Appendix 1.1 – IAMP ONE Phase Two Environmental Statement

This appendix contains the main report from the 2020 IAMP ONE Phase Two Environmental Statement (ES).

This application was granted planning permission on 22 June 2020.

Should anyone wish to view the appendices associated with the 2020 ES, they can be found on Sunderland City Council's website at https://online-applications.sunderland.gov.uk/ and by searching using planning application reference 20/00556/OU4.

IAMP INTERNATIONAL ADVANCED MANUFACTURING PARK

IAMP ONE PHASE TWO

Environmental Statement

March 2020

HBD

wardell armstrong

CONTENTS

NON-TECHNICAL SUMMARY

ENVIRONMENTAL STATEMENT

FIGURES

APPENDICES

1 INTRODUCTION

1.1 Context

1.1.1 This Environmental Statement (ES) has been prepared by Wardell Armstrong LLP, in conjunction with Lichfields and Systra, in support of the outline planning application for the development of the second phase of IAMP ONE. The application will seek permission to develop an additional area of land in the south-western part of IAMP ONE. Figure 1.1 illustrates the location of the site in the context of the surrounding area. Figure 1.2 identifies the different parcels of land within the overall IAMP site, and the relationship of this application area to these.

1.1.2 This ES presents the findings of the Environmental Impact Assessment (EIA) carried out for the proposed IAMP ONE Phase Two site (the Site). The 25.85ha Site includes some 6.85ha of land within the overall IAMP site area, for which planning permission has not yet been granted. Consent has already been granted for the wider IAMP ONE area[1] and the application for consent for IAMP TWO, to be delivered by a Development Consent Order (DCO) is anticipated as being made in June 2020.

1.1.3 The outline planning application is therefore required in order to complete the suite of planning permissions required to facilitate the development of this part of the wider IAMP development area.

1.1.4 Part of the land within the IAMP ONE (Phase One) site (hereafter referred to simply as IAMP ONE) which has already been granted planning approval is included within the red line boundary for this application in order to demonstrate that, in overall terms, IAMP ONE can be delivered effectively in relation to access, landscaping and flexibility of future development. The overall application area therefore includes the extent of land associated with Plots 1 and 2 and the access road (full width) as far as the eastern end of Plot 2, within IAMP ONE.

1.1.5 The introductory chapters of the 2018 ES for IAMP ONE and the 2019 PEIR (Preliminary Environmental Information Report) for IAMP TWO provide more information on the background to the overall project, the need for the development and the planning policy framework established by the IAMP Area Action Plan (AAP) for the overall development area.

[1] Planning application ref. 18/0092/HE4

1.1.6 This application is being submitted to Sunderland City Council (SCC) as the relevant planning authority. Informal consultation on the scope of the EIA was carried out with SCC and feedback from this has informed the preparation of this ES.

1.1.7 In addition to this ES, the outline planning application comprises the application forms, notices and covering letter; the Planning Statement for the proposed development; a design and access statement; Health Impact Assessment (HIA); the draft Design Code for the IAMP development; and relevant supporting plans and illustrations.

1.1.8 The ES will be available to view online at the website address http://www.sunderland.gov.uk/online-applications/ or during the opening hours of Sunderland City Council, at the following address:

Development Management
Sunderland City Council
Civic Centre
Burdon Road, Sunderland SR2 7DN.

1.1.9 All comments on this ES and the outline planning application should be issued to Sunderland City Council.

1.2 The applicant

1.2.1 The applicant is Henry Boot Developments (HBD). The wider IAMP site is located within the administrative areas of Sunderland City Council and South Tyneside Council. Figure 1.2, Site Extents, shows the relationship between the Site and the wider IAMP development areas, in the context of the surrounding area and the relevant local authority boundaries.

1.2.2 The two Councils are working closely with Nissan, the UK government (at national and regional levels) and with government agencies such as Highways England in the development of the IAMP site.

1.3 Requirement for an Environmental Statement

1.3.1 The statutory requirement for an EIA derives from the 1985 European Council Directive (No85/337/EEC) amended in 1997 by Council Directive 97/11EC that requires the study of the effects of a development upon human beings, flora, fauna, soil, water, air climate the landscape, material assets, cultural heritage, and the interaction between these. The Town and Country Planning (Environmental Impact

Assessment) Regulations 2017 (as amended) translate the EIA Directive into the UK's planning legislation.

1.3.2 In general, an Environmental Impact Assessment (EIA) will be needed for projects likely to have significant effects on the environment by virtue of their nature, size or location. Whether or not a particular development requires an EIA to be carried out depends on the nature of the development. An EIA is compulsory for major types of development listed in Schedule 1 of the 2017 Regulations (known as Schedule 1 development). Schedule 2 indicates types of other development for which an EIA is required when certain thresholds and criteria are met, indicating that the development (by virtue of its nature, size or location) is likely to have significant effects on the environment. Changes or extensions to Schedule 1 or Schedule 2 developments that may have significant adverse effects on the environment also fall within the scope of the Regulations.

1.3.3 Under the terms of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 the proposed development, as an industrial estate development on a site exceeding 0.5ha, is a Schedule 2 development.

1.3.4 The formal requirements for the content of an accompanying ES are set out in Schedule 4 of the EIA Regulations. While every report should provide a full factual description of a project's effects, the emphasis of Schedule 4 is on the significant effects to which the project is likely to give rise. Other effects of little or no significance in relation to planning considerations usually need only brief reference in the ES to indicate that their possible relevance has been considered. There is general guidance given on the definition of what constitutes a significant effect, but this is not exhaustive and much is dependent on expert opinions, including the views of regulatory authorities, as well as local conditions at the site.

1.3.5 The Regulations (Schedule 4, para. 4) provide a checklist of environmental components which should form the basis of an impact assessment:

- population;
- human health;
- biodiversity (in particular, species and habitats protected under The Habitats Directive and The Birds Directive);
- land;
- soil;

- water;
- air;
- climate;
- material assets;
- cultural heritage, including architectural and archaeological heritage;
- landscape; and
- the interaction between any of the above.

1.3.6 This checklist provides the reference point for this ES.

1.3.7 The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 now requires Environmental Statements to assess the potential significant effects arising from the vulnerability of the development to major accidents and disasters, as relevant to that development. This is addressed in chapter 14 of this ES.

1.4 Structure of the ES

1.4.1 The structure of this ES is as follows:

Part A

Introduction to the project and background to the application (this chapter 1). Description of the scope and methodology of the assessment (ES chapter 2). A detailed description of the site, its surroundings and of the proposed development (ES chapter 3). The planning policy context (ES chapter 4). Community consultation and consideration of alternatives (ES chapter 5).

Part B

Environmental assessment of the proposed development. This section includes a detailed examination of the impacts (positive and negative, permanent and temporary, direct and indirect) associated with the development, for the topics listed in Table 1.1 below. Detailed mitigation measures are formulated for negative impacts and the residual impacts of the scheme are quantified.

Non-Technical Summary

The chapters of the ES have been summarised and are reported on using non-technical language. This Non-Technical Summary has also been produced as a separate report so that it can be easily distributed to interested parties.

1.5 The consultancy team

1.5.1 The consultancy team advising on the delivery of the EIA for the IAMP ONE Phase Two development is listed in Table 1.1 below. The lead author(s) name is shown together with their qualifications. Each named individual is deemed to be a "competent expert", as required by the EIA Regulations.

Table 1.1: The EIA Consultancy Team

Role	Company	Author
Introduction	Wardell Armstrong	Gillian Beauchamp, BSc, BPhil, CMLI, PIEMA
Scope and Methodology	Wardell Armstrong	Gillian Beauchamp, BSc, BPhil, CMLI, PIEMA
Site and Project Description	Wardell Armstrong	Gillian Beauchamp, BSc, BPhil, CMLI, PIEMA
Planning Policy Context	Wardell Armstrong	Ben Parkins, BA (Hons), MSc, MRTPI
Community consultation and consideration of alternatives	Wardell Armstrong	Gillian Beauchamp, BSc, BPhil, CMLI, PIEMA
Air Quality	Wardell Armstrong	Philip Walton, BSc (Hons), AIAQM, AIEnvSc
Noise	Wardell Armstrong	Moise Coulon, MIoA, IoA Dip
Landscape and Visual Impact Assessment	Wardell Armstrong	Gillian Beauchamp, BSc, BPhil, CMLI, PIEMA
Waste	Wardell Armstrong	James Benn, BSc (Hons), MSc, MCIWM, PIEMA / Alison Kemp, BSc (Hons), MSc, MCIWM, PIEMA
Water Resources	Wardell Armstrong / Systra	Rachel Graham, BSc (Hons), MSc, MCIWEM, MIEnvSc / L Vioque BEng, MSICE, Tim Dawe, MEng, MICE
Geology and Soils	Wardell Armstrong	Helen Simpson, BSc (Hons), PhD, PIEMA
Ecology and Biodiversity	E3 Ecology	Becky White, MA, MSc, MCIEEM / Tony Martin BSc, PhD, CMLI, MCIEEM
Access and Transport	Systra	Alan Crawford, BA (Hons), MSc, MIHT Shaun Edwards, BEng (Hons), MCIHT
Vulnerability to Major Accidents and Disasters	Wardell Armstrong	Gillian Beauchamp, BSc, BPhil, CMLI, PIEMA
Climate Change	Wardell Armstrong	Addressed within relevant technical chapters of the ES
Cumulative effects	Wardell Armstrong	Gillian Beauchamp, BSc, BPhil, CMLI, PIEMA
Summary and Conclusions	Wardell Armstrong	Gillian Beauchamp, BSc, BPhil, CMLI, PIEMA plus all the above technical authors
Non-Technical Summary	Wardell Armstrong	Gillian Beauchamp, BSc, BPhil, CMLI, PIEMA plus all the above technical authors

2 SCOPE AND METHODOLOGY

2.1 Introduction

2.1.1 Informal consultation with Sunderland City Council was carried out between June and November 2019 and has informed the scope and preparation of this ES.

2.1.2 The scope of the EIA has had regard for the relatively limited size of the site compared with the remainder of the IAMP area, and the findings of the 2018 EIA undertaken for the IAMP ONE (Phase One) site. The methodologies to be used in the assessment would reflect those used for the IAMP ONE (Phase One) ES.

2.1.3 The informal consultation with SCC concluded that this ES would include chapters (some of which would be limited in their extent) on the following:

- air quality;
- noise;
- landscape character and visual amenity;
- waste;
- water environment;
- geology / soils / groundwater;
- ecology and biodiversity;
- access and transport;
- vulnerability to major accidents and disasters; and
- cumulative effects.

2.1.4 Topics to be scoped out of the EIA and excluded from this ES are cultural heritage and socio-economics.

2.1.5 A separate health impact assessment forms part of the documents supporting the outline planning application for the Site.

2.1.6 Sunderland City Council confirmed their agreement to this in a meeting held in November 2019.

2.2 Methodology and significance criteria

General approach

2.2.1 The discussion for each subject area generally follows a format that identifies and addresses:

- Site Activities – describes the site activities and/or sources of potential impact for that particular aspect.
- Potential Effects – describes the method used within each subject area to assess potential effects, both during construction and once the development is operational (including a separate assessment of cumulative impacts, where appropriate), and explains any assumptions or modification to the general impact assessment methodology described here.
- Mitigation Measures – describes the aspects of the design that have been incorporated (embedded mitigation) into the proposed development in order to provide mitigation, and/or the additional mitigation measures that will be used to reduce effects to acceptable levels.
- Residual Effects – re-assesses significance of impacts after mitigation is applied.
- Monitoring and follow-up - identifies what level of monitoring could be necessary, over a defined period, to ensure that mitigation measures remain appropriate and maintain actual effects within acceptable limits.
- Limitations to the Assessment – any absence of information or other limitations (e.g. restrictions on access) that have constrained the assessment in any way.
- Cumulative Assessment – discusses the potential for cumulative effects (see section 2.3, below).

2.2.2 Each technical chapter describes the methodology used in undertaking the assessment, with reference to relevant legislation and guidance, as appropriate. Criteria used to determine whether or not an effect is significant, and (where relevant) the level of effect, is also identified within each technical chapter.

2.2.3 Effects are assessed based on the available knowledge of the site and its surroundings, carried out using desk-based and site surveys and from information made available from the previous assessment work carried out for the adjacent IAMP ONE (Phase One) site.

2.2.4 Assessment methodologies have followed those used for the 2018 IAMP ONE EIA. Effects of construction and operation are addressed. Embedded mitigation, reflecting the mitigation already agreed for the IAMP ONE (Phase One) site is included as part of the baseline for the project; if additional mitigation is considered necessary to address any identified adverse effects, including cumulative effects, this is set out in the

technical chapter. Other measures may be secured via conditions attached to any subsequent consent for the development.

2.2.5 The assessment of construction effects is based on broad parameters, ahead of any detailed design of this aspect. Potentially different construction programmes may be identified based upon supplier requirements for the different units, which could lead to differences in the sequencing of construction, compared with that set out in Chapter 3 of this ES. These variables cannot be clarified at this stage, but sufficient information has been made available to enable an assessment of the potentially worst-case scenario.

2.2.6 Operational effects are similarly difficult to predict in the absence of a defined end user. Where assumptions have been made, or where limitations to the assessment are identified, these are clearly set out within the relevant technical chapter.

2.2.7 For some topics, there are no generally accepted criteria for assessing the level of effect (for instance, in considering the potential significance of any vulnerability of the development to major accidents and disasters). In these instances, professional judgement, experience and agreement with Sunderland City Council on the approach to be taken to the assessment, has been used as the basis of the EIA.

2.2.8 In response to an enquiry relating to the potential development of the Site for a single user, as opposed to several manufacturers, two indicative masterplans have been developed for the Site (Figures 3.1A and 3.1B). Individual technical assessments have determined which of these would result in the worst-case scenario, for that discipline, and undertaken the assessment on that basis.

Defining Terms and Significance Criteria for the EIA

Impact and Effect

2.2.9 The terms impact and effect are often used interchangeably but, within the context of the environmental studies considered in this ES, these terms have specific meanings.

2.2.10 Impact is used with reference to changes in a particular aspect of the environment (e.g. air or water) which can be considered attributable to the site. Where possible the degree of change is quantified.

2.2.11 Effect relates to the implication of changes in the baseline conditions which have been established for a particular receptor. The assessment of the significance of these

changes to the baseline is based on the magnitude of the impact and the sensitivity of the receptor to that change.

2.2.12 Thus, impacts are a measurement of the change upon aspects of the environment, from the baseline condition, as a consequence of the development at the site. The effect is how significant the change will be considering the sensitivity of the receptor.

Site Activities and Identification of Potential Effects

2.2.13 The nature of the assessment and the methodology adopted to define significance is specified for each environmental aspect but fits within a general framework.

2.2.14 Where quantitative techniques can be used, the approach adopted has been to model the natural environment and calculate the magnitude of the potential impact as a consequence of the site activities.

2.2.15 For a number of environmental aspects, qualitative techniques have been used to define the magnitude of the potential impact. For example, the Landscape and Visual Impact Assessment (chapter 8) relies on professional experience and knowledge about the consequences of a given action in order to determine the significance of a predicted impact. Expert judgement is critical to this evaluation.

2.2.16 Where predictions are subject to a degree of uncertainty, this is explained within each topic, together with any assumptions on which they are based.

General Methodology

2.2.17 Environmental impact assessment, in considering the potential for a development to give rise to potentially significant effects, makes a judgement about the sensitivity of the receptor and the magnitude of change likely to be experienced as a result of the proposed development. Effects may be positive, negative or neutral, direct or indirect, primary or secondary, short-term or long-term / temporary or permanent.

Receptor sensitivity

2.2.18 Sensitivity of a receptor will be specific to that receptor and its environment, but is typically based on the scale set out in Table 2.1. Where a specific aspect of the environment has used a variation of this, this is set out within the information for that chapter (main text or appendix).

Table 2.2: Receptor Sensitivity Scale	
Sensitivity of Receptor	**Description of Receptor**
Low	Low importance; abundant; local importance or scale; resilient to change; good potential for substitution within the local area.
Medium	Low to medium importance; relatively abundant; regional important or scale; reasonably resilient to change; potential for substitution.
High	Medium to high importance; relatively rare; national importance or scale; fragile and susceptible to change; limited potential for substitution.
Very High	Very high importance; extremely rare; international importance or scale; very fragile; highly susceptible to change; very limited potential for substitution.
Note: sensitivity considers the characteristics of the receptor together with its geographic extent.	

Magnitude of Change

2.2.19 The general descriptions used in Table 2.2 have been applied and, where relevant, further developed for each environmental aspect, taking into account any performance standards that may be applicable.

Table 2.2: Magnitude of Change Scale	
Magnitude of Change	**Description of Change**
Negligible	Minimal detectable changes in baseline resource. Changes are either of short duration or infrequent, such that direct control is not required to manage potential impact.
Low	Detectable change to the baseline conditions or resource. During construction and operations there would be ongoing change in the underlying characteristics or quality of the baseline conditions.
Medium	Degree of change is such that loss of, or adverse alteration to, the baseline conditions of a specific environmental resource would occur. Post-development characteristics or quality would be partially changed during construction and operational phases.
High	Degree of change is such that total loss of, or adverse alteration to, the baseline conditions of a specific resource would occur. Post-development characteristics or quality would be fundamentally and irreversibly changed.

Defining Significance

2.2.20 Based on the determination of sensitivity of the receptor and the magnitude of change (Tables 2.1 and 2.2, above), a matrix has been produced (Table 2.3, below) to define the scale or level of effect and thus whether or not this is significant, in EIA terms. It is relevant to note that not all assessments use a matrix to determine the level of

effect (for example, the landscape and visual impact assessment). This is explained within the relevant ES chapters.

Table 2.3: Level of Effect Matrix				
Receptor Sensitivity	**Magnitude of Change**			
	Negligible	**Low**	**Medium**	**High**
Low	Negligible	Negligible	Minor	Minor
Medium	Negligible	Minor	Moderate	Moderate
High	Minor	Moderate	Major	Major
Very High	Minor	Moderate	Major	Major

2.2.21 Typically, where an effect is rated as greater than moderate this can be considered to give rise to a significant effect on sensitive receptors. In addition, some moderate effects may be significant; this would be for the assessor to determine, having regard for the specific circumstances. More detailed definitions are set out in Table 2.4. Intermediate levels of effect may also be identified (for instance, minor-moderate, or moderate-major). As noted above, some best practice guidance (for instance, in respect of landscape character and visual amenity assessment) advises against the rigid use of such matrices, preferring to apply professional judgement in arriving at a conclusion on significance.

Table 2.4: Significance of Effect		
Scale of Impact	**Description of Impact (Sensitivity and Magnitude)**	**Significance of Effect**
Positive	Provides a net benefit to the receptor	Positive
Negligible	Receptor not concerned or altered by a particular activity; nearly indistinguishable from natural background variations.	Not significant
Minor	Well within accepted limits or standards; Noticeable impact on receptor, but sufficiently small so as not to be of concern	Not significant
Moderate	Within accepted limits or standards, but close to reaching the threshold; high magnitude changes on relatively insensitive receptors; Low magnitude changes on highly to very highly sensitive receptors	May be significant
Major	Accepted limits or standards are exceeded; high to moderate magnitude changes affecting highly to very highly sensitive receptors	Significant
Not acceptable	Total loss or adverse alteration to extremely rare or unique receptor. No mitigation possible	Significant

Mitigation Measures and Residual Effects

2.2.22 In general, adverse effects rated as significant should be mitigated in order to reduce the level of significance of the residual (post-mitigation) impact. Monitoring measures

may also need to be defined to assess the efficacy of the mitigation. However, under certain circumstances, significant residual effects may be acceptable, particularly if they are outweighed by the overall benefits of the development.

2.2.23 The potential impacts, with mitigation imposed, are assessed to determine the level of residual effects as a result of the site activities. The residual effect is determined as a result of the reduction in level of the impact together with a risk analysis based on any monitoring programme targeted to audit the impact. In certain of the technical assessments, mitigation has been applied as being integral to the site design and operational requirements. Where this is the case, the approach to mitigation has been defined prior to predicting potential impacts (for example, the noise assessment).

2.3 Cumulative impact assessment

2.3.1 Cumulative effects can be intra-project (i.e., the combined effects on soil, water and air quality resulting in adverse effects on the natural heritage, or the combined effects relating to air quality, disruption due to construction, changes in land use and to visual amenity resulting in adverse effects on the local population), or inter-project, where the combination of the proposed development together with other similar proposed developments may result in cumulative effects on one or more aspects of the environment.

2.3.2 Consideration of cumulative effects is a requirement of the 2017 EIA Regulations. Chapter 15 of this ES addresses the potential for cumulative effects on the natural and cultural heritage environments, and on the local people and on land use, arising from the proposed IAMP ONE Phase Two development. This will draw on the findings of the individual technical chapters as set out in para 2.3.4 below.

2.3.3 The methodology for cumulative impact assessment follows the principles established by the EIA process. Residual impacts, post-mitigation, are taken as the basis for the assessment, on the assumption that mitigation measures are put in place as set out in the ES. The sensitivity of receptors is taken to be either high or medium, where this involves the people residing in or using an area, or where this involves the natural environment as a combination of aspects which, when taken together, can be considered to be of at least medium sensitivity. The magnitude of effect will vary depending on the operations being considered as part of the cumulative assessment; the duration of such operations is also of relevance. Sensitivity and magnitude are combined in order to determine the potential for significant adverse cumulative effects and additional mitigation, if required, is developed to address these.

2.3.4 In considering the scope for the proposed IAMP ONE Phase Two development to give rise to potentially significant effects, individual technical chapters will consider the scope for cumulative effects associated with that environmental aspect to result from the combination of IAMP ONE Phase Two together with IAMP ONE and IAMP TWO. In addition, consideration will be given to the potential for cumulative effects in combination with other relevant planning applications, for the areas immediately adjacent to the site.

2.3.5 The current / recently determined planning applications, as well as those that have been approved but not constructed (and not, therefore, part of the baseline environment within the individual assessments) have been identified as:

Approved but not constructed:

- *application ref. 18/02055/FUL – provision of solar panels on building roof, Unipres, Washington Road;*
- *application ref. 18/01869/FUL – proposed three storey 36 bed hotel with parking (etc) on land adjacent to the Three Horse Shoes, Washington Road (variation of condition application ref. 19/02161/VAR forms part of this application, and a decision is awaited on this);*

Awaiting determination:

- *application ref. 17/02085/MW4 – for the construction of a renewable energy centre (gasification plant) on land to the west of Infiniti Drive, Washington. Application refused but appeal lodged in October 2019 (appeal ref. 19/00035/REF, land at Hillthorn Farm);* and
- *application ref. 18/01964/FUL – extension to existing farm shop, tea room (etc) at Elm Tree Nursery, Washington Road.*

2.3.6 Since the conclusion of the informal consultation with SCC (November 2019) there have been no other relevant planning applications received for the areas adjacent to the Site and the above applications remain either not yet constructed or undetermined. Cumulative assessments undertaken for this ES have therefore been restricted to the applications listed above, including those for IAMP ONE and IAMP TWO.

