding visible during the construction phase are of a temporary to short term nature only and therefore it is expected that this will require no remedial action other than as already stated.

The retention of the hedgerows surrounding the site combined shall reduce the visual impact of the proposal during construction.

As the development increases and phasing continues, the improvement in terms of landscape elements, trees etc., growth shall reduce the visual impact and in the long term be positive, as other developments in the area grow.

The greatest impact shall be the views through the site as they will become determined by the existing landscape elements of trees and hedges.

As these are being retained and augmented by the introduction of new trees and planting. The predicted impact during construction shall be moderate in the short term depending on the length of time on site.

Operational Phase

The mitigation measures, including measures taken during the design stage, which have evolved throughout the design process, that have been adopted in the proposed scheme and are detailed in the Landscape Plan, are as follows:

- The retention or replacement of some of the existing landscape structure of field boundaries, where possible, as well as boundary trees and an area of wet woodland to the north-west corner. A large, cohesive area of open space has been provided consistent with that set out in the LAP.

- The architectural layout aims to address visual impacts by proposing variety in scale, massing and elevational treatment of buildings and by creating positive frontage onto the proposed Lissywollen Avenue and the Old Rail Trail Greenway.

- The extensive planting of additional trees and shrubs throughout the site and on the site boundaries in keeping with the wider landscape character, will over time, reduce the visual mass of the buildings, soften the development over time from various viewpoints and assist in integrating the development into the landscape.

- Native and pollinator species (as per The All Ireland Pollinator Plan 2015 – 2020) planting for biodiversity has been incorporated into the scheme and this includes a native tree belt / woodland wetland area, wildflower meadows and semi natural grassland.

- It is proposed that the topsoil from the calcareous grassland to the south of the site is retained, stored appropriately and re-spread and allowed to recolonise naturally to form the semi-natural grassland and meadow areas denoted in the Landscape Plan. This is to retain the existing species on site.

- Several connected public open spaces have been designed as part of an overall design strategy that focuses on creating a distinctive 'sense of place' and individual character for the development area. The design of public open space that forms part of a network of spaces that includes areas for passive and active recreation, social / community interaction and play facilities catering for all ages. This area of open space corresponds to that as indicated in the LSFP.

- The hedgerows that are to be removed shall and reinstated with additional native tree planting and a replacement stone wall re-using existing stone will be provided.

- Connections to the Greenway to the south of the proposed development forms an integral part of the landscape proposals, with formal links and piers to announce the access points.

Application of best practice horticultural methods to ensure that mitigation measures establish and grow appropriately.

Landscape works are proposed to reduce and offset any adverse impacts generated due to the proposed development, where possible. The planting of substantial numbers of new trees and other planting in the open spaces the site boundaries and internal roads, both native and ornamental varieties, will enhance the overall appearance of the new development and compensate for the removal of hedgerows and trees where needed for the construction works, and increase the overall landscape capacity of the site to accommodate development.

Monitoring

A Landscape Architect shall be appointed to oversee and monitor the project at construction and operational stage. They shall liaise with other project members in relation to any existing and proposed trees.

The landscape architect shall overview all hard and soft landscape works and liaise with resident engineer, project team and contractor. The landscape architect shall also inspect the trees; however, most of the monitoring works shall be during and post-civil construction stage. The landscape architect

shall review and instruct on details of soft planting, trees, shrubs and of paving materials, walls and railings.

During the operational stage, the Landscape Architect and Arborist shall review the state of all planting and trees, The landscape architect shall review for period of 18 months, from practical completion of each stage the standard and quality of the materials and workmanship. A final certificate of completion shall be issued by the landscape architect in respect of this.