2.3.7 A brief summary of each of the above applications is provided below, to assist in informing the cumulative assessments.

2.3.8 ES Figure 2.1 illustrates the locations of these schemes relative to the Site.

Application ref. 18/02055/FUL – provision of solar panels on building roof, Unipres, Washington Road

2.3.9 As noted above, the Unipres site is directly to the south of the Site, on the south side of the A1290. The application proposes the installation of 17,500 photovoltaic (PV) panels on the roof of the existing building, delivering renewable energy for use by the Unipres site. The PV panels would have anti-reflective coating to make these glint- and glare-free.

2.3.10 This application for installation of solar panels on the roof of the Unipres building, on Washington Road, was approved by Sunderland City Council's Development Control (Hetton Houghton and Washington) sub-committee on 5th March 2019.

2.3.11 Installation of the solar panels had been anticipated as taking place in October or November 2019, but at the time of finalising the planning application, this had not yet taken place (Unipres pers. comm., 6th February 2020).

Application ref. 18/01869 – proposed 3 storey, 36 bed hotel on land adjacent to the Three Horse Shoes, Washington Road

2.3.12 The Three Horse Shoes pub is located on the west side and at the southern end of the Usworth Cottages road, on the north side of the declassified section of Washington Road, east of the A1290.

2.3.13 This application relates to the development of land to the west and north of the public house, some 710m to the east-north-east of the Site. The proposed hotel (reduced in size from 60 bed to 36 bed) would comprise a rectangular building, three storeys in height, with a flat roof, assumed to be some 9.1m above ground level. The hotel is to be located within the north-west part of the plot, north-west of the pub and oriented with its long elevation running west-east with areas of car parking to the south, east and west of the building.

2.3.14 The application was consented (subject to conditions) in October 2019; reserved matters are being discharged at the time of writing. A variation to condition 2 has been submitted (application ref. 19/02161/VAR) which proposes an amended position for the hotel building and changes to the site layout; this is awaiting determination.

2.3.15 The amended (December 2019) plans for the site indicate that some of the existing tree cover in the south-west part of the site, west of the existing pub is likely to be

retained. Elsewhere within the site, trees would be removed as part of the revised scheme.

Application ref. 17/02085/MW4 – gasification plant (Sunderland Renewable Energy Centre), Infiniti Drive, Washington

2.3.16 This application relates to the proposed development of a renewable energy centre (gasification plant) on land to the west of Infiniti Drive, Washington. The site is located on the west side of Infiniti Drive and would be some 1.175km to the south-west of the Site.

2.3.17 The proposed application includes information on the anticipated route of the underground cable connection from the site to the existing electricity substation within the centre of the Nissan site; however, as this would be routed along the existing road network, this aspect of the project is not considered within the cumulative assessment as it is considered that there would be no potential for significant cumulative landscape or visual effects associated with this.

2.3.18 The development proposes the construction of a main building (to accommodate the gasification plant) 140m x 65m and up to 36m high, with associated offices, turbine hall and ACC plant as well as offices and a flue stack, anticipated as 57m in height. The application is accompanied by an Environmental Statement.

2.3.19 The application was refused consent on 2 August 2019 but has since been appealed; as such it is included in the cumulative assessment for the Site.

Application ref. 18/01964/FUL – extension to existing farm shop, tea room and other facilities at Elm Tree Nursery, Washington Road

2.3.20 Elm Tree Farm Nursery lies west-south-west of and some 800m from the Site, on the eastern side of Washington Road and is accessed from the northern end of Infiniti Drive. The existing nursery site lies within the Green Belt.

2.3.21 This application proposed generally low-level extensions of the existing parking area, agricultural building and canopy structure, in addition to an additional polytunnel, new outdoor eating area and new children's play area. Solar panels are proposed for the south-facing elevation of the existing building.

2.3.22 The new / extended structures proposed within the site would be no taller than the existing buildings (approximately 6.0m to ridge height).

3 SITE AND SCHEME DESCRIPTION

3.1 Introduction

3.1.1 The Site forms part of the overall IAMP area as identified in the Area Action Plan (AAP) for IAMP, being the second phase of the consented (and under construction, in part) IAMP ONE development. IAMP TWO is to be delivered and determined under the Nationally Significant Infrastructure Project (NSIP) route.

3.1.2 The triangular piece of land north and west of West Moor Farm was not included in the 2018 IAMP ONE planning application due to issues relating to the availability of up to date ecological survey information and the then occupancy of the West Moor Farm property (which has since been vacated).

3.1.3 Figure 1.1 shows the location of the site in the context of its surroundings, Figure 1.2 shows the site in the context of the wider IAMP development. Plate 3.1 below shows an aerial image of the site and surrounding area, including relevant IAMP ONE boundaries.

Plate 3.1 Aerial view of the site and its surroundings

3.2 Site location and description

The Site

3.2.1 The Site comprises a triangular area of agricultural land (primarily arable); the now-redundant buildings and associated hard standing associated with West Moor Farm and cottage (all of which are to be demolished) located in the south-eastern corner of the triangular site; and land within the wider IAMP ONE site, associated with Plots 1 and 2 and the adjacent section of access road. An area to the east of West Moor Farm is currently in use as a construction compound; Plots 3, 4, 5/6 are nearing completion.

3.2.2 The overall area within the red line boundary for the Site extends to some 25.85ha; the triangular area of land forming Phase Two of IAMP ONE is approximately 6.85ha.

3.2.3 The agricultural land has been established (Sunderland UDP, September 1996) as Grade 3b (i.e. is not best and most versatile agricultural land). Existing field and roadside hedgerow boundaries, including occasional trees (ash, birch, sycamore, hawthorn) run on the eastern edge of the triangular site and the southern edge of the wider Site. A walkover survey of the Site in 2019 confirmed that the hedgerows within the Site are species-poor.

3.2.4 There are no watercourses or waterbodies present within the Site area.

3.2.5 The land is largely level, with only minor variations in elevation. The wider area comprises very gently undulating topography dropping gradually to the River Don (690m-700m to the north); further to the south, south of the River Wear the land rises to a high point of 136m at the Penshaw Monument.

3.2.6 There is an existing access to the A1290 from the West Moor Farm property; this is some 300m to the east of the junction into the Nissan site from the A1290. The site also incorporates an access track linking northwards to North Moor Farm. Both these accesses would be closed to vehicular use, with the implementation of the proposed development.

Surrounding land uses

3.2.7 Within the immediate surroundings of the Site, the existing Nissan works lie to the south of the A1290, agricultural land continues to the west and north, with the wider IAMP area to the north-east and east.

3.2.8 The closest residential property to the Site is North Moor Farm, located 250m to the north. The residential areas of Sulgrave and Usworth Hall are over 1km to the west and those of Town End Farm and Hylton Castle are over 1.5km to the east.

3.2.9 A high voltage overhead transmission line on lattice steel towers runs from south-west to north-east just beyond the Site's north-western (diagonal) boundary. This would be retained in situ.

Transport network

3.2.10 The A1290 forms the southern boundary of the Site. Minor improvements to this (some localised widening at the northern junction with International Drive, the internal spine road for IAMP ONE – see para. 3.3.21 below) are being undertaken as part of the IAMP ONE Phase One consent and are due for completion in June 2020. In due course the A1290 will be widened to dual carriageway as part of the road improvements associated with IAMP TWO.

3.2.11 Further to the east of the site is the A19 (T), one of the region's key north-south routes. The A194 (M) runs from south-west to north-east, some 2.5-3km to the north-west of the Site.

3.2.12 A network of 'A' roads and more minor roads provide connections to and within the nearby settlements.

3.3 Description of the development

3.3.1 The Site lies wholly within the administrative area of Sunderland City Council.

3.3.2 The outline planning application seeks planning permission for:

"Outline planning permission for the erection of industrial units (up to 98,937.2sq.m.) (gross internal area) for light industrial, general industrial and storage and distribution uses (Class B1(c), B2 and B8) with ancillary office and research and development floorspace (Class B1(a) and B1(b)) with internal accesses, parking, service yards, electricity sub-stations, attenuation basins and associated infrastructure, earthworks and landscaping, as well as the demolition of the existing buildings at West Moor Farm. All matters are reserved for determination at a later stage."

3.3.3 Access is reserved for future approval because the precise location of any access routes into and within the Site are not yet known. Access to the Site itself will be taken from the A1290 via International Drive (International Drive is currently under construction). See also para. 3.3.12, below.

3.3.4 In accordance with Policy S2 (Land Uses) of the adopted IAMP Area Action Plan (AAP) 2017-2032, the principal uses on site will be production, supply chain and distribution activities directly related to the Automotive and Advanced Manufacturing sectors (use classes B1(c), B2 and B8) (defined below) and related supporting uses:

- nano-engineering;
- additive / precision manufacturing;
- design / management of supply chains;
- green manufacturing;
- next generation electronics; and
- continuous manufacture of pharmaceuticals / bio manufacturing.

3.3.5 The IAMP AAP recognises that an element of B1(a) office space for business services and B1(b) research and development space will be required as ancillary space to support the principal uses on site.

3.3.6 A series of plans have been prepared to support the outline planning application and to broadly identify the proposed form of the IAMP ONE Phase Two development. These plans have been used to inform the results of the assessments reported in the technical chapters of this ES. The full list of development plans is set out in the Planning Statement. Appendix 3.1 includes some of these plans, in particular the Parameter Plans; the Indicative Masterplans are included as ES Figures 3.1A and 3.1B.

3.3.7 A description of the parameter plans is provided below.

Parameter plans

3.3.8 A series of parameter plans (see Appendix 3.1) have been developed, following the same principles as those used for the IAMP ONE (Phase One) site. These seek to achieve a balance between the need for some flexibility to be maintained, such that a detailed design can be reserved for subsequent approval, whilst defining the key principles of the Site in sufficient detail to enable the likely significant effects of the development to be assessed.

3.3.9 These plans are consistent with the overarching design principles set out in the draft Design Code (see also para. 3.3.16 *et seq* below) as well as with the Design and Access Statement.

3.3.10 The parameter plans comprise:

- Parameter Plan 1 'Extent of Development' (Appendix 3.1, drg. no. 6600-0352; this defines the maximum extent of the development plots and separates the site into zones.
- Parameter Plan 2 'Access' (Appendix 3.1, drg. no. 6600-048); this defines the potential connections to the consented internal spine road for the IAMP from the south-western part of the Site.
- Parameter Plan 3 'Green Infrastructure' (Appendix 3.1, drg. no. 6600-055); this identifies the locations for landscaping (within the wider site this includes green corridors, wildlife corridors and screening planting), routes for non-motorised users, lighting, street furniture, infrastructure, attenuation basins/SuDS; fencing and open space. Planting is particularly proposed on the site boundaries and within / adjacent to car parking areas. The landscape plan for the Site ties in with that of the plan for the adjacent IAMP ONE Phase One site, except where screen planting is no longer required as mitigation (to the east of West Moor Farm). The plan also shows the area of future land required for the dualling of the A1290 and which is to be maintained as a green corridor during IAMP ONE Phase One.
- Parameter Plan 4 'Building Heights' (Appendix 3.1, drg. no. 6600-056); this defines the maximum height of the buildings proposed within the 'built development zone' as being 30m above the average existing ground level within the development zone. This height includes any permanent (but not temporary) plant and machinery.

3.3.11 Two indicative masterplans have been developed for the Site (Figures 3.1A and 3.1B). These provide two examples of how the scheme could be taken forward, based on the broad parameters set out above. The indicative landscape strategy is based on these masterplan layouts. These drawings are submitted for information purposes only and are not intended to form part of the approved drawings. As noted in chapter 2 (para. 2.2.8) of this ES, the individual technical assessments have taken the worst-case version of these indicative site layouts as the basis for their assessment.

3.3.12 Given the outline nature of the application, it is not possible to confirm the final position of individual plot accesses. A standard design for the junction layout has been proposed as part of the consented IAMP ONE Phase One and the same design would be applicable to the Phase Two site. This comprises a 7.3m wide carriageway for each minor arm; a right-turn facility; shared use path into the development plot; 10m corner radii; and a dropped kerb crossing the junction with tactile paving. Junctions

will be spaced at a minimum of 50m centre-to-centre on the same side of the spine road, and a minimum 25m stagger provided for junctions on opposite sides of the carriageway.

Land use and floorspace

3.3.13 Land use will be as described above in terms of the anticipated industrial and warehouse / distribution uses and ancillary accommodation (para. 3.3.4).

3.3.14 This application does not seek to increase the amount of floorspace above that already approved through the IAMP ONE permission (156,840 sq.m. / around 1.688M sq.ft.). Given the permissions granted to date for plots 3, 4 and 5/6, this outline application seeks permission for the balance of floorspace remaining within IAMP ONE: 98,937.2 sq.m. / around 1.065M sq.ft. This aspect is addressed in more detail in the Planning Statement accompanying the outline application, from para. 3.4 *et seq*.

Heights and levels

3.3.15 The maximum height of the buildings within the 'Extent of Development' (Parameter Plan 4, Appendix 3.1) will be 30m above the average existing ground level within the part of the Site where the building is proposed. This height includes any permanent plant and machinery associated with the development.

Building design

3.3.16 A draft Design Code was submitted with the 2018 IAMP ONE ES to provide the overarching design principles for the IAMP and to set out pragmatic, flexible guidance for the individual plots or buildings within the IAMP. The Design Code is to be read in conjunction with the AAP (policies D1, D2, T1-T4, IN1, IN2 and EN1-EN4), which set out the key agreed parameters and a series of strategic policies, design guidelines and masterplan principles. The design of buildings and plots within this Site will comply with this Design Code. The accompanying Planning Statement prepared by Lichfields outlines how this scheme complies with AAP policy.

3.3.17 A Design and Access Statement is provided as part of the outline planning application for the Site which reinforces this requirement.

3.3.18 Each industrial unit will be of a modern design, set within landscaped plots, with the necessary vehicle parking, loading/unloading (if required) and manoeuvring areas. Buildings may need to be operated over a 24 hour, 7 day week period and it is therefore likely that external operational areas will require to be lit during the hours

of darkness to the minimum levels required for their safe operational use. Buildings will incorporate the latest design specifications for energy efficiency and the use of sustainable resources.

3.3.19 Full details of the building design will be agreed at the reserved matters stage; however, sufficient information has been made available to ensure that this EIA can be undertaken satisfactorily.

Access

3.3.20 Finalised information relating to access into the individual development plots from the under-construction International Drive will be determined as part of the detailed design for each plot. However, the same parameters as are being applied to the approved IAMP ONE (Phase One) site will apply.

3.3.21 International Drive connects to the A1290 at two locations: one in the south (to the west of the Nissan site access) and one in the north (to the south-west of the A19 Downhill Lane junction).

3.3.22 Access to North Moor Farm is currently provided from the A1290 via Downhill Lane and Follingsby Lane; the existing farm track is also used by construction vehicles. Access to North Moor Farm from the A1290 at West Moor Farm will be closed as part of the development proposals.

3.3.23 Access to the ELMA area would be obtained from the existing track at North Moor Farm.

Landscaping

3.3.24 An indicative landscape design was prepared for the IAMP ONE (Phase One) site extents (2018 ES, Chapter F, drgs. F9.1-F9.7) in order to minimise impacts on landscape character and visual amenity, and the same principles would be applied to the landscaping of this Site. This will include the following:

- screen planting of indigenous trees and shrubs established around the perimeter of the Site, including a percentage of grey poplar in addition to native woodland species. Some evergreen species (Scots pine, holly) will be included for year-round screening. Planting to the north-western boundary will have regard for the presence of the overhead electricity transmission line and will comprise relatively lower-growing species. National Grid clearance requirements will be adhered to;

- an additional planting buffer will be developed within the south-western triangular corner of the Site, using native woodland tree and scrub species, to provide enhanced visual screening of the development in views from the A1290 (eastbound);
- low topsoil bunding will be created, where possible, around the perimeter of the site, using topsoil stripped from within the Site area. This will provide additional screening of the built development, in addition to providing a good growing medium and accentuating the height of the planting;
- existing hedging and tree planting retained on the perimeter of the Site (and, where possible, within the Site extents) will be protected against damage during construction and augmented with native hedgerow tree and shrub species;
- verges within the development will be seeded with low maintenance grass mixes, to create a neat mown edge to roads and footpaths;
- any swales created within the Site will be seeded with an appropriate wildflower / marginal species mix to increase biodiversity and enhance visual amenity;
- screen planting (existing and as proposed) along the A1290 road frontage will be maintained;
- ornamental tree and shrub planting will be used at the entrances to individual development plots to accentuate the sense of arrival and highlight these access points for drivers;
- street furniture, lighting and signage will be co-ordinated across the development as a whole to create a unified style;
- links will be provided for pedestrians and cyclists into the development area; and
- to minimise light intrusion and reduce the prominence of the development at night, from surrounding areas, external lighting within the development will be fully cowled or else directed downwards / inwards, away from the perimeter of the site.

3.3.25 A Landscape Management and Maintenance Plan, as well as a Habitat Management Plan, has been prepared for the IAMP ONE (Phase One) site. A planning condition of IAMP ONE requires the preparation of a Landscape and Ecological Management Plan for the development plots and public realm areas within the development area, prior to the commencement of any planting within these areas. This will include details of

how the landscaping scheme will be managed and maintained in the future. It is likely that this requirement will extend into the area of the Site.

Ecology

3.3.26 The IAMP development extents include 110ha of land allocated as Ecological and Landscape Mitigation Area (ELMA) within the IAMP AAP (see Figure 1.2). This land will be used to implement some of the mitigation and/or compensation for impacts of the IAMP development on the habitats and species of the area.

3.3.27 Further ecological mitigation to address site-specific losses associated with the development of the Site (IAMP ONE Phase Two) has been identified and is set out in chapter 12 of this ES. This includes making provision for potential losses of nesting / roosting habitat (associated with the demolition of the West Moor Farm buildings) for barn owl and bats.

Flood risk and drainage

Surface drainage strategy

3.3.28 A detailed surface water design strategy has been developed for the infrastructure drainage, which will manage run-off from the main access roads, and will provide connection points for surface water from the development plot(s).

3.3.29 As the final development plot arrangements will not be finalised until the reserved matters stage, a detailed surface water design strategy has not yet been established for the development plot(s). The drainage design for the plot(s) will be submitted at the reserved matters stage.

Public storm sewer

3.3.30 There are no public surface water sewers within or adjacent to the Site. The closest surface water sewer is within Cherry Blossom Way, to the south. Northumbrian Water has previously stated that surface water from the development should be directed to watercourses rather than sewers.

Foul drainage

3.3.31 Northumbrian Water Ltd (NWL) has confirmed that there is adequate spare capacity in their network at Manhole 2701, which is adjacent to the old section of the A1290 highway west of the Site (following the realignment of that part of the road in 2017). Manhole 2701 contains an 1125mm diameter combined sewer.

3.3.32 A new trunk foul sewer system has been designed, part of which drains to a foul sewage pumping station that was constructed as part of IAMP ONE. A discharge rate of 51 l/s (litres per second) had been agreed with NWL for that installation, which discharges westwards to the combined sewer at MH2701. Two additional pumping stations will be provided for IAMP TWO which will operate in sequence. The first collects sewage from the development north of the River Don and transfers it southwards to a second facility, which also collects sewage from most of the IAMP TWO development south of the Don. This second facility sends its discharge westwards to the combined sewer at Manhole 2701.

Generally

3.3.33 The IAMP ONE Phase Two site development has been allowed for within all of the above drainage design work. No additional works are required therefore, other than to manage the surface and foul drainage associated with plot developments within the Site boundary.

Sustainability

3.3.34 It is intended that energy efficiency and sustainability will form an intrinsic part of the development proposals for the Site. Key aspects are set out below.

Energy use

3.3.35 Good practice will be applied across the development, making maximum use of natural heating and cooling processes in order to minimise energy consumption. The benefits of natural daylighting will be maximised in all building types, whilst ensuring that excessive solar gain is avoided through careful design. Buildings will seek to make best use of natural ventilation, including the cooling available from night-time dissipation of heat.

3.3.36 Where possible, a proportion of the development's energy requirements will be addressed through the provision of onsite generation of renewable energy; this could include roof-mounted photovoltaic panels.

3.3.37 Other sustainable aspects could be incorporated into the future development, ensuring it is energy efficient and facilitating the reduction of CO_2 emissions. This could include:

- water efficiency, reducing water demand through low usage / water-efficient fittings;

- water recycling systems;
- energy conservation, adopting a 'fabric first' approach to achieving an efficient building fabric with a high thermal mass;
- use of low energy light fittings; and
- energy metering and auditing.

Drainage

3.3.38 As noted above, developments will incorporate Sustainable Drainage Systems (SuDS) into the layout of their sites, to ensure rainwater is as far as possible returned to the ground and not discharged to the wider foul or surface water network.

Waste

3.3.39 Developments (including during construction) will be encouraged to minimise waste disposal with the use of waste audits promoted as far as possible.

Travel

3.3.40 Provision for pedestrians and cyclists will be incorporated into the overall layout of the development area, and facilities for cycle storage will be incorporated into individual site layouts.

3.3.41 A Construction Traffic Management Plan would be prepared and implemented for each development plot. This would include a Green Travel Plan to ensure that travel to the site by construction workers is as sustainable as possible, promoting car sharing and use of public transport in order to reduce individual car journeys to the site.

Accessibility

3.3.42 Developments within the site will be fully compliant with the requirements of the Disability Discrimination Act. All entrances to and exits from buildings will be designed with level thresholds and appropriate vertical access to all levels will be provided.

3.3.43 Accessible parking areas will be located adjacent to the main circulation points to minimise travel distances.

3.3.44 A Travel Plan is provided as part of this planning application, in line with the wider framework Travel Plan previously prepared for IAMP ONE.

3.4 Construction methodology

Construction phasing

3.4.1 Construction of the development is anticipated as commencing in February 2021, subject to planning permission. The first phase of work will comprise the removal of topsoil from the areas proposed for built development (including roads and parking areas) and construction of the access road(s) into the individual development plots. Where possible, topsoil removed from within the development areas will be retained for use on site in bunding and landscaped areas.

3.4.2 Utility and drainage provision for the site overall has been designed into the works for the wider IAMP ONE site area. Connections from individual plots will be provided as part of the preliminary on-site works.

3.4.3 In advance of construction work commencing on any plot within the Site, it is anticipated that a pre-commencement ecological survey / walkover and report will require to be completed, to ensure that there is no disturbance to any ecology (fauna and flora) as a result of construction operations.

3.4.4 The hours during which construction (not including deliveries, see below) is anticipated as occurring on site are:

- Mondays to Fridays, 0700 – 1800 hours.
- Saturdays, 0800 – 1700 hours.
- No working on Sundays and Bank or Public Holidays.

Construction site access

3.4.5 Access into the development plots will be obtained from the main spine road within the IAMP ONE site, via the access constructed from the A1290 Washington Road.

Construction access routes

3.4.6 Construction vehicles will be contractually obliged to follow an agreed route to and from the site, as set out in a Construction Traffic Management Plan (CTMP). It is anticipated that Heavy Goods Vehicles (HGVs) accessing the development site will do so via the A19 (north or south) and then travel via the A1290 to the internal site access road. This routeing is intended to avoid, as far as possible, sensitive areas such as schools, hospitals, built-up residential areas and sections on the existing road network that experience notable congestion.

Construction delivery timing

3.4.7 To minimise disruption to the immediate surrounding area, including avoiding potential conflict with times when shift changes take place within the adjacent Nissan factory, the CTMP will set out those times when construction deliveries to the site will be permitted. These would typically be restricted to:

- Mondays to Saturdays, between 08.00 hrs and 14.30 hrs.

There would be no deliveries on Sundays, Bank Holidays or public holidays.

3.4.8 Where appropriate, for the delivery of specific elements of equipment or materials, any large construction vehicles will be required to adhere to an allocated delivery time slot, to be agreed with the local highway authority.

Wheel washing

3.4.9 Any new construction site entrances will be kept clear of mud, debris and materials at all times. Deposition of mud or soils onto the public road will be minimised, including through the re-use of excavated topsoils on site, as far as practicable. All loads leaving the site will be sheeted.

3.4.10 Wheel wash facilities will be available for all vehicles leaving the site and roads will be inspected on a daily basis, with the additional implementation of a road sweeper, if required.

On-site parking

3.4.11 The expectation is that the daily movement of construction staff will, wherever possible, take place via multi-occupancy trips using car sharing. Given the nature of the working patterns in the construction industry, these trips can be anticipated as occurring outside of the typical peak 'commuting' periods.

3.4.12 A specific, hard-surfaced parking area for construction staff vehicles accessing the site will be developed; this will be able to be shared with visitors to the site and delivery vehicles. Signage will be provided to direct vehicles to the correct areas.

Site security and contact details

3.4.13 Security at the site entrance will control access to the site area which will be restricted to authorised vehicles only. Adequate turning provision will be provided within the site enabling vehicles to enter and exit in a forward gear.

3.4.14 Contact information, including mobile phone number(s) will be provided to all people anticipated as requiring access to the site. This contact information will also be made available to the local community so that direct liaison with the site can be facilitated, should there be a requirement for issues to be resolved.

Site waste management plan

3.4.15 A Site Waste Management Plan (SWMP) will be prepared; this will include details of the types and volumes of excavations and construction waste arisings anticipated for the proposed development site. This would be similar to but separate from the Construction Demolition Management Plan (CDMP) described below.

3.4.16 The SWMP will identify where materials can be re-used, recycled or otherwise recovered, in preference to sending waste to landfill, which will only occur where no other alternatives are available. This will take into consideration factors such as any potential hazards presented by the waste type, estimated volumes of waste, benefits of re-use and whether local markets exist to receive these waste streams.

Construction demolition management plan

3.4.17 The proposed development of the Site includes the demolition of the existing West Moor Farm buildings. The required archaeological buildings survey, requested by Tyne & Wear Archaeology Services, has been completed and the report of survey is included as Appendix 3.2. Prior to this demolition taking place, a Construction Demolition Management Plan (CDMP) will be prepared. As with the SWMP described above, this CDMP will identify the types and volumes of waste anticipated as arising from the demolition of the farm buildings, and the means of re-using, recycling, recovering or otherwise disposing of these, in a sustainable manner. Any potential hazards will be identified (e.g. asbestos) as will any end users able to receive the demolition waste.

Construction Environmental Management Plan

3.4.18 A Construction Environmental Management Plan (CEMP) will be prepared prior to the commencement of works on site. This will include any mitigation identified within this ES, in relation to construction activities, including measures to minimise construction noise and control dust emissions from the site.

3.4.19 Industry good practice will be implemented to minimise construction noise; this will include:

- use of modern and well-maintained plant and equipment;
- switching off plant when this is not being used; and
- scheduling of noisy works outside of sensitive times, i.e. avoiding the early morning and weekend periods.

3.4.20 The Dust Management Plan (DMP) included as part of the CEMP will include a range of site-specific mitigation measures to control dust emissions; these will include:

- locating machinery and activities likely to generate dust, including stockpiles of soils, as far as possible from sensitive receptors;
- fully enclosing the site, or specific operations, where possible, particularly where there is high potential for dust and particles to be produced;
- avoiding runoff from site, of water or mud;
- keeping site fencing, barriers and scaffolding clean, using wet methods;
- removing materials with the potential to produce dust from site as soon as practicable, unless these are proposed for re-use on site;
- stockpiles to be covered and any long-term stockpiles of topsoil or subsoil to be seeded, to prevent wind stripping;
- all stationary vehicles to have engines turned off;
- dust suppression techniques, including water sprays, to be used during extended dry conditions;
- use of bonfires or burning of waste materials on site;
- use of water-assisted road sweepers on access and local roads, to remove any material tracked out of the site;
- implementation of a wheel wash on site; and
- all loaded vehicles entering or leaving the site to be sheeted to prevent escape of materials during transport.

3.4.21 With the implementation of all of the above it is considered that construction can take place with minimal impact on the local environment.

4 PLANNING POLICY CONTEXT

4.1 Introduction

4.1.1 This chapter of the ES sets out, in summary form, the planning context for the proposed development. A more detailed Planning Statement[1] is also provided in support of the outline application.

4.1.2 The following plans and guidance are primary material policy considerations relevant to this outline planning application:

- The National Planning Policy Framework (February 2019).
- Planning Practice Guidance (March 2014).
- The Adopted Development Plan, comprising:
  - Sunderland Core Strategy and Development Plan 2015-2033 (CSDP), adopted January 2020; and
  - International Advanced Manufacturing Park, Area Action Plan, adopted November 2017.

4.1.3 These aspects are considered further, below.

4.2 Planning history

4.2.1 The outline planning application being submitted for this Site forms part of the wider planning base for the delivery of the International Advanced Manufacturing Park (IAMP). On 15 September 2015 the Secretary of State gave a direction that the IAMP should be treated as a project of national significance, for which development consent is required, under Section 35(2)(a)(ii) of the Planning Act 2008 (as amended) and Regulation 2 of the Infrastructure Planning (Business or Commercial Projects) Regulations 2013 (Original Direction).

4.2.2 Detailed information on the planning background to the overall development of IAMP is included in section 3 of the Planning Statement for the 2018 IAMP ONE consented development. In summary, in order to bring forward and meet the demand for early development on part of the IAMP site, an area (known as IAMP ONE) was taken out of the DCO process and made subject to consent by means of a planning application. Part of that IAMP ONE area (Phase Two) was not included within the planning

[1] International Advanced Manufacturing Park (IAMP) Planning Statement, IAMP ONE Phase Two, Henry Boot Developments, March 2020 (Lichfields)

application for the development due to the need for updated ecology surveys and also as the property within that parcel of land (West Moor Farm) was still occupied, at that time.

4.2.3 This outline planning application is being submitted to ensure that the whole of the IAMP ONE area can benefit from a planning consent, and thereby deliver the benefits anticipated at the outset of the process.

4.3 National and local planning policies and guidance

National Planning Policy Framework (NPPF)

4.3.1 The current NPPF was published and came into effect in February 2019. It sets out the Government's planning policies for England, and how these should be applied. It provides the framework within which local development plans are produced but does not contain specific policies for nationally significant infrastructure projects.

4.3.2 Achieving sustainable development is at the heart of the NPPF, through the use of economic, social and environmental objectives; a presumption in favour of sustainable development forms the core principle of the NPPF.

4.3.3 Section 6 of the NPPF addresses economic expansion and delivery of economic growth and productivity and sets out the ways in which planning policies should seek to promote this.

4.3.4 Section 9 of the NPPF relates to the promotion of sustainable transport, noting that transport issues should be considered from the earliest stages of plan-making and development proposals, so that potential impacts of development on transport networks can be addressed. Opportunities to promote walking, cycling and public transport use should be identified and pursued; and environmental impacts of traffic and transport infrastructure identified and addressed.

4.3.5 Section 12 relates to quality of design and achieving well designed places, including the use of design guides and codes to provide a framework for creating distinctive places.

4.3.6 Section 14 relates to supporting the transition to a low-carbon future, planning for and meeting the challenge of climate change (including flooding).

4.3.7 Section 15 relates to the conservation and enhancement of the natural environment, through protection (at international, national and local level) and through the

development of improved networks of habitats and green infrastructure, including across local authority boundaries.

4.3.8 Section 16 addresses the conservation and enhancement of the historic environment, recognising that, where a development would adversely affect a non-designated heritage asset, a balanced judgement is required, having regard to the scale of loss and significance of the asset. Developers should be required to record and advance understanding of the significance of any heritage asset to be lost, in a proportionate manner.

4.4 National Planning Practice Guidance (2014)

4.4.1 On 6th March 2014 the Department for Communities and Local Government (DCLG) launched a planning practice guidance (NPPG) web-based resource. The NPPG covers a wide range of topics including design, climate change, EIA, the historic environment, travel plans / transport assessments and statements, water and waste.

4.5 Adopted Development Plan

4.5.1 As noted above, the relevant parts of the adopted development plan are the Sunderland CSDP and the IAMP Area Action Plan (AAP).

Sunderland Core Strategy and Development Plan 2015-2033

4.5.2 The CSDP was adopted in January 2020. It consists of three parts:

- Part One – Core Strategy and Development Plan (CSDP), which sets out the overarching strategy, strategic policies and strategic allocations and designations for the future change and growth of Sunderland, as well as local policies for development management purposes.
- Part Two – Allocations and Designations Plan (A&D Plan), setting out local policies including site-specific policy designations and allocations for the development, protection and conservation of land in the city in order to deliver the strategy set out in the CSDP.
- Part Three – International Advanced Manufacturing Park (IAMP) Area Action Plan (AAP) 2017-2032 (the IAMP AAP), which sets out the site-specific policies for the comprehensive development of the IAMP.

4.5.3 The CSDP notes (para. 1.6) that it and the IAMP AAP have superseded saved policies of the Sunderland Unitary Development Plan (UDP) 1998 and its 2007 Alteration (No.

2). However, some saved UDP policies will remain as part of the Development Plan, until the A&D Plan is adopted, and are required to be read alongside the CSDP.

4.5.4 CSDP Policies that are relevant to the Site and its immediate surroundings are:

- Policy CN15, Great North Forest. The Site lies within an area covered by this policy; developments that assist in the creation of the Great North Forest (on land between and around the main urban areas) will be permitted. Developments that would adversely affect the creation of the Forest will be resisted.
- Policy CN16, Trees / Woodland. This policy seeks to retain and enhance existing woodlands, tree belts and field hedgerows and encourages new planting of native species.
- Policy CN23, Wildlife Corridor. The adjacent area of land proposed for development as the ELMA (Ecological and Landscape Management Area) lies within land designated as a wildlife corridor. Within this corridor, measures to conserve and improve the environment will be encouraged, while development adversely affecting the continuity of the corridor will normally be refused. Where, on balance, development is acceptable because of wider plan objectives, appropriate habitat creation measures will be required to minimise detrimental impacts.
- Policies T8 Pedestrians, T9 Cyclists, and T10 Paths and Multi-User Routes. These policies promote non-vehicular transport, including for people with disabilities.
- Policy T13, Highway Improvements, T14 New Development, and T15 Protection of Road Lines and Communications Corridors. These policies relate to requirements for improved transport infrastructure, noting that promotion of new roads that facilitate the movement of industrial traffic and assist the development of proposed industrial and commercial areas, will be supported.

4.5.5 The UDP Proposals Map allocates the existing Nissan site as an area to be retained and improved for economic development (Policy EC2).

4.5.6 Although the UDP Proposals Map shows the Site as lying with the Green Belt (Policies CN2, CN3, CN4 and CN5), the Area Action Plan (AAP) prepared for the IAMP has removed this land from the Green Belt.

4.5.7 The Great North Forest policy is no longer relevant.

4.5.8 A range of other saved UDP policies relate to the more general aspects of development planning, including aspects such as environmental protection,

transportation, noise and vibration, contamination, flooding and water quality. These are addressed within the Planning Statement prepared for this outline planning application and included in Table 4.1, below.

IAMP Area Action Plan

4.5.9 The IAMP Area Action Plan (AAP) was adopted on 30th November 2017. It provides the planning policy framework for the comprehensive development of approximately 392,000 sq.m. of floorspace for uses related to the automotive and advanced manufacturing sectors, delivered on a 150ha site that has been removed from the Green Belt. The adjacent land to be retained for ecological and landscape mitigation (ELMA) (110ha) remains in the Green Belt.

4.5.10 Of this land, the IAMP ONE Phase Two site comprises 25.85ha (of which 6.85ha is land for which planning permission has yet to be granted), the remaining 19ha forms part of the previously-consented IAMP ONE site (which is 61ha overall, including 4.9ha of on-site ELMA land).

4.5.11 The AAP's vision for the IAMP (AAP para. 2.6) is:

"A nationally important and internationally respected location for advanced manufacturing and European-scale supply chain industries. A planned and sustainable employment location that maximises links with Nissan and other high value automotive industries as well as the local infrastructure assets, including the ports, airports and road infrastructure."

4.5.12 Para. 2.7 of the AAP states that the type of place the Councils are seeking to create is:

"an attractive working environment that creates the conditions in which businesses can establish and thrive and where people choose to work. A unique opportunity for increased job and business creation and the promotion of regional prosperity whilst taking advantage of natural assets and green infrastructure including the River Don corridor."

4.5.13 The AAP sets out a broad range of policies addressing development within the AAP. In addition to policies setting out how development is to be taken forward (Policies S1, S2 and S3) are policies addressing aspects such as design, the public realm, transport infrastructure and parking, flood risk, landscape, ecology, green infrastructure, and securing mitigation.

4.5.14 The Planning Statement prepared as part of this outline planning application describes these in more detail in Chapter 5 of that Statement.

4.6 Analysis of the relevant Planning Policies

4.6.1 The analysis of the relevant planning policies against the findings of the EIA is set out in Chapter 6 of the Planning Supporting Statement, prepared by Lichfields and included as part of the outline planning application for the Site. This information is not therefore repeated here.

5 COMMUNITY CONSULTATION AND CONSIDERATION OF ALTERNATIVES

5.1 Community Consultation

5.1.1 Consultation with the local community was undertaken following discussions with Sunderland City Council on the type of consultation considered to be appropriate for the proposed planning application. This was agreed as a leaflet drop, targeted at specific residential and commercial areas in the vicinity of the site and immediate surroundings, in addition to organisations and businesses with connections to the IAMP site.

5.1.2 The leaflet drop was carried out in February 2020. A copy of the leaflet, together with a figure identifying the area within which it was circulated, is included in Appendix 5.1.

5.1.3 There were very few comments received in response to the leaflet drop. These are summarised in Chapter 4 of the accompanying Planning Statement (Lichfields, March 2020).

5.1.4 A response on behalf of a landowner within IAMP TWO raised various questions in relation to the proposed outline planning application and indicated that further comments would be provided once the planning application is submitted. The comments include querying how the inclusion of additional land does not increase the amount of approved floorspace. The applicant is seeking, through this submission, to enter into a planning condition to prevent the total floorspace for IAMP ONE being exceeded. The precise mechanism is to be agreed during the planning application process. Additionally, the comments contend that this is not comprehensive development and that this application will prejudice the Development Consent Order. However, the Secretary of State has already agreed to the early delivery of IAMP ONE (including the triangular area of land) through a planning application and that IAMP TWO is a project of national significance and is to be consented by way of a DCO. As such, bringing forward the additional triangular area of land through a planning application rather than through the DCO process will not prejudice the DCO.

5.1.5 Responses from the general public ranged from no objections; the suggestion that IAMP should be suspended and that manufacturing could be leaving the area rather than moving in; and that bringing jobs to the area is welcomed but increased traffic is not, and that the metro line should be extended to Washington using the nearby closed Leamside Line.

5.1.6 Following BREXIT on the 31st January 2020, the basis for future trade agreements between the UK and other nations, including the European Union, is still to be confirmed. The automotive sector is a key economic component of the UK economy, particularly the export market, and global companies, such as Nissan Manufacturing UK (NMUK), have made commitments to retain investment and build new models within the UK. That can be evidenced by the automotive sector investment that is currently taking place at IAMP ONE Phase One. Government policy, as set out in recent press releases from the new administration, is to bring forward the date when no new carbon fossil fuel-based vehicles can be sold within the UK. This is the key focus for the sector in its Research & Development and product development – the move to electric vehicles.

5.1.7 Importantly, this is a long-term development that will be brought forward over 15 years – there will be natural 'ebbs and flows' over this period to which the development can and will respond. Looking at the present, there is strong demand for the units currently being brought forward in IAMP ONE Phase One; the commitments made by NMUK to enhance its presence in Sunderland and to build new models; and the lack of other sites for large scale manufacturing in the North East – all of these factors point to long term growth and investment demand for IAMP (including IAMP TWO).

5.1.8 With regard to the comment about additional traffic, it is recognised that there will be more vehicles in the area; however, the number of vehicular movements will not be above that already approved through the 2018 IAMP ONE permission.

5.1.9 The possibility of extending the Tyne and Wear Metro System through to Washington is being considered at a regional level and is something that is part of a long-term strategic transport proposition. However, there are no approved plans for such an extension at the current time.

5.1.10 Improvements to local bus infrastructure were approved as part of the 2018 IAMP ONE permission and any future occupiers of buildings will need to submit and have approved a Travel Plan which will encourage public transport use and hence seek to reduce the number of journeys by private car.

5.2 Alternatives

5.2.1 Consideration of the reasonable alternatives studied by the developer, and a description of these is a requirement of the EIA legislation (Regulation 18, 3 (d) and

Schedule 4, point 2). The legislation notes that these are to be "*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 development on the environment*."

5.2.2 Typically, consideration of alternatives may include aspects such as the 'do nothing' option, potential alternative sites, designs, site accesses or alternative technologies.

5.2.3 The PEIR for IAMP TWO (March 2019) noted in the Non-Technical Summary (para. 1.3.5) that "*Alternatives to IAMP as a whole were assessed during the production of the IAMP AAP. This concluded that the land to the north of Nissan was the preferred option due to its size and availability for development, adjacency to Nissan, and its links to transport networks."* The PEIR for IAMP TWO also included an assessment of alternatives (PEIR Chapter C, section C3.3 and Appendix C2). This addressed the size and scale of the development, its location (with reference to the site selection criteria), the design of the development and the 'no project' alternative. A high-level comparison of environmental impacts, between the different site options, was also included, although this concluded that such a comparison is not appropriate.

5.2.4 In the case of the proposed development of the IAMP ONE Phase Two site, the planning application is required to complete the suite of consents necessary to deliver the IAMP development as a whole, within the wider area identified for this. Alternative sites and accesses, and the 'do nothing' option, are not therefore relevant. As the application is for outline planning consent, this leaves open the type of industry that may wish to develop land within the Site boundary.

5.2.5 It is therefore considered that, given the work previously completed in this regard, there is no requirement for any further consideration of reasonable alternatives as part of this submission.

6 AIR QUALITY

6.1 Introduction and background

6.1.1 This chapter of the ES assesses the potential effects of the proposed development of IAMP ONE Phase Two (the Site) on air quality.

6.1.2 The proposed development at IAMP ONE Phase Two includes the demolition of the existing buildings associated with the former West Moor Farm, as well as the removal of the existing topsoil within the site, in order to facilitate the development of the site as part of the wider IAMP area. There are no vehicle generation increases arising from IAMP ONE Phase Two.

6.1.3 This ES chapter details the results of the air quality screening assessment, which considers the potential disamenity dust effects and fine particulate matter arising during the construction phase of the development. A qualitative discussion of air quality emissions arising from vehicular generation during the operational phase is also included and the assessment considers the findings from a previous air quality assessment undertaken as part of the wider IAMP ONE consent[1].

6.2 Consultation and scope of the assessment

6.2.1 Informal consultation with Sunderland City Council (SCC) suggested that an air quality assessment be included within the EIA for the Site, but that this be limited to consideration of potential effects associated with the demolition of the buildings at West Moor Farm, in the south-eastern corner of the site, and the removal of topsoil from the Site. Sensitive receptors to be affected by the construction activities are outlined in Table 6.2.

6.2.2 The air quality effects of the operational phase were assessed as part of the wider IAMP ONE consent. Due to the reasons outlined in the introductory Chapters, the original outline application did not include the triangle of land forming the south-western part of the Site (the location of West Moor Farm). However, for air quality (and transport), the assessment considered the entirety of IAMP ONE as being operational. Consequently, vehicle generation and the subsequent impacts this may have had on air quality have already been accounted for and modelled as part of the outline May 2018 Air Quality Environment Statement[1], prepared by Golder Associates.

[1] Planning application ref. 18/00092/HE4

6.2.3 The demolition of West Moor Farm will provide land in excess of what was previously assessed in the May 2018 report[1]. However, this additional land will not result in a net increase in developable floorspace or vehicle generation. Consequently, all vehicle generation arising from IAMP ONE has already been assessed[1].

6.2.4 Two indicative masterplans have been prepared for the outline planning application, as outlined in the introductory Chapters. The construction activities of each will be similar. The Masterplans assume the development may be either multiple industrial units or a single, larger industrial unit. No vehicle generation increase will occur from either Masterplan.

6.3 Methodology

Legislation, policy context and literature review

Relevant air quality legislation and guidance

6.3.1 The air quality assessment has been undertaken in accordance with the following legislation and guidance:

- EU Ambient Air Quality Directive 2008/50/EC (i.e. the CAFE Directive);
- The Environment Act 1995;
- Department of Environment, Food and Rural Affairs, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, July 2007;
- The Air Quality Standards Regulations 2010;
- Department for Environment, Food and Rural Affairs, Local Air Quality Management Technical Guidance LAQM.TG(16), February 2018;
- Ministry of Housing, Communities and Local Government, National Planning Policy Framework, February 2019; and
- Department for Communities and Local Government, Planning Practice Guidance: Air Quality, March 2014.

6.3.2 Further details of these documents are included in Appendix 6.1.

6.3.3 The relevant air quality objectives and limit values applicable to the proposed development are set out below in Table 6.1.

Table 66.1: Air Quality Objectives and Limit Values Relevant to the Assessment*

Pollutant	Objective/Limit Value	Averaging Period	Obligation
Nitrogen Dioxide (NO_2)	200µg/m^3, not to be exceeded more than 18 times a year	1-hour mean	All local authorities

Table 66.1: Air Quality Objectives and Limit Values Relevant to the Assessment*			
Pollutant	**Objective/Limit Value**	**Averaging Period**	**Obligation**
	40µg/m^3	Annual mean	All local authorities
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	England, Wales and Northern Ireland
	40µg/m^3	Annual mean	England, Wales and Northern Ireland
Particulate Matter ($PM_{2.5}$)	Limit Value of 25µg/m^3	Annual mean	England, Wales and Northern Ireland
**In accordance with the Air Quality Standards Regulations 2010*			

Construction Phase Impacts

6.3.4 To assess the impacts associated with dust and fine particulate matter releases during the construction phase of the development, an assessment has been undertaken in accordance with guidance from the Institute of Air Quality Management (IAQM)[2]. Further details of the construction assessment methodology are provided in Appendix 6.2.

6.3.5 Two sensitive receptors have been identified within 350m of the Site, one human (high sensitivity, North Moor Farm) and one ecological. The ecological receptor is the ecological and landscape mitigation area (ELMA), which borders to the land to the north of IAMP ONE. The land is not an ecological designation and therefore it would typically be assigned a low sensitivity in accordance with the IAQM Construction Guidance criteria. However, in recognition of the ELMA (and Green Belt) status of this land, a medium sensitivity is assigned to this area, for the purposes of this assessment.

6.3.6 A summary of the sensitive receptors in relation to where construction phase activities will take place is detailed in Table 6.2.

Table 6.2: Closest Existing Sensitive Receptors to the Proposed Site		
Receptor	**Direction from the Site**	**Approximate distance to the closest on-site operation (m)***
North Moor Farm	North	235m
ELMA	North and west	Adjacent to site boundary
*construction vehicles are expected to travel onto the A1290 and toward the A19(T). There are no sensitive receptors located on this route, within 50m of the roadside at a distance of up to 500m from the construction site entrance.		

[2] Institute of Air Quality Management, Guidance on the Assessment of Dust from Demolition and Construction, February 2014

6.3.7 The criteria used to assess the construction impact of the proposed development, and the associated significance of effects at existing sensitive receptors, are included in Appendix 6.2.

Operational Phase Impacts

6.3.8 A discussion of the potential impact during the operational phase is outlined in this ES Chapter. Reference is made to the findings of the previous ES for IAMP ONE prepared by Golder Assocciates.[1]

6.3.9 A review of the most recent air quality information is included in this Chapter as well as a discussion regarding vehicle-derived air quality impacts.

6.4 Baseline situation

Background air pollutant concentrations

6.4.1 The air quality assessment needs to take into account background concentrations upon which the local, traffic derived pollution is superimposed.

6.4.2 As there are currently no representative NO_2, PM_{10} or $PM_{2.5}$ monitoring locations in the vicinity of the proposed development site, background concentrations have been obtained from the 2017-based Defra default concentration maps, for the appropriate grid squares[3].

6.4.3 The background pollutant concentrations used in this assessment are detailed in Table 6.3.

Table 6.3: Background Pollutant Concentrations used in the Air Quality Assessment (x: 433500 y: 559500*)

Pollutant	2020 Annual Mean Concentrations (µg/m^3)
Nitrogen Dioxide (NO_2)	11.07
Particulate matter (PM_{10})	12.18
Particulate matter ($PM_{2.5}$)	6.98
*Grid reference centred at Moor House Farm	

6.4.4 Background pollutant concentrations at and in the vicinity of the development are well below air quality objectives.

[3] Accessed through the Defra Local Air Quality Management webpages (http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html)

Sunderland City Council and Local Pollution Review

6.4.5 The proposed development is located on land to the north of the A1290, north of the Nissan manufacturing plant, surrounded by arable farming land and the under-development IAMP ONE site. There are no significant sources of pollution near the Site, however the A19(T) is located approximately 1.4km to the east.

6.4.6 There are no air quality monitors operated by SCC in the vicinity of the Site and no air quality monitoring was undertaken as part of the IAMP ONE submission.

6.4.7 For the IAMP TWO Development Consent Order application, air quality monitoring has been undertaken by the Applicant. A 9-month monitoring study was completed at 9 locations in the local area (near and around the A1290 and A19), and data has been annualised. Of most relevance to this assessment are diffusion tubes 1 and 2 which are located at the A1290, located at West Moor Farm and near Downhill Lane which is the closest monitoring location to the Site. Annualised 2018 NO_2 concentrations were 22.10 µg/m^3 and 20.80µg/m^3 respectively.

6.5 Assessment of effects

Construction Phase

Step 1 – Requirement for Detailed Construction Phase Assessment

6.5.1 There are sensitive receptors located within 350m of the future construction activities. The requirement for a detailed construction phase risk assessment is met.

6.5.2 The IAMP ONE outline submission[1] includes sensitive receptors around the entirety of the red line boundary. Consequently, the highly sensitive residential receptors are located in closer proximity than North Moor Farm to this site assessment. It is therefore anticipated that the permitted dust mitigation scheme will already account for risks higher than those predicted in this assessment. This is due to the assessment only considering the construction works at the triangular area of land at West Moor Farm. Demolition of West Moor Farm is included in the assessment.

Step 2 – Impact Assessment

6.5.3 In accordance with the IAQM guidance, the main activities to be considered during the construction phase of the proposed development are demolition, earthworks, construction and trackout.

6.5.4 The existing farmhouse and outhouses at West Moor Farm will be demolished as part of this application. Demolition activities involve the tearing down of buildings or

structures by either deconstruction or destructive means. Only deconstruction activities are proposed in this application.

6.5.5 Earthworks covers the processes of soil-stripping, ground-levelling, excavation and landscaping. Earthworks also encompasses any material handling activities which may be required either during the working of the surfaces or by unloading/loading activities.

6.5.6 Construction activities will focus on the construction of proposed buildings, access roads and car parking areas. This includes the foundation design and application of concrete.

6.5.7 Trackout is defined as the transport of dust and dirt by vehicles travelling from a construction site on to the public road network. This may occur through the spillage of dusty materials onto road surfaces or through the transportation of dirt by vehicles that have travelled over muddy ground on the site. This dust and dirt can then be deposited and re-suspended by other vehicles.

Step 2A

6.5.8 Step 2A of the assessment defines the potential dust emission magnitude from demolition, earthworks, construction and trackout in the absence of site-specific mitigation.

6.5.9 Examples of the criteria for the dust emission classes are detailed in Appendix 6.2. The results of this step are detailed in Table 6.4.

Step 2B

6.5.10 Step 2B of the construction phase dust assessment defines the sensitivity of the area, taking into account the significance criteria detailed in Appendix 6.2, for demolition, earthworks, construction and trackout. The sensitivity of the area to each activity is assessed for potential dust soiling, human health effects and ecological effects.

6.5.11 For demolition, there are currently between 1 and 10 receptors (residential) within 350m of where these activities may take place.

6.5.12 For earthworks and construction, there are currently between 1 and 10 receptors (residential) within 350m of where these activities may take place, which is assumed to be the site boundary for the purposes of this assessment. The ELMA is estimated to be located within 20m of an earthwork activity but up to 50m from a construction-specific activity.

6.5.13 For trackout, there are no sensitive receptors located within 50m of where trackout may occur for a distance of up to 500m from the site entrance (assuming construction vehicles exit onto the A1290 and travel to the A19). Notwithstanding the IAQM Construction Guidance terminology, the sensitivity of the area is defined as medium.

Step 2C

6.5.14 Step 2C of the construction phase dust assessment defines the risk of impacts from each activity, by combining the dust emission magnitude with the sensitivity of the surrounding area.

6.5.15 The risk of dust impacts from each activity, with no mitigation in place, has been assessed in accordance with the criteria detailed in Appendix 6.2. The results of this step are detailed in Table 6.4.

Summary of Step 2

6.5.16 Table 6.4 details the results of Step 2 of the construction phase assessment for the sensitive receptors identified.

Table 6.4: Construction Phase Dust Assessment for Sensitive Receptors

	Activity			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Step 2A				
Dust Emission Magnitude	Small[a]	Large[b]	Large[c]	Large[d]
Step 2B				
Sensitivity of Closest Human Receptors	High	High	High	High
Sensitivity of Closest Ecological Receptors (ELMA)	Medium	Medium	Medium	Medium
Sensitivity of Area to Ecological Impacts	Low	Medium	Low	Low
Sensitivity of Area to Dust Soiling Effects	Low	Low	Low	Low
Sensitivity of Area to Human Health Effects	Low[e]	Low[e]	Low[e]	Low[e]
Step 2C				
Dust Risk: Dust Soiling	Negligible Risk	Low Risk	Low Risk	Low Risk
Dust Risk: Human Health	Negligible Risk	Low Risk	Low Risk	Low Risk
Dust Risk: Ecological	Low Risk	Medium Risk	Low Risk	Low Risk

Table 6.4: Construction Phase Dust Assessment for Sensitive Receptors				
	Activity			
	Demolition	Earthworks	Construction	Trackout
a. Total volume of material to be demolished estimated to be less than 20,000m^3 *b. Total site area estimated to be more than 10,000m^2* *c. Total building volume estimated to be between 25,000 and 100,000m^3, with potentially dusty construction materials* *d. Number of construction phase vehicles estimated to be more than 50 movements per day (IAMP ONE Phase One submission estimates up to 84 movements per day)* *e. Background annual mean PM_{10} concentration is taken from the LAQM Defra default concentration maps, for the appropriate grid square for 2018*				

Operational Phase

6.5.17 The proposed development does not introduce any new vehicle flows.

6.5.18 The IAMP ONE submission[1] included an operational phase assessment of vehicle generation, using the detailed modelling software ADMS-Roads. The assessment predicted air quality pollutants (NO_2, PM_{10} and $PM_{2.5}$) concentrations at various sensitive receptor locations and for a proposed 2020 future operational year. The scope of study covered the main road network to be utilised by the development (this included the A1290, A19, A1231 and A184).

6.5.19 The air quality assessment predicted negligible air quality changes and that pollutant concentrations would be below the air quality objectives and limit values in all scenarios considered.

6.5.20 The additional extent of development land included as part of this submission is not expected to result in significant effects or even any changes to those conclusions predicted previously, in terms of air quality.

6.6 Mitigation measures

Construction Phase

Step 3 – Mitigation

6.6.1 During the construction phase, the implementation of effective mitigation measures will substantially reduce the potential for nuisance dust and particulate matter to be generated, which can be secured by planning condition.

6.6.2 Step 2C of the assessment has identified that the risk of dust soiling and human health effects is not negligible for all the activities and therefore site-specific mitigation will

need to be implemented to ensure dust effects from these activities will be not significant.

6.6.3 Best practice dust control measures are recommended and would be set out in more detail in a Dust Management Plan, prepared as part of the Construction Environmental Management Plan (CEMP) for the site, in advance of development commencing.

6.6.4 Examples of typical dust controls, included in the Management Plan, are:

- regular grading and maintenance of haul roads, if used within the Site;
- speed restrictions on vehicles within the Site;
- recording of all dust complaints and prompt action to address these, keeping a detailed written log of received information and complaints, and actions taken to resolve the situation;
- provision of training to the site personnel, on dust mitigation;
- laden lorries to be covered before leaving the site;
- provision of water bowsers to spray haul roads and stockpiles with water to suppress dust emissions, as necessary; and
- minimising of stockpiling heights, thereby reducing wind whipping and lofting.

6.6.5 Additional measures in order to manage dust generation from the building demolition works, are to soft-strip inside the building prior to demolition and to also retain windows and doors to limit dust releases. The outbuildings shall be checked prior to demolition for asbestos and should any asbestos be found, this will be removed from Site by a specialist contractor.

Operational Phase

6.6.6 No additional mitigation above that required for IAMP ONE Phase One is deemed necessary, due to there being no prediction of significant effects. Mitigation measures required for IAMP ONE include a number of transport-related measures, including junction upgrades, traffic management improvements and a travel plan.

6.7 Residual effects

6.7.1 Residual effects are those effects of the development that remain after mitigation measures have been implemented. With the implementation of the measures set out in the Dust Management Plan, residual effects would expect to be negligible, for construction and operation.

6.8 Cumulative effects

6.8.1 The construction and working of land within this Site will be completed as part of the construction of IAMP ONE. The identified committed developments requiring due consideration for cumulative effects will not cause adverse risks during their construction period, should this coincide with that of the Site, i.e. increased disamenity dust and fine particulate matter releases, due to the distances between these developments and the Site. No consideration of potential cumulative effects of construction is therefore required, for these.

6.8.2 Both IAMP ONE, this development and the future developments at IAMP TWO would all be worked in accordance with an approved Construction Environmental Management Plan (CEMP), which will outline an extensive list of mitigation ensuring that the potential for dust and fine particulate matter arising from construction activities will be minimal and will be controlled.

6.8.3 In relation to the cumulative effects associated with traffic generation and air quality, the outline submission[1] considered two committed developments within the traffic data modelled: Hillthorn Farm Commercial Park and Turbine Business Park. Due to the low pollutant concentration predictions presented in the air quality report accompanying the 2018 outline submission, it is anticipated that any additional committed developments that might be considered, would not change the overall conclusions of the assessment and would remain as negligible and not significant. There is no additional floorspace proposed, or additional vehicle generation arising from IAMP ONE Phase Two.

6.9 Limitations of study

6.9.1 There were no limitations to this study.

6.10 Summary and conclusions

6.10.1 An air quality screening assessment has been completed which considers the potential air quality effects of both the construction and operational phases of the IAMP ONE Phase Two development proposals.

6.10.2 A construction phase risk assessment has concluded there is a risk of potential disamenity dust and fine particulate matter releases during the demolition, earthworks, construction and trackout activities during construction of the development. Mitigation to control and limit dust generation during construction would be outlined in a Construction Environmental Management Plan.

6.10.3 A qualitative review of the potential air quality effects during operation of the development has been undertaken. A review of the baseline indicates pollutant concentrations in the local area are well below the air quality objectives and limit values.

6.10.4 The proposed development will complete the suite of planning permissions required to implement IAMP ONE. IAMP ONE and all traffic arising from it has been assessed in a previous Environmental Statement, prepared by Golder Associates. The planning application was granted, and the Air Quality Chapter concluded negligible air quality changes and no significant effect. There are no vehicle increases proposed as part of this development, therefore there will be no adverse air quality changes arising. A negligible and not significant effect is predicted. No significant cumulative impacts on air quality have been identified.

7 NOISE

7.1 Introduction

7.1.1 This chapter of the ES assesses the likely significant effects of the development on the nearest Existing Sensitive Receptors (ESRs). Potential noise impacts are assessed for the construction and operational stages using a combination of measured and predicted noise levels.

7.1.2 The baseline situation is considered, before the likely environmental effects of the proposed development upon the current uses are identified, during the construction and operational phases, taking into account any cumulative effects. Mitigation measures to reduce any negative environmental effects are identified, as appropriate, before the residual environmental effects are assessed.

7.1.3 The aims of this noise assessment are as follows:

- to identify noise criteria based on current guidance;
- to identify existing sensitive receptors;
- to propose mitigation measures should these be required;
- to assess residual impacts with mitigation measures in place; and
- to assess potential cumulative impacts.

7.1.4 Two indicative masterplans have been prepared for the outline planning application; this noise assessment considers the layout for the single unit, as this is the likely worst-case option with regards to potential noise impacts.

7.2 Consultation and scope of the assessment

7.2.1 Informal consultation was carried out with Sunderland City Council (SCC) as part of the preparation of this ES and this concluded that significant noise effects on noise ESRs was considered unlikely but that an assessment would be undertaken, focussing on the occupants of North Moor Farm. Vibration effects would not be assessed.

7.2.2 No new baseline information is required as the wider IAMP ONE site was granted outline planning approval, with baseline noise levels measured and presented in the supporting ES (Chapter E and appendices). The relevant baseline levels previously presented for North Moor Farm have been utilised for this assessment.

7.2.3 This chapter therefore considers the following aspects of noise:

- existing noise levels at North Moor Farm;

- construction noise impact at North Moor Farm;
- operational noise impact at North Moor Farm; and
- any noise mitigation measures which may be required.

7.2.4 The development forms part of the wide IAMP ONE project and would not generate additional traffic on the local network compared to the traffic flows already anticipated in the outline planning approval for the wider IAMP site. This is due to the quantum of the proposed development being the same as the IAMP ONE consent. As such, the development would not have a significant impact in respect of any changes to road traffic noise at receptors along the road network and this is not considered further within this ES chapter.

7.3 Planning policy and guidance

7.3.1 This section provides a brief commentary on the noise policy, guidance and standards relevant to this assessment. The details on how these were applied for the assessment are included in the methodology section.

National Planning Policy Framework

7.3.2 The main national guidance document for Local Planning Authorities is the National Planning Policy Framework (NPPF). The NPPF came into force in 2012 and superseded Planning Policy Guidance Note 24: 'Planning and Noise' (PPG24). It was updated in February 2019 and is the current planning policy guidance within England.

7.3.3 Paragraph 180 of the NPPF states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking in account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) Mitigate and reduce to a minimum potential adverse impact resulting from noise from new development - and avoid noise giving rise to significant adverse impact on health and the quality of life;

b) Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."

7.3.4 Paragraph 182 of the NPPF states:

"Planning policies and decisions should ensure that new development can be integrated with existing business and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

7.3.5 With regard to 'adverse impacts' the NPPF refers to the 'Noise Policy Statement for England' (NPSE), which defines three categories, as follows:

- NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to noise.

- LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

- SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

7.3.6 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided. The second aim refers to the situation where the impact lies somewhere between LOAEL and SOAEL, and it requires that all reasonable steps are taken to mitigate and minimise the adverse effects of noise. However, this does not mean that such adverse effects cannot occur.

Planning Practice Guidance (PPG 2014)

7.3.7 In March 2014, the Department for Communities and Local Government (DCLG) launched the Planning Practice Guidance (PPG) web-based resource. This provides guidance on the approach to Noise and Vibration.

7.3.8 The PPG provides further detail about how the effect levels can be recognised. Above the NOEL, noise becomes noticeable; however, it has no adverse effect as it does not cause any change in behaviour or attitude. Once noise crosses the LOAEL threshold it begins to have an adverse effect and consideration needs to be given to mitigating

and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. Increasing noise exposure further might cause the SOAEL threshold to be crossed. If the exposure is above this level the planning process should be used to avoid the effect occurring by use of appropriate mitigation such as by altering the design and layout of the development. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused. At the highest extreme the situation should be prevented from occurring, regardless of the benefits which might arise. Table 7.1 summarises the noise exposure hierarchy.

Table 7.1: Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to close windows for most of the time. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality	Significant Observed Adverse Effect	Avoid

Table 7.1: Noise Exposure Hierarchy			
Perception	**Examples of Outcomes**	**Increasing Effect Level**	**Action**
	of life diminished due to change in acoustic character of the area.		
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an 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.	Unacceptable Adverse Effect	Prevent

7.3.9 Overall, the PPG in relation to noise summarises the approach to be taken when assessing noise. It accepts that noise can override other planning concerns, but states:

"Neither the Noise Policy Statement for England nor the National Planning Policy Framework (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separate from the economic, social and other environmental dimensions of proposed development"

British Standard 5228-1:2009 +A1:2014 (BS5228), Code of Practice for Noise and Vibration Control on Construction and Open Sites

7.3.10 Guidance on the prediction and assessment of noise and vibration from construction sites is provided in British Standard (BS) 5228 2009 +A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise. BS5228 provides recommended limits for noise from construction sites.

British Standard 4142:2014 +A1:2019 (BS4142), Methods for rating and assessing industrial and commercial sound

7.3.11 BS4142 is used to rate and assess sound of an industrial and/or commercial nature including:

- Sound from industrial and manufacturing processes
- Sound from fixed installations which comprise mechanical and electrical plant and equipment
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises

- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

7.3.12 The standard is applicable to the determination of the following levels at outdoor locations:

- Rating levels for sources of sound of an industrial and/or commercial nature
- Ambient, background and residual sound levels, for the purposes of:
  - investigating complaints;
  - assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and
  - assessing sound at proposed new dwellings or premises used for residential purposes.

7.3.13 The purpose of the BS4142 assessment procedure is to assess the significance of sound of an industrial and/or commercial nature. BS4142 refers to noise from the industrial source as the 'specific noise' and this is the term used in this chapter to refer to noise that is predicted to occur due to commercial activities. BS4142 assesses the significance of impacts by comparing the specific noise level to the background noise level (LA90).

7.3.14 Certain acoustic features can increase the significance of impacts over that expected from a simple comparison between the specific noise level and the background noise level. In particular, BS4142 identifies that the absolute level of sound, the character, and the residual sound and the sensitivity of receptor should all be taken into consideration. BS4142 includes allowances for a rating penalty to be added if it is found that the specific noise source contains a tone, impulse and/or other characteristic, or is expected to be present. The specific noise level along with any applicable correction is referred to as the 'rating level'.

BS8233 Guidance on sound insulation and noise reduction for buildings

7.3.15 British Standard 8233 "Guidance on sound insulation and noise reduction for buildings" 2014 bases its advice on the WHO Guidelines, which recommends 35 dB LAeq,16hour during the daytime period and 30 dB LAeq,8hour during the night-time period. In addition, for internal noise levels it states:

"Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."

7.3.16 Furthermore, with regard to external noise, the Standard states:

"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 LAeq,T with an upper guidance value of 55 dB LAeq,T which would be acceptable in noisier environments. However, it is also recognised 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."

7.4 Methodology

Identification of Existing Sensitive Receptors

7.4.1 As stated above, the consultation process identified North Moor Farm as the one Existing Sensitive Receptor (ESR) to be assessed. This is a residential dwelling to the north of the proposed development and is shown as ESR1 in Figure 7.1. The co-ordinates are listed below in Table 7.2.

Table 7.2: Existing Sensitive Receptors

Existing Sensitive Receptors	Co-ordinates		Sensitivity	Distance to proposed development (m)
	X	Y		
ESR1-North Moor Farm	433015	559052	Moderate	180

Criteria for Significance of Impact

7.4.2 The potential noise effects associated with the Proposed Development have been assessed in accordance with the guidance to determine whether noise and impacts occur at receptors. Where likely adverse effects are identified, appropriate mitigation measures are proposed to avoid, reduce or compensate for the adverse effects.

7.4.3 The significance of an environmental impact is determined by both the sensitivity of the receptor and the magnitude of the impact which can be defined as shown below in Table 7.3Table 7.3 and Table 7.4.

Table 7.3: Sensitivity of a Receptor	
Sensitivity	**Description**
High	The receptor/resource has little ability to absorb change without fundamentally altering its present character or is of international or national importance. Groups of 10 or more properties, schools, or SSSI
Moderate	The receptor/resource has moderate capacity to absorb change without significantly altering its present character or is of high importance. Individual residential properties
Low	The receptor/resource is tolerant of change without detriment to its character, is of low or local importance. Residential properties, where occupants have an interest in the development, commercial and business uses, and amenity

Table 7.4: Magnitude of Impact	
Magnitude of Impact	**Definition**
Major	Impact resulting in a considerable change in baseline environmental conditions predicted either to cause statutory objectives to be significantly exceeded or to result in severe undesirable consequences on the receiving environment.
Moderate	Impact resulting in a discernible change in baseline environmental conditions predicted either to cause statutory objectives to be exceeded or to result in undesirable consequences on the receiving environment.
Minor	Impact resulting in a discernible change in baseline environmental conditions with undesirable conditions that can be tolerated
Negligible	No discernible change in the baseline environmental conditions, within margins of error of measurement.

7.4.4 An Impact Significance Matrix as shown in Table 7.5 combines both the magnitude and sensitivity and was used in this assessment to establish the significance of the noise impact. An impact equal or below moderate is considered to be not significant in EIA terms and above moderate is considered significant.

Table 7.5: Impact Significance Matrix				
Magnitude	**Sensitivity**			
	High	**Moderate**	**Low**	**Negligible**
Major	Substantial	Moderate	Moderate	Negligible
Moderate	Substantial	Moderate	Minor	Negligible
Minor	Moderate	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Methodology for Construction Noise

7.4.5 The activities associated with the construction phase of the development will have the potential to generate noise and vibration and create an impact on the surrounding area. Guidance on the prediction and assessment of noise from development sites is set out in BS5228-1 (Noise).

7.4.6 Construction noise can have disturbing effects on the surrounding neighbourhood. The effects are varied and are complicated further by the nature of the site works, which will be characterised by noise or vibration sources that will change location throughout the construction period. The duration of site operations is also an important consideration. Higher noise and vibration levels may be acceptable if it is known that the levels will occur for a limited period.

7.4.7 Under Section 60 of the Control of Pollution Act (COPA) 1974, the local authority has the power to serve a notice which could impose requirements as to the way in which works are to be carried out. This could specify times of operation, maximum levels of noise which should be emitted and the type of plant which should or should not be used. This is a common way of enforcing reasonable levels of construction noise.

7.4.8 However, it may be preferable for the chosen contractor to obtain prior consent under Section 61 of COPA 1974. Section 61 enables anyone who intends to carry out works to apply to the local authority for consent. Under Section 61, the local authorities and those responsible for construction work have an opportunity to settle any problems, relating to the potential noise, before work starts.

7.4.9 In addition to COPA 1974, BS5228-1 provides guidance on significance criteria for assessing the potential noise impacts associated with the construction phase of large projects. For the purposes of this noise assessment, the noise likely to be generated by construction phase, has been assessed against significance criteria established, using the ABC Method from BS5228-1.

7.4.10 The ABC method for determining a threshold requires the ambient noise levels at existing sensitive receptors to be determined. The ambient noise levels at each existing receptor location are then rounded to the nearest 5dB(A) to determine the appropriate threshold value in accordance with the category value, A B or C, as detailed in Table 7.6.

Table 7.6: Thresholds for Construction Noise at Residential Receptors in accordance with the ABC Method of BS5228-1			
Assessment Category and Threshold Value Period (LAeq)	**Threshold Value, in decibels (dB)**		
	Category A *	**Category B ****	**Category C *****
Daytime (0700 to 1900 hours) and Saturdays (0700 to 1300 hours)	**65**	**70**	**75**
* Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than this value.			
** Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.			
*** Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category B values.			

7.4.11 As noted above, the ambient noise levels have been established based on baseline surveys undertaken for the previous IAMP ONE planning application. The ambient levels have then been used to set the category (either A, B or C) and compared to noise predictions for construction activities.

7.4.12 The construction noise assessment considers BS5228 parts 1 and also sets out details of 'best practice' management and control measures to ensure that impacts are minimised as far as possible.

Methodology for Operational Noise (Industrial Noise)

7.4.13 The operational phase of the development will add new plant noise and vehicle movements to that already consented for the wider IAMP ONE site, hence has the potential for impacts on North Manor Farm, which is the closest identified receptor. An assessment has been undertaken to compare the existing background levels with predicted plant noise.

7.4.14 Baseline noise levels and limits at North Moor Farm, from the previous IAMP ONE application, have been used and predictions of potential noise from the development have been undertaken for comparison with these limits.

7.5 Baseline situation

Noise Survey

7.5.1 A noise survey was carried out for the wider IAMP ONE application, and this data has been utilised for this assessment. Baseline noise monitoring was carried out in

November 2017 at six locations surrounding the wider IAMP ONE site and this included noise monitoring at North Moor Farm.

7.5.2 At North Moor Farm, distant road traffic on the surrounding road network, including on the A1290, A19 and A184 were the dominant noise sources. Noise from the Nissan plant was also audible, which included a constant, low-level, low-frequency droning noise and reverse alarms.

7.5.3 A summary of the measured levels at North Moor Farm is shown in Table 7.7 below.

Table 7.7: Summary of measured baseline noise levels at North Moor Farm in November 2017

Period	Measured Level, dB			
	$L_{aeq,T}$	L_{Amax}	$L_{A10,T}$	$L_{A90,T}$
Daytime (2 hours)	45	68	46	41
Night-time (30 minutes)	45	60	46	43

7.5.4 The baseline noise levels may now have changed slightly as construction of the first IAMP ONE units has started; however, it is judged that the November 2017 baseline levels are representative for the purpose of this assessment.

7.6 Assessment of effects

Assessment of Construction Noise

7.6.1 The existing sensitive receptor, North Moor Farm, has the potential to be affected by the construction phases of the proposed development.

7.6.2 The hours of operation for the construction works will likely be between 07:00 – 18:00 Mondays to Fridays (excluding Bank Holidays) and 08:00 – 17:00 on Saturdays. No construction would take place outside of these hours or on Sundays or on Bank or Public Holidays. Deliveries would typically be restricted to 0800 – 1430 on Mondays to Saturdays.

7.6.3 Based on the measured ambient noise levels North Moor Farm for the daytime period, the appropriate threshold has been determined for each of the construction noise sensitive receptors, as detailed in Table 7.8 below.

Table 7.8: Construction Noise Assessment Criteria			
Receptor	**Ambient Noise Level Rounded to the nearest 5dB(A) (dB LAeq)**	**Appropriate Category Value A, B or C in accordance with BS5228-1**	**Noise Level above which activities of the Construction Phase may cause a significant impact at the Receptor (dB LAeq)**
North Moor Farm	45	A	65

7.6.4 The construction phase activities may generate short term increases in noise levels, above those recommended in the above table. The levels of noise received at the receptors closest to the proposed development would depend on the sound power levels of the machines used, the distance to the property, the presence of screening or reflecting surfaces and the ability of the intervening ground to absorb the propagating noise.

7.6.5 At this stage, detailed information regarding the nature and timescales of activities likely to take place during the earthworks and construction phase is not known. Activities on the site, which could give rise to construction noise impacts include (but are not limited to):

- Site preparation i.e. ground excavation, levelling of ground, trenching, trench filling, unloading and levelling of hardcore and compacting filling.
- Construction of the proposed development including piling, construction of, fabrication processes e.g. planing, sanding, routing, cutting, drilling and laying foundations.

7.6.6 Noise predictions for construction activities have been undertaken in SoundPLan version 8.1 (environmental noise prediction software), assuming a worst-case scenario with work undertaken in the area closest to North Moor Farm. It assumes two excavators with a sound power of 88dB (LAeq) at a fixed location on the site boundary nearest to North Moor Farm, a moving dozer with a sound power of 83dB (LAeq) moving at 5km/h along that site boundary and moving articulated dump trucks with a sound power of 90dB (LAeq) moving at 5km/h from the dozer work area to the A1290 (crossing the site to join the road).

7.6.7 The resulting construction noise contours are provided in Figure 7.2 and this shows that construction noise levels are predicted to be 21dB (LAeq) at North Moor Farm.

These levels are well below the 65dB threshold and therefore indicate a minor magnitude of noise impact before mitigation.

7.6.8 The sensitivity of the existing residential receptor is moderate, and the magnitude of change before mitigation is minor. Therefore, the effects of noise during construction are likely to be of minor impact and not significant in EIA terms. No mitigation measures are required; however, the use of best practice during construction should be employed to reduce the potential impact.

Assessment of Operational Noise (Industrial Noise)

7.6.9 Noise predictions have been carried out to support this assessment which consider the potential noise sources on the site. The predictions are based on indicative values of sound power levels for the size and type of plant to be used.

7.6.10 The noise predictions have been undertaken using SoundPLAN version 8.1 environmental noise prediction software. This software calculates the propagation of noise to the procedures contained in International Standard ISO 9613-2 *'Acoustics – Attenuation of sound during propagation outdoors'* for construction and operational phases.

7.6.11 The SoundPLAN model calculates the propagation of noise from source to receptor and accurately calculates the amount of attenuation provided by acoustic barriers such as buildings and the intervening topography. The site model has been created using site topographical survey data together with the indicative masterplan for a proposed single unit (as shown on Figure 3.1B).

7.6.12 Table 7.9 below identifies the items of plant modelled and associated source type and sound power levels.

Table 7.9: Plant assumed for operational phase

Noise Source	Quantity	L_w dB (A)	Comment
Development plot – Single large unit building			
Noise break-out from inside to outside of building	1	See comment	As per the previous IAMP ONE application, noise inside the building has been predicted at 85dB which is the equivalent to the Upper Exposure Action Value specified in the Control of Noise at Work Regulations. The walls and roof have been assumed to be composed of Kinspan AWP/60 with no lining (Rw=25dB) and the noise model calculates noise breaking out of the building.

Table 7.9: Plant assumed for operational phase			
Noise Source	**Quantity**	**L_w dB (A)**	**Comment**
Development plot – Single large unit yard			
HGV	1	84	10 HGV movements per hour has been assumed with a speed of 5km/h.
Forklifts	1	107	5 forklift movements per hour has been assumed with a speed of 5km/h.

7.6.13 The above assumptions present a worst-case daytime scenario for predicted noise levels and it is assumed that night-time noise levels may be lower due to less activities inside the building and less HGVs and forklifts in the yard. For the purpose of this assessment, the same predicted levels have been used for daytime and night-time.

7.6.14 The predicted specific operational sound levels are shown in Figure 7.3 and also summarised in Table 7.10 below.

7.6.15 BS4142 includes guidance on the application of an additional weighting which should be applied to the specific sound level should the industrial noise be tonal, impulsive, intermittent or have any other characteristics that are readily distinctive against the residual acoustic environment, as experienced at receptors. Due to the background at North Moor Farm being already predominantly dominated by road and industrial noise from Nissan and given that the predicted specific noise of 33dB (LAeq) is well below the 45dB (LAeq) existing ambient noise, noise from the proposed development will not be readily distinctive at receptors and no character penalties are judged applicable.

7.6.16 The predicted rating levels of operations from the proposed development have been compared to the background sound levels, the results are shown in Table 7.10.

Table 7.10: Comparison of rating noise levels and background sound levels		
Item	**North Moor Farm - daytime**	**North Moor Farm – night-time**
Proposed development Rating Noise Level, L_{Aeq} (dB)	33	33
Background Noise Levels L_{A90} (dB)	41	43
Exceedance of Background Noise (dB)	-8	-10

7.6.17 The rating levels are predicted to be at least 8dB below the background noise levels which indicates a minor magnitude of change.

7.6.18 The sensitivity of the existing residential receptors is moderate and the magnitude of change before mitigation is minor. Therefore, the effects of noise during operation of the proposed development is likely to be of minor impact and not significant in EIA terms.

7.7 Mitigation measures

Mitigation for Construction Noise

7.7.1 To reduce the impacts of noise levels generated by the construction phase of the development at North Moor Farm, mitigation measures can be adopted.

7.7.2 Best working practice can be implemented during each phase of the earthworks and construction works at the site. This can be set out within the Construction and Environmental Management Plan (CEMP). The following measures may be put in place to minimise noise emissions:

- when works are taking place within close proximity to North Moor Farm, screening of noise sources by temporary screens may be employed;
- all machinery should be regularly maintained to control noise emissions, with particular emphasis on lubrication of bearings and the integrity of silencers;
- site staff should be aware that they are working adjacent to a sensitive area and avoid all unnecessary activities due to misuse of tools and equipment, unnecessary shouting and radios;
- as far as possible, the avoidance of two noisy operations occurring simultaneously in close proximity to the same sensitive receptor;
- adherence to any time limits imposed on noisy works by the local authority;
- implement set working hours during the week and at weekends;
- ensure engines are turned off when possible; and
- should earthworks and/or construction activities need to be carried out during night-time hours, the local authority could include a planning condition which requests advance notice and details of any night working to be provided.

Mitigation for Operational Noise (Industrial Noise)

7.7.3 The indicative layout assessed (Figure 3.1B) includes a yard screened from North Moor Farm by the building and this may be considered as embedded mitigation. A different layout within the site could however result in higher levels of operational noise being experienced by the receptors at North Moor Farm.

7.7.4 As per the previous IAMP ONE outline planning application, each proposed unit is expected to be subject to its own planning conditions which would include the requirement for a detailed noise assessment. The detailed assessment would consider the proposed noise sources within that unit and recommend appropriate noise mitigation. At this stage, no specific mitigation measures are suggested; however, indicative measures may be:

- evaluation of each unit to be undertaken at detailed design stage and mitigation measures proposed accordingly;
- external plant such as fans, stacks and heating and ventilation units can be specified to reduce noise levels. Where necessary, silencers may be applied to plant to attenuate tonal components;
- where possible, buildings' access points such as shutters and loading bay doors be positioned to face towards the south-east (away from North Moor Farm);
- if possible, the design of the plot layout should seek to position areas where vehicle noise can be expected to occur (loading / unloading / delivery yards, parking areas) on the opposite side of the building from North Moor Farm; and
- white noise reversing alarms for movements in yards may be specified if required.

7.8 Residual effects

Mitigation for Construction Noise

7.8.1 The sensitivity of the existing residential receptor at North Moor Farm is moderate, and the magnitude of change after mitigation (suggested as best practice) will be minor or negligible. Therefore, the effects of noise during construction are likely to be of minor impact and not significant in EIA terms.

Mitigation for Operational Noise (Industrial Noise)

7.8.2 No specific mitigation measures are suggested; however, this will be reviewed at the detailed planning stage and indicative measures have been provided. The sensitivity of the existing residential receptor at North Moor Farm is considered to be moderate, and the magnitude of change following mitigation will be minor. Therefore, the effect of noise during operation of the proposed development is likely to be of minor impact and not significant in EIA terms.

7.9 Limitations of study

7.9.1 The baseline levels are taken from those presented in the previous IAMP ONE application and these are judged to be representative for the purpose of this assessment.

7.9.2 As no detailed information is available at this stage, assumptions have been made for construction noise predictions and operational noise predictions. The assumptions are similar to those made in the previous IAMP ONE application.

7.10 Cumulative impact assessment

7.10.1 This development will form part of the wider IAMP ONE site where other plots are already consented. The indicative layout (as assessed in this chapter) includes a building proposed to be some 190m from North Moor Farm. Other buildings within the wider development area would be located at least 420m away and would have a low likeliness in raising the levels of operational noise above those shown in the above assessment. Any cumulative effects of noise during construction, from works occurring within more than one plot at the same time, are similarly not expected to give rise to significant effects, and construction noise would in any case be temporary.

7.10.2 Due to the geographic location of all proposed development plots and the fact that predicted noise levels of the closest unit (as shown on Figure 3.1B) are well below background levels, it is anticipated that cumulative noise from all IAMP ONE units will also be below background noise levels and no significant cumulative impact is predicted.

7.10.3 Development within IAMP TWO is even further from North Moor Farm and there would be no cumulative effects on noise from the combination of the Site with this.

7.10.4 Similarly, none of the other consented but not constructed or in planning applications as set out in ES Chapter 2 are sufficiently close to North Moor Farm as to give rise to the potential for cumulative effects on noise.

7.11 Summary and conclusions

7.11.1 A noise assessment has been undertaken for the development's construction and operational phases, to assess the potential impact at the nearest Existing Sensitive Receptor which is North Moor Farm.

7.11.2 The baseline noise levels at North Moor Farm have been taken from those identified within the previous IAMP ONE application.

7.11.3 The following potential impacts have been assessed:

- Construction noise impact assessment at North Moor Farm.
- Operational noise impact assessment at North Moor Farm.

7.11.4 Baseline data was used to establish potential threshold for construction noise and these were compared to predictions of construction noise levels. The effects of noise during construction was found to be not significant in EIA terms and no mitigation measures are required. However, the use of best practice during construction should be employed to reduce the potential impact and examples have been provided.

7.11.5 In the absence of detailed information, indicative noise predictions have been carried out for the potential noise sources during the operational phase. The predicted noise levels at North Moor Farm were compared to background levels. The effects of noise during operation is predicted to be well below background levels and not significant in EIA terms. Indicative mitigation measures are suggested and these would be reviewed at the detailed planning stage.

7.11.6 No cumulative noise impacts have been identified.

7.11.7 For this development, noise should not be a determining factor in granting outline planning permission in accordance with the current guidance.

8 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

8.1 Introduction and background

8.1.1 This chapter of the Environmental Statement (ES) identifies and assesses the effects of the proposed IAMP Phase Two site on the landscape character and landscape resource, and on the visual amenity of the site and surrounding area. The proposed development is described in chapter 3 of this ES. The methodology used in this study conforms to the Guidelines for Landscape and Visual Impact Assessment (GLVIA, 3rd Edition 2013) and associated good practice guidance. This assessment includes consideration of construction and operational stages of the proposed development and an analysis of the likely impacts on key receptors.

8.1.2 This chapter should be read in conjunction with the LVIA chapter (chapter F) of the 2018 IAMP ONE ES.

8.1.3 The LVIA has been carried out by an experienced landscape architect employed by Wardell Armstrong LLP.

8.2 Consultation and scope of the assessment

8.2.1 Informal consultation was carried out with Sunderland City Council as part of the preparation of this LVIA. In relation to the potential impacts on landscape character and visual amenity, it is noted that the 2018 IAMP ONE ES LVIA had not identified any significant adverse effects on landscape character and the landscape resource during the construction and operational stages of the proposed development, and that residual (post-mitigation) effects on visual receptors would also not be significant adverse. Some of the significant adverse effects on visual amenity identified in the IAMP ONE ES for specific receptors during the construction phase would not be applicable to the IAMP ONE Phase Two site: the West Moor Farm property has been vacated (and is due for demolition) and the receptors at Hylton Bridge will be sufficiently distant, with development on the main IAMP ONE site screening views of the Phase Two site (the Site). Receptors at North Moor Farm would remain sensitive to development within the Site, however.

8.2.2 The Site will be subject to LVIA and three of the viewpoints used in the IAMP ONE ES will be included within this LVIA; these are viewpoints 1, 13 and 16.

8.2.3 Potential adverse effects on landscape character and visual amenity could result from:

- the loss of existing perimeter and internal trees and hedgerows from within the site area;
- the change in character to the site from the introduction of the proposed development; and
- changes to the visual amenity of nearby residential receptors, users of the immediately adjacent A1290 and users of footpaths with views of the Site.

8.2.4 The cumulative change to the character of the landscape and cumulative effects on visual amenity, from the addition of this site to the wider IAMP area will also have the potential to give rise to adverse effects. Both construction and operational effects will be assessed.

8.2.5 Mitigation has already been defined for the adjacent IAMP ONE site and it is anticipated that the indicative design for the Site will include some screen planting and will reflect the measures proposed for IAMP ONE, where these are relevant to this Site.

8.2.6 Having reviewed the consultation responses to the 2019 PEIR documentation for IAMP TWO, the Green Belt status of the land adjacent to the Site is included as a landscape receptor in this LVIA.

8.2.7 Two indicative masterplans have been prepared for the outline planning application; this LVIA considers the layout included for the single unit development as the worst-case option in this regard, given its greater mass. ES Figure 3.1B refers.

8.3 Methodology

General approach

8.3.1 Landscape effects associated with a development relate to changes to the fabric, character and quality of the landscape as a resource and how it is experienced. This requires consideration of the character of the landscape, the elements and features that it contains, and any value attached to the landscape (whether formally or informally).

8.3.2 Landscape assessment studies:

- direct effects upon specific landscape elements, especially prominent and eye-catching features;
- change in character, which is the distinct, recognisable and consistent pattern of elements that creates distinctiveness and a sense of place;

- subtle effects that contribute towards the experience of intangible characteristics such as tranquillity, wildness and cultural associations; and
- effects on designated landscapes, conservation sites, and other acknowledged special areas of interest.

8.3.3 Visual effects relate closely to landscape effects, but they concern changes in views and visual amenity. Visual assessment concerns people's perception and response to changes in visual amenity. Effects may result from new landscape elements that cause visual intrusion or new features that obstruct views across the landscape.

8.3.4 Both landscape and visual effects can be adverse, beneficial or neutral, short, medium or long term, permanent or temporary, reversible or irreversible, direct (an effect that is directly attributable to the proposed development) or indirect (effects resulting indirectly from the development as a consequence of the direct effects), and cumulative, relating to additional changes that may arise when the proposed development is considered in conjunction with other similar developments.

8.3.5 The methodology for this Landscape and Visual Impact Assessment (LVIA) follows the recommendations and guidance set out in the following reports:

- Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA 3)[1]; and
- Landscape Character Assessment Guidance[2].

8.3.6 GLVIA 3 stresses that the emphasis of landscape and visual impact assessments should be on the identification of likely **significant effects**, embracing all types of effects: adverse and beneficial, direct and indirect, and long and short term, as well as cumulative effects. It also stresses that the approach to the assessment needs to be proportionate to the scale of the project being assessed and the nature of the likely effects.

8.3.7 The Landscape Institute produced Technical Guidance Note 06/19[3] to advise its members on the use of photography and photomontage in landscape and visual

[1] Guidelines for Landscape and Visual Impact Assessment, Third Edition, by the Landscape Institute and Institute of Environmental Management and Assessment (2013)

[2] An Approach to Landscape Character Assessment, Natural England (2014)
Landscape Character Assessment Guidance for England and Scotland (2002), Countryside Agency in conjunction with Scottish Natural Heritage

[3] Visual representation of development proposals, Landscape Institute TGN 06/19 (September 2019)

assessment and on visual representations of development proposals; the photographs in this LVIA have been produced and presented in accordance with this advice.

The study area

8.3.8 The LVIA considers the Site and its surroundings, encompassing an area within a 2km radius of the outermost edge of the development. This area has been determined by the topography of the landscape and intervening physical features. The LVIA has been carried out by means of a process of desk and site survey and analysis of this 2km study area.

8.3.9 Whilst the general area of the Site will be visible from more distant locations (for instance, from elevated sections of the B1288 to the west-north-west of the Site, at 4.0km – 4.8km distance); at over 2km it is considered that, given the relatively level / gently undulating nature of the topography and presence of intervening trees, it would be difficult to distinguish the area of the Site from its surroundings, particularly given the extensive expanse of the adjacent Nissan site and the ongoing development within IAMP ONE. Any effects on visual amenity would not be significant at this distance and this assessment has not therefore considered these very distant views.

Thresholds and criteria

8.3.10 GLVIA 3 (paragraph 1.20) states that the guidance is "*not intended to be prescriptive, in that it does not provide a 'recipe' that can be followed in every situation. It is always the primary responsibility of any landscape professional carrying out an assessment to ensure that the approach and methodology adopted are appropriate to the particular circumstances*." This LVIA has therefore defined a set of criteria to assess the potential landscape and visual effects of the proposed development that reflect the circumstances of the site and the surrounding area.

8.3.11 Appendix 8.1 sets out in more detail the methodology used in undertaking this Landscape and Visual Impact Assessment.

8.3.12 Overall, effects may be adverse, neutral or beneficial.

8.3.13 Where significant effects are predicted, these are highlighted in bold text. Whilst significant adverse effects may be identified in connection with a proposed development, this does not imply necessarily that the development taken as a whole would be unacceptable in environmental terms.

Zone of Theoretical Visibility mapping

8.3.14 Zones of Theoretical Visibility (ZTVs) are also referred to as Zones of Visual Influence diagrams (ZVIs) or visual envelope maps (VEMs); however, ZTV is the preferred term as it emphasises the key factors of the plans – that they are theoretical and that they indicate potential visibility by coloured shading overlain on an Ordnance Survey background, to illustrate the areas within the surrounding landscape from which the proposed development is theoretically visible. As they are based upon computer modelling of inter-visibility based upon bare ground topography, they do not show the effects of screening of buildings or trees, or of localised changes in the topography that may not be included in the Digital Terrain Model (DTM). They are thus a worst-case scenario. They do not convey the nature or significance of effects; in particular, it is relevant to note that the mapping depicts the theoretical view of the whole development in the same way as the theoretical view of a small part of the uppermost part of a single building.

8.3.15 For this LVIA a ZTV has been created based on the landform of the existing site and the indicative masterplan for the site (ES Figure 3.1B), using an assumed building height of 30m above ground level. This is shown on ES Figure 8.1, together with the viewpoint locations (as below).

Selection of viewpoint locations

8.3.16 Viewpoints are chosen to illustrate the potential visual effects of a scheme. The principal criterion is that they must be representative of the range of views and viewer types likely to experience the development (paragraphs 6.19 and 6.20 of GLVIA 3). Specific points may also be chosen because they are important existing viewpoints in the landscape.

8.3.17 View types can include:

- areas of high value such as designated landscapes, long distance footpaths and cycle routes, etc.;
- illustrations of different LCAs, rather than specific receptors;
- viewpoints that may have wide panoramic views or, by contrast, focused views;
- viewpoints at different distances from the site;
- viewpoints at different elevations; and
- viewpoints from different aspects.

8.3.18 Viewer types can include:

- views from residences, roads or recreational points where visitors may experience the landscape; and
- viewpoints where viewers would be likely to be stationary, as well as those where they would be moving through the landscape.

8.3.19 Representative viewpoints were identified for the IAMP ONE EIA, as explained in the 2018 ES at chapter F, section F3.3. Sixteen viewpoints were used in that LVIA (section F4.2.3 refers). Given the smaller nature of the Site, it was agreed as part of the informal consultation on this LVIA (see section 8.2 above) that only three of these viewpoints would be of relevance. These are viewpoints 1, 13 and 16.

8.3.20 Photographs have been taken from these viewpoint locations, in October 2019, in order to ensure that the baseline images are up to date. The photographs were taken with a full frame digital SLR camera with a fixed 50mm lens, mounted on a stable, levelled tripod with a professional panoramic head attached. This positions the focal centre of the camera lens above the pivot of the tripod and allows the photographs to be stitched together accurately using software.

8.3.21 Viewpoints 1, 13 and 16 (numbering is retained from the 2018 IAMP ONE ES for ease of cross-reference) illustrate the site in the context of its surroundings and are presented on ES Figures 8.6 – 8.8. Each viewpoint figure includes the following:

- the OS grid reference and elevation (height AOD) of the viewpoint location;
- the distance from the proposed development boundary (closest point) to the viewpoint;
- a location map for the viewpoint;
- information on the camera type, height, time and date of the photograph, with weather conditions; and
- horizontal scale and horizontal and vertical field of view.

8.3.22 Text describing the existing and predicted view during construction and post-completion of the development, and any cumulative visual effects for each viewpoint location is set out in section 8.6 below.

8.4 Baseline Conditions

Landscape character baseline

8.4.1 This section firstly reviews the published landscape character information relevant to the 2km study area and the landscape designations and sensitive receptors. The site assessment then informed a description of the existing baseline condition of the area within the vicinity of the site.

8.4.2 The following studies provide a strategic assessment of the 2km radius study area, see ES Figure 8.3:

- Natural England National Character Areas 14 *Tyne and Wear Lowlands* and 15 *Durham Magnesian Limestone Plateau*;
- City of Sunderland Landscape Character Assessment (September 2015); and
- South Tyneside Landscape Character Study, March 2012.

8.4.3 These are discussed, below.

Natural England National Character Areas

8.4.4 The site and the majority of the study area to the south, west and north lies on the eastern edge of the Natural England National Character Area (NCA) 14 *Tyne and Wear Lowlands*. This is a 'T' shaped character area covering the lower valleys of the Rivers Tyne and Wear.

8.4.5 The NCA is described as:

"*lowlands ... bounded to the south and east by the prominent escarpment of the Durham Magnesian Limestone Plateau National Character Area (NCA). To the west, the land rises through the Durham Coalfield Pennine Fringe NCA to the uplands of the North Pennines NCA. To the north, the extensive conurbation lying in the broad valley of the Tyne merges into the South East Northumberland Coastal Plain NCA.*"

8.4.6 The key characteristics of this NCA, of relevance to the site and study area, are:

- *Undulating landform incised by the river valleys of the Tyne and the Wear and their tributaries.*
- *Widespread urban and industrial development with a dense network of major road and rail links and the spreading conurbations of Tyneside in the north.*

- *Between settlements, wide stretches of agricultural land with large, regular, arable fields bordered by hedgerows with few hedgerow trees, often with large farmsteads and urban fringe pasture land with pony and cattle grazing.*

8.4.7 The full NCA profile, including information on opportunities, landscape change and analysis supporting statements of environmental opportunity, can be found at: http://publications.naturalengland.org.uk/file/5130054698795008

8.4.8 Land to the east of the site lies within the north-westernmost part of NCA 15, *Durham Magnesian Limestone Plateau*. This is described as:

"*a striking, west-facing Magnesian Limestone escarpment which forms a series of spurs and valleys which mark the western boundary of the National Character Area (NCA), and overlooks the Tyne and Wear Lowlands to the north and west, affording dramatic views of the City of Durham. The plateau drops gradually to the Tees Lowlands to the south and the Durham Coalfield Pennine Fringe to the south-west. Transport routes such as the A19 and coastal railway form prominent features in the landscape and provide links to the north and south, but also detract from tranquillity and create physical and psychological barriers to public access.*"

8.4.9 The key characteristics of this NCA, of relevance to the site and study area, are:

- *Strong influence of historic mining industry on both local culture and the landscape, in the form of ex-coal mining towns and villages with distinctive surrounding areas of allotments and pony paddocks, reclaimed colliery sites, disused and existing railways, and industrial archaeology.*
- *Widespread urban and industrial development in the north and major transport corridors throughout.*

8.4.10 The full NCA profile, including information on opportunities, landscape change and analysis supporting statements of environmental opportunity, can be found at: http://publications.naturalengland.org.uk/file/8461491

City of Sunderland Landscape Character Assessment

8.4.11 The City of Sunderland Landscape Character Assessment (September 2015) has categorised the district into Landscape Character Types (LCTs); these are further subdivided into more localised Landscape Character Areas (LCAs). ES Figure 8.3 illustrates the extent of these LCTs and LCAs, for the 2km study area.

8.4.12 The site and the surrounding area to the immediate north, west, south and east lies within LCT 2 *Coalfield Lowland Terraces* and the LCA of 2a, *Usworth Lowland*.

8.4.13 LCT 2 *Coalfield Lowland Terraces* covers an area of gently rolling topography that forms a transitional landscape between the Magnesian Limestone escarpment and the Wear Valley. Other key characteristics of this LCT, of relevance to the Site and study area, are described as:

- *underlying Carboniferous Coal Measures masked by thick layers of glacial deposits;*
- *the topography is gently rolling or flat in areas of boulder clay, with a more undulating terrain associated with river valleys, ...;*
- *agricultural land use is mixed but predominantly arable with semi-regular patterns of medium and large-scale fields bounded by low hawthorn hedges and pockets of recently planted woodland;*
- *fragmented by industrial and residential development, the landscape includes corridors of open space between settlements, often with urban fringe character;*
- *large industrial complexes and industrial estates are present.*

8.4.14 The LCA 2a *Usworth Lowland* extends from the boundary with South Tyneside Council in the north, around and to the east of the built-up area of Washington, east as far as the A19 and south to (and in part, just beyond) the A1231. This is described as:

"*... large scale arable fields bordered by remnant and weak hedgerows with sparse tree cover. There are a few isolated farms in this area but little other development. Some woodland occurs along the River Don, and though some of this is in South Tyneside it contributes to the character of this area. South of the A1290, which bisects the area, industrial development becomes the main land use. Nissan and Vantec occupy a substantial section of this character area, incorporating numerous very large buildings, hardstandings, a test track and ten wind turbines. New and old woodland contains the development from some angles, though it is highly visible from elevated locations.*

... The whole area is crossed by a number of high voltage electricity lines, with large pylons appearing to overwhelm many landscape features and interrupting views. Roads, including the minor ones, are typically busy with traffic.

The landscape has an open character, which enables views over to the Boldon Hills to the north-east, in South Tyneside. Views looking south towards Sunderland are limited by the large industrial structures associated with the Nissan car factory. The area has

a generally low recreational value, with a limited number of underused public footpaths and bridleways. The Great North Forest Heritage Trail passes through the north between Washington and West Boldon, and there are footpaths around Barmston Pond Local Nature Reserve ... A number of local wildlife sites cover plantations and grasslands around the Nissan factory, and the ponds and burns further north. This flat landscape was previously used as a RAF station during the First and Second World Wars. It later became Sunderland Airport, and today the North East Aviation Museum occupies part of the airfield north of the Nissan factory."

8.4.15 Sensitive features within the *Coalfield Lowland Terraces* LCT are defined as:

- "*Negative impact of infrastructure, including major roads and industrial and business parks.*
- *Recreational value of parks, footpaths and cycleways.*
- *Settlement fringe character of parts of the landscape.*
- *Maintenance of the distinction between settlements*."

8.4.16 In relation to 'industrial estates and complexes', the guidance (Table 4.2) recommends that developments within this LCT "*seek opportunities to enhance and extend landscaping and integrate new buildings into the landscape. Utilise native species which occur locally, e.g. Grey Poplar. Aim to enhance maintenance of landscapes in and around industrial and commercial premises, including woodland and hedges*." Development should not be permitted that will "*adversely encroach on the Green Belt and block green corridors through this already fragmented landscape.*"

8.4.17 The landscape strategy set out within the Sunderland Character Assessment for the LCA 2a *Usworth Lowland*, is based on the key aspects and features of this area which contribute to landscape value, being:

- *Large undeveloped area within north Sunderland, which acts as a settlement break between Sunderland and Washington.*
- *Continuous with large area of similar farmland in the north, in South Tyneside.*
- *North East Aircraft Museum is a visitor attraction and also illustrates the history of this landscape as an airfield.*
- *Barmston Pond Local Nature Reserve provides ecological interest in the area*.

8.4.18 The overarching strategy for this LCA can be summarised as:

"*Landscape enhancement towards a high-biodiversity area incorporating potential for recreation within and around the existing and potential future commercial development. The existing limited hedges and tree cover in the north should be maintained and this structure enhanced as part of any new proposals. The open aspect of land between Sunderland and South Tyneside should be retained in line with Green Belt purposes where applicable. Views to Boldon Downhill enhance the sense of place in this location. Connections could be improved through better green networks around the existing land uses, linking up currently isolated features such as the Barmston Pond nature reserve. Pedestrian and cycle links between adjacent residential areas and the River Wear would improve recreational opportunities and routes to work.*"

8.4.19 The susceptibility of this LCA to the proposed development is assessed as low, given that the LCA extends across various areas of existing industrial development (including that at Nissan and Follingsby). The value of this LCT is assessed as low-medium, reflecting its mix of industry and some farmland. The sensitivity of this LCA is therefore considered to be low-medium.

8.4.20 To the west and east of the LCA 2a *Usworth Lowland* are landscape character types that are defined by their urban character, specifically LCA 4a *Washington* to the west (part of the *Urban New Town* LCT) and LCA 9f *Hylton Castle, Downhill and Castletown* (within the *Urban Limestone Plateau* LCT) to the east.

8.4.21 Given the built-up nature of these areas, it is not proposed to go into the detail of their key characteristics, sensitive features or guidance and strategy for development, none of which relates to industrial development.

8.4.22 It is nevertheless relevant to note that for the *Washington* LCA, the overarching strategy includes reference to the 'provision of green links to employment sites in this and in adjacent areas.' The proposed IAMP development includes an extensive area of ecology and landscape mitigation (the ELMA) which, when established, in conjunction with the perimeter site landscaping will provide a green corridor through the site. SUDs areas and internal landscaping of the individual development plots will also provide green spaces within the development area.

South Tyneside Landscape Character Study

8.4.23 Within the South Tyneside Landscape Character Study (March 2012), land to the north of the Site and in the north of the study area falls within the *Urban Fringe*, *Boldon Fell* LCA.

8.4.24 This is described as a large area, occupying the south-west corner of the borough, either side of the A184 and extending south into Sunderland, as far as the A1290, and south-west into Gateshead (to the A195).

8.4.25 The key characteristics of this LCA are described as:

- *Large scale arable fields with gappy hedges.*
- *Overhead power lines converging on the substation by the A19.*
- *Busy dual carriageways subdivide the area.*
- *Regenerating woodland and scrub on former extraction sites.*
- *Farms and country house with associated woodland.*

8.4.26 In terms of physical influences on the landscape, the watercourses flowing into the River Don are described as having limited impact on the wider area. Views across the open flat landscape are generally unimpeded by woodland and long views are possible, including to the landmark Penshaw Monument, to the south.

8.4.27 Guidelines for this LCA include supporting the reinstatement and restoration of hedges for landscape and habitat value and the planting of new woodland to reinforce the landscape structure. Enhancement of access networks across the area is also supported. In relation to the habitat network, the guidance seeks to promote the creation of linear links between sites of habitat value, using new hedge and woodland planting as appropriate, and focusing the habitat network on the burns in the area. Woodland planting that would obstruct key views should be resisted.

8.4.28 The susceptibility of this LCA to the proposed development is assessed as low as the LCA is separated from the Site by the remainder of the IAMP area. The value of this LCA is assessed as medium, reflecting the greater extent of farmland and associated tree cover and hedging. The sensitivity of this LCA to the proposed development is therefore considered to be low-medium.

8.4.29 The ELMA proposed for the site will create a green corridor through and across the development area, as noted above.

Landscape designations and sensitive receptors

8.4.30 There are no landscape designations applicable to the Site and 2km study area. ES Figure 8.2 illustrates the various sensitive receptors and designations within the study area.

8.4.31 As noted above (para. 8.2.6), the Site lies directly adjacent to land designated as Green Belt. Land scheduled for built development within the IAMP site was removed from the Sunderland Green Belt as part of the approval of the IAMP Area Action Plan (see ES chapter 4, section 4.6). The ELMA land remains within the Green Belt.

8.4.32 Sensitive landscape receptors relate to the semi-mature and mature trees present within the Site and on the boundary with the A1290, and the existing hedgerows present within the Site. It is acknowledged, however, that the nature of the proposed development makes it likely that the majority of the existing internal hedgerows and trees are likely to be removed to accommodate the proposed development.

Landform and drainage

8.4.33 The Site is relatively flat, comprising gently undulating land at between 35m and 40m AOD, falling gradually to the north-east / north and the River Don. The river and its various tributaries meander through the landscape. ES Figure 8.4 illustrates the topography of the study area.

Landcover and land use

8.4.34 The Site comprises rectilinear fields of varying sizes, primarily in arable use (where not under construction for IAMP ONE). Fields are enclosed by straight, generally gappy hedgerows with occasional hedgerow trees. Small triangular plantations and copses are present within and break up the landscape, as does the vegetation lining the River Don, on the boundary between Sunderland and South Tyneside.

8.4.35 An overhead electricity transmission line on steel towers forms the north-western boundary of the Site, running from north-east to south-west through this area. This is one of several overhead lines running south through this general area from the substation at Mount Pleasant, on the south-western edge of West Boldon, north-east of the Site.

8.4.36 To the south-west is the Elm Tree Farm Garden and Nursery, which includes a tearoom and children's play area.

8.4.37 The North East Air Museum is situated to the east of the A1290 and north of the Nissan site, further to the east along the Washington Road.

Settlements and individual properties

8.4.38 West Moor Farm (comprising the farmhouse, cottage and associated farm buildings, and areas of hardstanding) is located on the southern edge of the Site, on the north

side of the A1290. This property is now vacant and is due to be demolished as part of the overall development of the IAMP site. To the immediate north of the Site is North Moor Farm, accessed via a narrow farm track from Follingsby Lane, to the east. The property comprises a single storey detached house and a series of barns / outbuildings to the north and north-west. Other individual and groups of properties are scattered across the wider area, enclosed by the network of main roads encircling the Site.

8.4.39 Also within the wider area are the residential areas of Usworth and Sulgrave, within Washington new town, to the west, and Town End Farm and Hylton Castle, on the north-west edge of Sunderland, to the east.

Transport corridors and rights of way

8.4.40 The A1290 linking Washington with the A19 runs along the southern boundary of the Site; this road is proposed to be dualled, east of the junction with the Nissan site, as part of the wider transport improvements for the area.

8.4.41 To the east of the Site the A19 is the primary north-south route within the area. To the south, the A1231 dual carriageway provides links to the A1(M), A184(M) and the A19.

8.4.42 Closer to and north-east of the Site, minor roads (Follingsby Lane, Downhill Lane and West Pastures) provide links to the wider road network for the individual properties and other built developments within this general area.

8.4.43 There are no public rights of way with the Site or its immediate surroundings. A footpath runs north-east from Follingsby Lane, east of Strother House Farm, to cross West Pastures and continue east-north-east to the A19. A Byway Open to All Traffic (BOAT) links East House with Follingsby Lane, to the west of Strother House Farm, with a footpath running west and south from East House to Usworth Hall.

8.4.44 The Great North Forest Heritage Trail runs along Follingsby Lane and Downhill Lane, to the north-east of the Site. This long-distance route for walkers and cyclists covers 105km as a circular route through the Tyne & Wear countryside, linking Tantobie, East Rainton, Houghton-le-Spring, Whitburn, West Boldon and Kibblesworth.

8.4.45 To the west a dismantled railway line runs north-south, forming the eastern edge of Washington. The line (the Leamside Line) remains the property of Network Rail and is not, therefore, a public right of way, though there are ambitions to re-open this line

for rail traffic.[4] The section of this line as it passes to the west of the Site will therefore be included in the LVIA, for potential users of the railway line.

8.4.46 ES Figure 8.5 shows the public rights of way and other access routes within the study area.

Formal and informal recreation areas and visitor attractions

8.4.47 There are no formal recreation areas within the 2km study area and the ZTV for the Site.

8.4.48 To the south-west of the Site, the Barmston Pond nature reserve provides an informal recreation area. As noted above, there is an informal play area at the Elm Tree Nursery, to the south-west of the Site.

8.4.49 Visitor attractions in the study area comprise the North East Aircraft Museum on Washington Road, 800m east of the Site. The Penshaw Monument is some 4km to the south of the Site but is included as a viewpoint location and therefore also referenced here.

Landscape features

8.4.50 The main landscape feature of the area surrounding the Site is the high voltage overhead electricity transmission line.

8.4.51 The perimeter tree belt on the southern boundary of the A1290 is notable given the generally open nature of this landscape. Mature and semi-mature trees present within the Site, on the lines of the existing field boundary hedgerows, are notable landscape features at the local level only.

Landscape value

8.4.52 The landscape is not ascribed any value from formal designations and does not provide the backdrop to settlements, though land outwith the IAMP development area is within the Green Belt and contributes to the separation of the settlement areas of Washington and north-west Sunderland. Green Belt designation is a planning control and does not provide any indication of landscape quality or condition.

[4] https://www.nexus.org.uk/sites/default/files/Metro%20Futures%20brochure.pdf

8.4.53 The condition of the landscape can be considered to be moderate, with some well-maintained farmland (albeit gappy hedges in places). There are few opportunities for recreational access, though there are some visitor attractions in the area.

8.4.54 The presence of extensive industry (Nissan site and associated industrial areas), wind turbines and overhead transmission lines detract from the perception of this landscape, though the agricultural land provides visual contrast and a degree of relief from this.

8.4.55 The overall value of this landscape is considered to be low.

Landscape susceptibility

8.4.56 Appendix 8.1, para. 1.1.12 sets out the criteria against which susceptibility to development can be judged. In respect of the development of the proposed Site for advanced automotive manufacturing, this can be summarised as:

- Landform: the site is relatively level and as such susceptibility to development is low. Major changes to the topography of the Site are unlikely to be required, though some perimeter screen bunding may be proposed.
- Skylines: within the general area of the Site, much of the skyline is developed; to the north the skyline is more open but includes 'clutter' such as electricity pylons and clumps of trees. As such the susceptibility to change is medium. The skyline of the Site can expect to change with the development of buildings that may be up to 30m high. In this regard it is relevant to note that, to date, the tallest building on site relates to a limited part only of the SNOP building, at 19m; other parts of that and the other approved buildings on IAMP ONE Phase One are at heights ranging from 6-10m, 13.5m and 15m above ground level. A building at 30m height above the existing ground level would therefore have a considerably greater influence on the skyline, particularly for near-distance views, than the existing and consented built developments within the IAMP ONE (Phase One) site.
- Landcover: the trees and hedgerows within the site provide some limited land cover (vegetation) but their contribution to the local character of the landscape is limited. The susceptibility to change in relation to this aspect is assessed as medium. Some of this existing vegetation, particularly within the internal Site area, is likely to be removed to accommodate the proposed development plots.
- Scale: this is considered to be a medium to large-scale landscape given the relatively level nature of the topography and limited scope for outward views,

primarily to the north. The triangular area of land for which planning permission is being sought, and within which the West Moor Farm buildings are presently sited, is of more of a small-medium scale, however, as a result of the presence of the farm buildings and enclosure provided by adjacent road and field-side boundary hedging. Human-scale elements are present in the form of existing farm buildings, though these are proposed for demolition; the larger-scale Nissan buildings have an influence on landscape scale and the current and future development of the IAMP site will add to this. The susceptibility of the Site to the proposed development is assessed as low-medium, for this aspect, having regard for the greater scale, massing and height of the building proposed by the indicative masterplan, ES Figure 3.1B. The proposed development will form part of the wider IAMP development area, creating a large-scale industrial development that extends the existing Nissan development area northwards.

- Enclosure: enclosure of the Site is provided in part by the existing roadside planting on the A1290; the existing and under-development large-scale industrial buildings also create enclosure, within the immediate area of the Site. The susceptibility of the Site to the proposed development is assessed as low, for this aspect. Enclosure will increase further with the development of the Site for industry, and creation of perimeter planting.
- Intervisibility: there is some intervisibility with surrounding areas, but this is generally limited to the edges of these and is restricted in places by intervening tree cover and built development. The susceptibility of the Site to the proposed development is assessed as low-medium, for this aspect. Perimeter planting to the boundaries of the Site will however be unlikely to screen a building of up to 30m in height.
- Condition: the condition of the Site is assessed as moderate (as noted above); the susceptibility of the Site to the proposed development is assessed as low-medium, for this aspect. Development of the Site for industry will have the potential to enhance this aspect.
- Typicality and rareness: the Site contains no features that could be considered to be rare; it exhibits a high degree of typicality in terms of urban fringe agricultural land. The susceptibility of the Site to the proposed development is assessed as low, for this aspect. Development of the Site for industry will be in keeping with the character of adjacent areas.

- Views and landmarks: the Site contains no landmark features and is not a highly-noticeable feature in local views. The susceptibility of the Site to the proposed development is assessed as low-medium, for this aspect; the development of a building of up to 30m in height would result in this being a highly noticeable feature within the immediate area.
- Tranquillity: the Site has low levels of tranquillity given the presence of the A1290 and the existing Nissan development (in addition to the, albeit temporary, construction operations on the adjacent IAMP ONE site). The susceptibility of the Site to the proposed development is assessed as low, for this aspect. This aspect is unlikely to change given the proposed development for industry.
- Remoteness: the Site is not remote and as such any susceptibility in relation to this aspect is considered to be low / negligible. There will be no change to this aspect.
- Visual receptors: the extent to which the Site is visible from within surrounding areas is limited (as discussed below); as such, susceptibility to change is low-medium. The extent to which this would change as a result of the proposed development is indicated (theoretically) on ES Figure 8.1 and discussed further in section 8.6, below.

8.4.57 Taking the above analysis into account, the susceptibility of this landscape to the change proposed from the development of large-scale industrial buildings is assessed as low-medium. This reflects the potential for a considerably taller and larger-scale building (as indicated on ES Figure 3.1B) to be developed within the Site, compared with the existing baseline of development within IAMP ONE Phase One.

8.4.58 The landscape is considered able to accommodate the proposed development but there would be some loss of character; this is considered further in section 8.5, below. The maintenance of the baseline environment would be limited to the area proposed for Ecological and Landscape Mitigation (the ELMA area).

8.4.59 Guidance from landscape character assessments (as noted above, para. 8.4.18) can be complied with, in that there remains scope for enhancement of the landscape through the provision of tree and hedgerow planting, enhanced habitat for wildlife and the creation of an improved access network.

Landscape sensitivity

8.4.60 Given the low-medium susceptibility of the landscape, combined with low value, the sensitivity of this landscape to the proposed development is assessed as low-medium.

Visual baseline

8.4.61 The visual baseline relates to the presence of visual receptors (people) and the scope for views into, and out from / across the Site and surrounding area. The visual baseline is influenced by the topography and vegetation cover of the area, in addition to the extensive areas of built development to the west, south and east.

8.4.62 Views of the existing Site are possible from near-distance locations (e.g. the adjacent A1290) and from more elevated positions within the wider landscape (such as from the Penshaw Monument, to the south). From elsewhere, in many instances the combination of undulating landform and tree / hedgerow field boundaries limits the scope for views of the existing Site.

8.4.63 With the introduction of a single, large-scale building up to 30m in height, the scope for visibility increases, though intervening built development will provide screening from within settlement areas.

8.4.64 Views out from the Site are limited in a southwards direction due to the roadside (A1290) planting screening the northern boundary of the Nissan site. In other directions, views north extend to the ridge line north of Follingsby Lane. Views west extend to the eastern edge of the housing and industrial development in the Sulgrave / Usworth Hall areas of Washington; views east (where not restricted by the hedgerow running north-south, east of West Moor Farm) extend to the areas of higher ground east of the A19(T).

8.4.65 From within the general area of the Site, visual detractors present in the landscape include the tall lattice steel towers, typically 40-50m high. The wind turbines to the south of the Nissan site are in excess of 100m high and are also prominent visually.

8.4.66 ES Figure 8.1 indicates the extent of the Zone of Theoretical Visibility (ZTV) of the Site (see paras. 8.3.14 / 8.3.15, above) with a single building 30m in height included within the development area.

8.4.67 Within the newly adopted Sunderland Core Strategy and Development Plan 2015-2033, Policy NE11 Creating and Protecting Views, with the objective of ensuring that new developments do not impact on existing public views. The supporting text to this Policy makes reference to the Council's Landscape Character Assessment (LCA) and Green Infrastructure Strategy, in identifying important viewpoints. The Penshaw Monument is identified in the LCA as a location from where extensive panoramic views can be obtained; this is included as a viewpoint within this LVIA.

Visual amenity receptors

8.4.68 Visual amenity receptors (the people within the 2km study area whose views would be affected by the proposed development) are separated into three main categories:

- settlements, groups of properties and individual properties;
- users of roads and public rights of way; and
- users of recreation areas (formal and informal).

8.4.69 Information on these various receptors, located within the 2km study area and the ZTV (ES Figure 8.1), is set out below.

Settlements, Groups of Properties and Individual Properties

8.4.70 The north-eastern edge of Washington (Usworth Hall and Sulgrave districts) is just over 1km to the west of the Site. Two-storey properties on the eastern edge of Sulgrave face east, with the trees lining the embankment sides of the dismantled railway line providing some visual screening for views towards the site. Within the Usworth Hall area, industry occupies much of the eastern edge of the district; where housing is located in the north-eastern corner, this is similarly set down below the level of the former railway line, with a wider belt of trees to the east of these houses, providing screening for views eastwards.

8.4.71 The Town End Farm and Hylton Castle areas of Sunderland are 1.03km to the east of the Site, east of the A19, with a dense belt of tree planting providing the western edge of the settlement. There is therefore no scope for views towards the Site from these areas.

8.4.72 Usworth Cottages comprises a terrace of five, two-storey properties located to the east of the A1290, some 500m from the Site. These face west but have a narrow screen of deciduous trees on the west side of their access road. To the north is a single-storey property, The Chalet, with trees on the western and southern boundaries providing visual screening. These properties are currently empty and are scheduled for demolition. There will therefore be no residential visual receptors at this location.

8.4.73 As noted above, the property at West Moor Farm, on the southern boundary of the Site, is also due to be demolished as part of the development proposals and therefore has no visual receptors present.

8.4.74 To the immediate north of the Site is North Moor Farm. The single storey property on the southern side of the farm buildings faces north-north-west – south-south-east and

has a small conservatory on its southern elevation. There will be near distance views of the existing Site from this property, including from external areas and from the access track to the farm.

8.4.75 South-west of the site, at the northern end of Infiniti Drive, a row of terraced houses (Severn Houses) lies to the east of the entrance to the Elm Tree Nursery. These two storey properties face north-north-west and are backed by an extensive area of broadleaved woodland, which wraps around the eastern side of the terrace. There are no views of the Site from these properties due to the intervening screening provided by tree / scrub cover separating the Seven Houses Nature Reserve from the Nissan site, in addition to the tree cover immediately east of the terrace of houses.

8.4.76 North-east of the Site are Hylton Bridge Farm (c.300m distance, house and bungalow) and Hylton Grove Farm (460m distance). East of Hylton Grove Farm are two, two-storey roadside properties, facing south (c. 500m distance). Views towards the existing Site will be partially screened by intervening hedges and tree cover from these properties.

8.4.77 Further from the site are the properties of East House (1.4km to the north-west) and Strother House Farm (1.38km to the north). Intervening trees and field boundary hedging will interrupt views towards the existing Site from these properties. The upper parts of the buildings within the Nissan site are visible in the distance, as are the wind turbines within the Nissan site.

8.4.78 Down Hill Farm lies towards the edge of the 2km study area, to the north-east of the Site; views from this area extend across the intervening farmland to beyond the A19(T), with extensive runs of overhead pylons dominating the view. The Site is difficult to distinguish at this distance, due to the relatively level topography and intervening tree cover, and its position beyond the ongoing development within the consented IAMP ONE site.

Transport routes and rights of way

8.4.79 Near views of the existing Site will be possible from the section of the A1290 as it approaches and then passes the site. Some screening is provided by roadside hedging and trees, though there are open views from the west when passing beneath the overhead transmission lines and in areas where there are gaps in the roadside hedging.

8.4.80 There would be no views of the Site from the A19(T) due to intervening development and tree cover. From the elevated overbridge at the Downhill Lane junction of the A19(T) and the A1290, there are views west towards the Site, but this is difficult to distinguish within the relatively level topography and intervening tree cover and ongoing built development.

8.4.81 More distant views towards the Site will be possible from sections of Follingsby Lane, including from the more elevated area to the east of the dismantled railway line, north-north-west of the Site. Views are interrupted by intervening hedging and tree cover, with the white buildings within the Nissan site and the various wind turbines visible to the south and south-east. From the section of Follingsby Lane east of North Moor Farm, the existing Site lies close to the horizon, contained between two of the existing lattice steel towers, with some screening provided by the intervening trees and hedging. Views would be oblique and transient.

8.4.82 From the elevated sections of Downhill Lane, to the north-east of the Site and on the edge of the 2km study area, there are distant views across the A19(T) towards the Site, but as noted above this sits beyond existing, ongoing development and the level topography and intervening tree cover makes this difficult to distinguish from its surroundings.

8.4.83 From the BOAT between Follingsby Lane and East House, the existing Site would be seen in the distance, in the foreground to the existing industrial development at Nissan. Intervening hedging and trees provide some screening.

8.4.84 Any views towards the existing Site from the footpath to the east and north-east of Strother House Farm would similarly be interrupted by intervening tree cover and hedgerows; the Site sits in front of the existing Nissan site and the white façades of buildings within this are noticeable in the distance.

8.4.85 The dismantled railway line to the east of the Sulgrave and Usworth Hall areas of Washington may at some point be brought back into service as part of the local network. Views towards the Site, in this event, will largely occur from the section of track between the A1290 and Follingsby Lane, seen obliquely and at a distance of between 1 and 2km through gaps in the tree cover / hedging along the eastern edge of the track.

8.4.86 No, or negligible views are anticipated from other roads in the study area and in the ZTV, including the A19.

Users of formal and informal recreation areas

8.4.87 No views of the existing Site will be possible from within the Barmston Pond nature reserve, given the presence of boundary tree planting and intervening buildings within the Nissan site. Similarly there will be no views of the Site from the play area within the Elm Tree Nursery, due to screening from intervening tree cover.

8.4.88 Visitors to the North East Aircraft Museum will have limited scope for views of the existing Site as the intervening buildings and trees will provide some screening.

8.4.89 For visitors to the Penshaw Monument, the existing Site will be visible in views to the north, seen in the distance as part of the agricultural landscape located beyond the existing Nissan site. Development of the IAMP ONE site will also be visible from this elevated position.

8.5 Assessment of landscape effects

Introduction

8.5.1 Effects of construction and during operation (i.e. once the development plot is completed and occupied) on the landscape character and landscape resource of the area are set out below.

8.5.2 These can be summarised as:

- the effects of the demolition of the West Moor Farm buildings on the character of the local landscape;
- the temporary effects associated with the construction of the development, including the presence of temporary compounds and materials storage areas, in addition to the removal of existing features (such as the hedgerows within the site, in part or in full) (see also Table F12 in the 2018 IAMP ONE ES chapter F); and
- the permanent change in nature of the site from arable fields to a development plot containing a large industrial building, access road and routes for pedestrians and cyclists, car parking areas, HGV access, loading and unloading areas, and perimeter and internal landscaping.

8.5.3 The assessment is based on the outline masterplan for the Site (Option B) and the four parameters plans (Appendix 3.1, drg. refs. 6600-052, 6600-048, 6600-055, 6600-056), including a maximum height of the single, large-scale building within the Site of 30m above existing ground levels.

Demolition and construction effects on the landscape resource and landscape character

Effects on designated areas

8.5.4 The demolition and construction works would take place in close proximity to the area of Green Belt that lies to the west and north of the Site. Effects would be indirect and temporary. The value of Green Belt land can be considered to be at best medium, given that its purpose is to separate built-up areas; the susceptibility of the area of Green Belt closest to the proposed development is assessed as low given that no development would take place on Green Belt land. The sensitivity of this area, to the proposed development, is therefore assessed as low-medium.

8.5.5 Effects of demolition would take place a short distance (under 200m) from Green Belt land and the magnitude of effect is therefore assessed as low-medium; on a low-medium sensitivity receptor, indirect effects would be adverse, short-term and not significant.

8.5.6 Construction operations would extend across more of the Site but the incorporation of a landscape buffer on the boundary between the IAMP development and the ELMA would create a degree of separation. The magnitude of effect, from the presence of plant and machinery, and associated noise and visual impacts from works on Site, is assessed as medium. Indirect effects on this low-medium sensitivity receptor would be no greater than slight-moderate adverse, for the duration of the construction phase, and not significant.

Effects on site elements and perceptual aspects

8.5.7 The demolition of the existing buildings at West Moor Farm would alter the character of the landscape, but at a local level, only, as the buildings are not prominent features in the landscape, being reasonably well contained by the roadside planting and field boundary hedging and trees east of the farm. This is assessed as a medium magnitude of effect on a low-medium sensitivity receptor and would be adverse, but not significant.

8.5.8 Construction operations are also likely to result in the loss of the existing internal trees and internal field boundary hedgerows, in order to accommodate the proposed development plots. Roadside boundary planting can expect to be retained, other than where widening of the road is proposed. This change to the landscape resource would have a local effect on landscape character and would be compensated for in the

longer-term with the planting of replacement trees and hedgerows, in addition to the area of native tree and scrub planting proposed within the south-western corner of the Site (provided as mitigation for the loss of existing planting, and to visually soften the western edge of the Site). The magnitude of effect, pre-mitigation, is assessed as medium, on a receptor of low sensitivity: not significant.

8.5.9 Changes to landform as a result of construction operations are expected to be minimal given the relatively level nature of the Site. Topsoil will be stripped from built development areas, to a depth approximating to some 300mm, and may be used to create perimeter (or other) mounding. However, the change to the character of the landscape from such changes to the landform will be barely perceptible from within the wider areas. As such, this would not give rise to significant effects.

8.5.10 Lighting is present within the adjacent residential and industrial areas and will be provided within the IAMP ONE development. During construction, some lighting can be expected where works are taking place during the winter months, and may be required for security reasons, but this would be short term and temporary. The magnitude of effect is assessed as no greater than medium, on a low sensitivity receptor and effects would not be significant.

Landscape character

8.5.11 The proposed demolition and construction operations would give rise to direct, temporary effects on the *Coalfield Lowland Terraces* (*Usworth Lowland*) LCT / LCA. The susceptibility of this LCA to the proposed development has been assessed as low-medium (para. 8.4.57, above) and the value of the LCA is assessed as low (para. 8.4.55); low-medium sensitivity. The magnitude of effect associated with demolition and construction operations is assessed as high. Effects on the landscape character of the site and its immediate surroundings would be adverse, but not significant, short-term and temporary.

8.5.12 Effects on the landscape character of the wider area of the *Usworth Lowland* LCA and the *Urban Fringe, Boldon Fell* LCT, to the north, from demolition and construction operations would be indirect and limited to changes associated with the noise of construction plant and perception of construction operations. This is assessed as on an LCA of low-medium sensitivity and low-medium and low magnitude of effect (reducing with distance from the Site) and would not be significant.

Operational effects on landscape character and the landscape resource

Effects on designated areas

8.5.13 The effects of the proposed development, once developed plots are operational, would be permanent and long-term.

8.5.14 The adjacent area of Green Belt land, to the west and north of the site, would be occupied by the ELMA and management operations within this area of land are proposed to ensure that there are longer-term beneficial effects on the ecological interests of the local area, and on the character of the landscape. In addition, perimeter landscaping to the IAMP site would provide some separation between the two areas; as this planting establishes over time, the effectiveness of this would increase, though would not reach the height of a 30m high building.

8.5.15 Any indirect effects on the low-medium sensitivity Green Belt land are assessed as of medium-high magnitude and would result in indirect, permanent adverse effects and would not be significant.

Effects on site elements and perceptual aspects

8.5.16 Changes to the scale of the Site will result from its development as a part of the wider IAMP ONE site. The generally medium scale of the existing landscape (within a wider area of medium to large scale) is likely to increase to large scale with the development of a large building, potentially 400m by 215m and 30m in height. The scale of the wider landscape is influenced by the presence of the existing and under-construction large and medium size buildings within IAMP ONE Phase One; these are largely c. 13-15m in height, with one building that is c. 19m high at its tallest. The magnitude of effect is assessed as medium-high, on a low-medium sensitivity receptor, and as such **the change in landscape scale would be significant**.

8.5.17 Enclosure within the area will alter as a result of the proposed development: the existing north-south hedgerow is likely to be removed, but this will be offset by new perimeter planting along the diagonal, western boundary as well as other planting within the south-western corner of the Site, and internal soft landscaping. Reinforcement of existing, retained hedgerows (such as the section alongside the A1290, in the section where road widening is not proposed) would also be beneficial in increasing the degree of enclosure within the Site. Additional enclosure will be provided by the development of the proposed industrial building. The magnitude of effect is assessed as medium-high (having regard for the adjacent area of industrial

development immediately to the east-north-east) on the low-medium sensitivity receptor: not significant.

8.5.18 Lighting will form part of the Site development; this will accord with the principles of the Design Code for IAMP ONE. As such, this would maintain a consistency of appearance and effect on the character of this landscape. It is intended that the south-western corner of the Site, including any building facades facing towards this end of the Site, be kept as dark as practicable so as to minimise adverse effects on species and habitats. The effects of the provision of lighting within the majority of the developed Site area is assessed as a low-medium magnitude of effect on a low-medium sensitivity receptor: not significant.

8.5.19 As noted above, the loss of some of the existing trees and hedgerows within the Site will be compensated for through the planting of extensive areas of replacement native trees and scrub (particularly in the south-west corner of the Site) and hedgerows / hedgerow trees. Once this planting is established, it will contribute positively to the landscape character of the local area.

8.5.20 Overall, effects of the developed Site on the landscape resource of the local area are assessed as resulting in a medium magnitude of effect on a low-medium sensitivity receptor and would not be significant, other than from the change in landscape scale.

Effects on landscape character

8.5.21 The proposed Site development would result in permanent, direct effects on this part of the *Coalfield Lowland Terraces* (*Usworth Lowland*) LCT / LCA. The susceptibility of this LCA to the proposed development has been assessed as low (para. 8.4.19, above) and the value of the LCA is assessed as low-medium (para. 8.4.19). The magnitude of effect associated with the permanent, long term development of the Site is assessed as medium-high; on a low-medium sensitivity receptor: **significant effect**.

8.5.22 Effects on the landscape character of the wider area of the *Usworth Lowland* LCA and the *Urban Fringe, Boldon Fell* LCT, to the north, from the permanent development of the Site would be indirect and limited to changes to the skyline, associated with the presence of a tall, large-scale building on the horizon to the south. The magnitude of this change is assessed as medium, reducing to low with increased distance from the Site, and would not be significant.

Cumulative landscape effects

8.5.23 Cumulative effects on landscape are assessed in relation to the combination of the proposed development of the Site together with anticipated developments in the nearby area, as set out in this ES, chapter 2, paras. 2.3.4 and 2.3.5 and as shown on ES Figure 2.1. The cumulative assessment is limited to the operational stage of the proposed development, as any effects of construction would be short-term and temporary and would not be significant, therefore.

Cumulative effects on the landscape resource

8.5.24 Cumulative effects on the landscape resource of the local area would result from the overall development of the Site in combination with the development of the IAMP ONE Phase One and IAMP TWO areas. There would be some loss of hedgerows and individual trees within these development areas and this would result in a significant effect on the landscape resource, reducing over time with the establishment of the landscaping within the site and within the adjacent ELMA area. The assessment of effects (above) has identified a significant effect on landscape scale as a result of the proposed development. The cumulative effect on landscape scale, from the combination of the proposed development with the wider IAMP development, is not however considered to result in any significant cumulative effect on the landscape resource (medium-high magnitude of effect, low-medium sensitivity receptor).

8.5.25 In relation to the current planning applications set out in ES chapter 2 para. 2.3.5, the following conclusions can be drawn in relation to the potential for cumulative effects on the landscape resource of the local area:

- Application ref. 18/02055/FUL – provision of solar panels, Unipres building – this does not result in any loss of or change to the existing landscape resource and there are therefore no cumulative effects to assess.
- Application ref. 17/02085/MW4 – renewable energy centre west of Infiniti Drive – it is understood that the mature trees to the immediate east of the site would be retained and as such there would be only limited effects on the existing landscape resource as a result of this proposed development, if it was to proceed. The combination of the loss of internal hedgerows and trees within the IAMP ONE Phase Two site, together with this proposed development, is not considered to result in significant cumulative effects on the landscape resource (low-medium magnitude of effect, low-medium sensitivity receptor).

- Application ref. 18/01964/FUL – extension to Elm Tree Nursery, Washington Road – there would be no loss of existing trees or hedgerows as a result of the proposed extension to the Nursery site and as such no cumulative effects on the landscape resource would result.
- Application ref. 18/01869/FUL and subsequent application 19/02161/VAR – proposed hotel, Washington Road – there would be some loss of existing trees and field boundary hedging within the central area of this development, to accommodate the hotel building and car parking, though some existing trees on the south-western and north-eastern parts of the site are shown as likely to be retained. The combination of the loss of the internal hedgerows and trees within the IAMP ONE Phase Two site, together with the changes resulting from this proposed development, is not considered to result in significant cumulative effects on the landscape resource of the local area (medium magnitude of effect on a low-medium sensitivity receptor).

8.5.26 Overall, no significant cumulative effects are predicted in relation to the landscape resource of the local area. This is also considered to be the case when considering the total effects of all the proposed developments (IAMP ONE Phase One and IAMP TWO, and current / recently approved planning applications, as above) in combination with the Site (medium-high magnitude of effect on a low-medium sensitivity receptor).

Cumulative effects on landscape character

8.5.27 Cumulative effects on landscape character can also result from the combination of the proposed development with other developments in the local area. In respect of the proposed development of IAMP ONE Phase One and IAMP TWO, these lie entirely within the *Coalfield Lowland Terraces* LCA. Direct effects on the character of this landscape would result from the installation of the industrial units within the IAMP ONE Phase One and IAMP TWO sites; these have not been identified as significant effects (IAMP ONE 2018 ES and IAMP TWO PEIR).

8.5.28 There could be scope for some indirect cumulative effects on the adjacent *Urban Fringe, Boldon Fell* LCA; the scope for any significant effects would be limited to the areas closest to the IAMP site. Effects on this LCA are assessed as significant, pre- and post-mitigation, for the IAMP TWO site.

8.5.29 The cumulative effect on landscape character from the combination of the Site with the wider IAMP development areas is assessed as a medium-high magnitude of effect on low-medium sensitivity receptors: not significant.

8.5.30 In relation to the current planning applications set out in ES chapter 2 para. 2.3.5, the following conclusions can be drawn in relation to the potential for cumulative effects on the landscape character of the local area:

- Application ref. 18/02055/FUL – provision of solar panels, Unipres building – this does not result in any loss of or change to the existing industrial character of the Nissan site and there are therefore no cumulative effects to assess.
- Application ref. 17/02085/MW4 – renewable energy centre west of Infiniti Drive – this development would result in changes to the character of the local area, within the *Coalfield Lowland Terraces* LCA as well as potential indirect effects on the adjacent *Urban New Town* LCA. This has been assessed as not significant within the LVIA undertaken for the proposed development (chapter 6 of the ES provided in support of the application). The combination of development within the IAMP ONE Phase Two site, together with this proposed development, is not considered to result in significant cumulative effects (direct and indirect) on the landscape character of the local area, which is already heavily urbanised (low-medium magnitude of effect, low-medium sensitivity receptor).
- Application ref. 18/01964/FUL – extension to Elm Tree Nursery, Washington Road – changes to the landscape character as a result of the proposed extension to the Nursery site, within the *Coalfield Lowland Terraces* LCA, would result from the further intensification and extension of this existing development. However, this is not considered likely to be significant. When the proposed IAMP ONE Phase Two development is combined with this, the small amount of additional intensification is assessed as not significant (low-medium magnitude of effect on a low-medium sensitivity receptor).
- Application ref. 18/01869/FUL – proposed hotel, Washington Road –the development of the proposed hotel building and car parking would alter the character of the landscape in this area (within the *Coalfield Lowland Terraces* LCA) but not to a significant level, given the presence of industrial buildings to the north, west and south. The combination of the proposed development within the IAMP ONE Phase Two site, together with this proposed development, is not considered

to result in significant cumulative effects on the landscape character (low-medium magnitude of effect on a low-medium sensitivity receptor).

8.5.31 Overall, no significant cumulative effects, either direct or indirect, are predicted in relation to the landscape character of the local area as a result of the proposed development of the Site. This is also considered to be the case when considering the total effects of all the proposed developments (IAMP ONE Phase One and IAMP TWO, and current / recently approved planning applications, as above) in combination with the Site (medium-high magnitude of effect on low-medium sensitivity receptors).

8.6 Assessment of effects on visual amenity

Introduction

8.6.1 The Zone of Theoretical Visibility (ZTV), ES Figure 8.1, is based on theoretical visibility using LiDAR data, including buildings, trees and other above ground features, and assumes an eye height of 2m. It is based on an assumed maximum building height of 30m within the development plot extents (as shown on the parameters plan, Appendix 3.1, drg. ref. 6600-056). It is relevant to note that, to date, no buildings on the IAMP ONE Phase One site have been built at this height; the tallest of these is a part of the SNOP building (c.19m above ground level) and other parts of this building are at 6.0m and 10.0m. Buildings within plots 4 and 5/6 are 13.5m and 15m above ground level (respectively).

8.6.2 Given the presence of extensive areas of built development within the areas surrounding the site, the ZTV extents have been shown as being cut off at the edges of the settlements and industrial zones enclosing the site. Views from areas beyond these edges can expect to be constrained by the existing built development.

8.6.3 The ZTV indicates that the main areas within the 2km study area, from which there would be views of the proposed building, lie to the immediate west, north and east of the Site, with more limited visibility to the south and south-west. More distant views are possible from the areas of higher ground further to the south, including where viewpoint 13 is located (at the Penshaw Monument).

8.6.4 Given the nature of the Site and limited presence of near-distance receptors, the assessment of effects on visual amenity has been limited to operational effects. Any effects of construction operations on visual amenity for receptors in the area of the site, would in any case be short-term and temporary and as such it is considered that this would not give rise to significant effects.

Effects on visual receptors – during operation

Residential receptors (settlements, groups of properties, individual properties

8.6.5 Residential receptors with scope for views of the site include the north-eastern settlement edge of Washington, over 1km to the west of the Site. Views from properties facing east on this edge are partially screened by existing tree cover on the edges of the disused railway line; this line is elevated above the ground floor levels of the houses on Sulgrave Road. Any views towards the Site would be relatively distant, seen primarily from less sensitive upper floor windows. The proposed development within the Site would, from the southern section of Sulgrave Road, be seen in front of and blocking views of the IAMP ONE Phase One site, where occupancy of various plots has commenced. Residential receptors may be considered as highly susceptible to changes in the views from their properties (GLVIA paras. 6.33 and 6.36), though views from upper floor windows, where rooms are not typically occupied during daylight hours, are less sensitive (medium susceptibility). The value ascribed to the view from this area is assessed as medium; the sensitivity of these receptors is therefore assessed as medium and medium-high. The magnitude of effect is assessed as medium (balancing the distance to the site and the presence of the existing IAMP ONE Phase One development plots against the greater height of building proposed for the Site) and any effects on visual amenity for residential receptors in this general area are assessed as not significant.

8.6.6 North Moor Farm lies within the ELMA area and to the immediate north of the Site. This is a single storey property facing south-south-east towards the Site. There would be direct views of the operational development within the Site, seen beyond the intervening ELMA area, potentially within a distance of 190m. The property already experiences views of the development within the existing IAMP ONE Phase One area and the proposed development within the Site would extend this further to the west, as well as being markedly closer in proximity. This is assessed as a high magnitude of effect (having regard for the existing view from this property) on a medium-high sensitivity receptor (high susceptibility and medium-low value): **significant effect**.

8.6.7 For the properties at Hylton Bridge Farm, further to the north, there is limited visibility towards the Site. The two storey property at Hylton Bridge Farm has no main windows facing to the south-west; a row of trees lines the southern boundary of the garden area, screening views from the single storey Bungalow at Hylton Bridge Farm. Any views towards the Site from within the general area of these properties would (at

present) look across existing farmland and would include the existing, under construction buildings within the consented areas of the IAMP ONE Phase One site, at between 370m and 600m distance. The proposed development would be some 500m distance and the greater height of the building, at 30m, in addition to its overall extent would be a noticeable difference, within this general view. The magnitude of effect from the presence of the proposed 30m high building within the Site is assessed as medium-high, on receptors of medium-high sensitivity (high susceptibility and medium-low value): **significant effect**.

8.6.8 From the two, two-storey properties on the roadside at Hylton Grove Farm, views south towards the current development within IAMP ONE Phase One are restricted by roadside hedging and intermittent trees, in addition to buildings associated with Hylton Bridge Farm. Within the wider view, roadside trees and hedging, and field boundary hedging and hedgerow trees interrupt views south-south-west. Views towards the site would be marginally more distant than those of Hylton Bridge Farm, with a slightly greater extent of intervening farmland. The proposed development would be visible, seen beyond and above the intervening vegetation. Effects on visual amenity from the proposed development at the Site are assessed as of medium-high magnitude, on receptors of medium-high sensitivity (high susceptibility and medium-low value): **significant effect**.

8.6.9 From the properties of East House and Strother House Farm, at 1.35km+ from the Site, any views of the completed development would be partially screened by intervening trees and field boundary hedging and seen in front of the existing Nissan buildings and completed / under completion, extents of the consented IAMP ONE Phase One site. The 30m high building would break the skyline in this view. Effects on visual amenity would not be significant (assessed as a low-medium magnitude of effect on medium-high sensitivity receptors (high susceptibility, medium value)).

8.6.10 For the properties in the Down Hill Farm area, views of the completed development would form part of the wider view of the consented IAMP ONE site, located beyond, and marginally taller than these. Effects on visual amenity would not be significant (assessed as a low magnitude of effect on medium-high sensitivity receptors (high susceptibility, medium value)).

Users of transport routes and rights of way

8.6.11 From the immediately adjacent sections of the A1290, as it approaches and passes the site, there would be near-distance views of the completed development (VPs 1 and

16, ES Figures 8.6 and 8.8 refer). These would be of short duration, transient and varying from more distant, direct views to near-distance and oblique views of the Site, seen in the context of the consented IAMP ONE Phase One development which, for westbound road users, would initially screen views of the proposed building within the Site. For eastbound road users within the 1.6km section of road east of the IAMP ONE access road, the proposed building within the Site would be the first element of the development to be seen, occupying part of the forward view, albeit intermittently screened by roadside trees but increasing in prominence as the road user gets closer to the Site. Effects on visual amenity for users of this section of road, when considered in their totality, are assessed as up to medium-high magnitude (having regard for the presence of the completed / under completion, extents of the consented IAMP ONE site and the limited duration of the view) on receptors of low, and low-medium sensitivity, varying with proximity to the site (low susceptibility and low, or low-medium value): not significant.

8.6.12 There would be no views of the proposed development from the A19(T).

8.6.13 From the overbridge at the Downhill Lane Junction with the A19(T), and from elevated sections of Downhill Lane to the north-east of the Site, any views of the proposed development would be difficult to discern beyond the built development within the consented IAMP ONE Phase One site. Effects on visual amenity would not be significant (assessed as low magnitude on low-medium sensitivity receptors (low susceptibility and low-medium value)).

8.6.14 From sections of Follingsby Lane to the north-north-west of the Site, there would be more distant and oblique views, interrupted in places by roadside hedging and tree cover. The Site would be seen in conjunction with the wider, under development IAMP ONE Phase One site and the existing Nissan development area. Effects on visual amenity would not be significant (up to medium magnitude of effect on low-medium sensitivity receptors (low-medium susceptibility and low-medium value)).

8.6.15 From the BOAT between Follingsby Lane and East House, there would be scope for distant views of the completed development, seen in closer proximity than, and in conjunction with the wider IAMP ONE Phase One site at a distance of over 1.35km. The proposed building within the Site would break the skyline, to a noticeably greater extent than the existing buildings within IAMP ONE Phase One. Effects on visual amenity would not be significant (low-medium magnitude of effect on medium sensitivity receptors (medium susceptibility and low-medium value)).

8.6.16 Distant views from the footpath to the east and north-east of Strother House Farm towards the proposed development would be interrupted by intervening trees and hedgerows. The proposed building within the Site would break the skyline, sitting in front of the existing Nissan buildings; effects on visual amenity would not be significant (low magnitude of effect on medium sensitivity receptors (medium susceptibility and medium value)).

8.6.17 From the dismantled railway line to the east of Sulgrave and Usworth Hall, if this were to be brought back into service, there would be transient and oblique views of the completed development, seen in the context of the wider IAMP ONE Phase One site and the Nissan buildings. Effects on visual amenity would not be significant (low-medium magnitude of effect on medium sensitivity receptors (medium susceptibility and low-medium value)).

8.6.18 For other roads and rights of way within the study area, any views of the proposed development would typically be distant and interrupted by intervening tree cover and would not be significant.

Users of formal and informal open space and recreation areas

8.6.19 For visitors to the Penshaw Monument (VP13, ES Figure 8.7), there would be distant views northwards of the completed development; however, this would be seen in the context of the wider industrial development areas (including IAMP ONE Phase One and IAMP TWO, and Follingsby Park). Effects on visual amenity would not be significant (low magnitude of effect on medium-high sensitivity receptors (medium-high susceptibility and medium-high value)).

8.6.20 From the North East Aircraft Museum, views towards the site are well screened by intervening tree cover (in the area of the junction with the A1290) in addition to the buildings being constructed within the consented IAMP ONE Phase One site, and there would be no effects on visual amenity for visitors to this location.

Assessment of key views

8.6.21 Viewpoints used in this assessment have been selected to represent locations from where the site is most visible, for the greatest numbers of visual receptors. Two of the viewpoints (numbers 1 and 16, ES Figures 8.6 and 8.8) are located close to the site, on the A1290; the third (VP 13, ES Figure 8.7) is a more distant and elevated viewpoint from the Penshaw Monument, to the south of the site. Although this is outside the 2km study area, it is included because of its elevated position, from where there are

panoramic views of the wider settlement areas. The Penshaw Monument is also identified as an Important Panoramic Viewpoint (IPV) within the Sunderland UDP (see also para. 8.4.67, above).

8.6.22 The following analysis of these viewpoints, supported by panoramic photography (ES Figures 8.6 – 8.8) considers the existing view, the view with the proposed development (during the construction and operational phases) and predictions of the potential effects on the visual amenity of the relevant receptors. Any cumulative effects on visual amenity for these viewpoint receptors are also identified. Appendix 8.2 provides additional information relating to the viewpoint analysis, from that stated on the Viewpoint Figures.

Viewpoint 1: view from the A1290 at the new entrance road (ES Figure 8.6)

8.6.23 This viewpoint location has been amended slightly from that used in the 2018 IAMP ONE ES, where two locations close to and west of West Moor Farm were used as viewpoints (see IAMP ONE ES chapter F, Figures F4, F5 and Appendix F1 Viewpoint 1). The location used here has moved a short distance to the east in order to provide a view looking west (the views used in the 2018 ES were looking east).

8.6.24 The existing view is representative of the view for users of the A1290 from the area of the main entrance into IAMP ONE. The view looks west, into the area of the Site, with roadside trees lining both sides of the A1290. Construction work is evident within the consented IAMP ONE Phase One site, in the foreground and just beyond the site entrance. The three electricity pylons passing to the west of the Site can be seen against the horizon. There is a distant view of the farmhouse chimneys and farm buildings at West Moor Farm (to be demolished), seen adjacent to the clump of roadside trees; further to the north, North Moor Farm buildings can be seen in the centre of the view, with the new industrial buildings at Follingsby South seen behind and to the left of these. This view will be subject to change as the plots within the consented IAMP ONE Phase One site are developed.

8.6.25 During construction, there would be near and middle-distance views of construction operations (part of which would be within the consented IAMP ONE Phase One site area). These would be transient views. Effects on the visual amenity of road users are assessed as medium-high magnitude, on low sensitivity receptors (low susceptibility, low value): not significant.

8.6.26 On completion of the construction works, there would be near-distance views of the completed development, occupying a wide part of the existing field of view and obstructing any views further to the west, though these views would be transient and of short duration. In the longer-term, with the proposed widening of the A1290 in this area, there would be additional loss of roadside tree cover / hedgerows, though this would be replaced with new roadside planting. The mass and height of the building within the Site would block views towards the horizon and would be seen against the skyline from this location. Effects on visual amenity are assessed as of high magnitude on low sensitivity receptors (as above): **significant**, reducing in the long-term to below significant levels with the assimilation of the development into the general area. The establishment of perimeter and internal planting will assist in softening views into the Site but will not fully screen the 30m building from view.

8.6.27 Cumulative effects from this viewpoint are assessed as:

- In relation to IAMP ONE, much of the consented Phase One site that is under development is already visible from this viewpoint location, seen in succession (i.e. a different field of view); the combination of the proposed development together with this would result in an intensification of the quantum of development visible from this location. Cumulative effects on visual amenity are assessed as of high magnitude on low sensitivity receptors (as above): **significant**, reducing in the long-term to below significant levels (as above). The establishment of perimeter and internal planting within the general area of the development site will assist in softening views into the Site but will not fully screen the buildings from view.
- In relation to IAMP TWO, the northern development area would be largely, if not entirely screened from view by development within the IAMP ONE site whilst development areas to the east of the A1290 would lie to the rear of this view. Cumulative effects on visual amenity are assessed as of medium magnitude on low sensitivity receptors (as above): not significant.
- In relation to application ref. 18/02055/FUL, there would be no views of the solar panels from this location and therefore no cumulative visual effects to assess.
- In relation to application ref. 17/02085/MW4, there would be no views of this development from this location, due to the screening provided by the roadside trees and therefore there are no cumulative visual effects to assess.

- In relation to application ref. 18/01964/FUL, the proposed extension to Elm Tree Nursery would not be visible from this location and there are therefore no cumulative visual effects to assess.
- In relation to application ref. 18/01869/FUL, the proposed hotel building lies within a different field of view to the Site and is expected to largely be screened from view, from this location, by the intervening tree cover in the area of the junction of the A1290 accessing the old section of road. There may be some limited visibility in winter months when trees are not in leaf. Cumulative effects on visual amenity, from the combination of the Site with this proposed development, are assessed as a medium magnitude on low sensitivity receptors (as above): not significant.

8.6.28 Cumulative effects on visual amenity, from the combination of the Site with the totality of the above developments (those for which cumulative effects have been identified and assessed) include developments in different fields of view (successive visibility). The overall magnitude of effects is assessed as medium, on low sensitivity receptors, and would not be significant.

8.6.29 In summary, cumulative effects on visual amenity would largely not be significant, with the exception being the combination of the Site and IAMP ONE; in the longer-term, such effects can be expected to reduce to below significant as a result of the assimilation of the development into the general area. The establishment of perimeter and internal landscaping will assist in softening views of the Site.

Viewpoint 13: view from the Penshaw Monument (ES Figure 8.7)

8.6.30 The existing view is representative of the view for visitors to the Penshaw Monument. The panoramic view looks north from this elevated viewpoint towards the industrial development in Washington and northern Sunderland, including the extensive Nissan site and its wind turbines, interspersed with broadleaved tree cover, breaking up the development extents. Development of the existing IAMP ONE Phase One site can be seen in the middle distance, beyond the existing Nissan site, set behind the wind turbine that is second from the left in this view. North Moor Farm buildings are also visible in the middle distance (beyond the westernmost turbine), with the electricity pylons crossing the field seen to the west of this. Further to the west, the recently completed Follingsby South development can be seen beyond near-distance trees. The urban areas of South Tyneside and North Tyneside form the distant horizon to this view.

8.6.31 During construction, there would be distant views of construction activities seen beyond the existing Nissan site, but given the distance from the Site (c. 4km+) this would be difficult to distinguish in any detail. Effects on visual amenity are assessed as of negligible-low magnitude, on medium-high sensitivity receptors (low susceptibility and medium-high value): not significant.

8.6.32 Once the construction works are completed, the operational development would be seen in the distance in conjunction with the wider IAMP site and the adjacent Nissan site, extending the extent of built development northwards by a short distance, in addition to the introduction of a taller, more prominent building (though this would not break the skyline). Effects on visual amenity are assessed as of low-medium magnitude, on medium-high sensitivity receptors (low susceptibility and medium-high value): not significant.

8.6.33 Cumulative effects from this viewpoint would include all of the developments noted in ES chapter 2 and shown on ES Figure 2.1, as these are all located to the north of the viewpoint (including the solar panels). However, not all of these would be readily discernible given the distance from the viewpoint location, to these. As a result, cumulative visual effects, both in relation to the combination of the Site and IAMP ONE Phase One / IAMP TWO, and the Site and the various individual applications, as well as the totality of these developments, are not considered likely to be significant, for this viewpoint (negligible-low magnitude of effect on medium-high sensitivity receptors).

Viewpoint 16: view from the A1290 to the west of the Site (ES Figure 8.8)

8.6.34 The existing view is representative of the view for eastbound users of the A1290. The view looks east along the A1290 at the start of a straight section of road leading towards the entrance to the Nissan site and, further east, to parts of the local road network and to the A19(T). The open farmland to the west of the Site is seen, framed by hedgerows and roadside trees. The major buildings within the Nissan site are screened by the tree planting on the south side of the A1290, but there is a long-distance view from this location of the new building development within the IAMP ONE Phase One site. This is seen largely backdropped by the more elevated landform and tree cover to the east of the A19(T). There are no views of West Moor Farm as this is screened by the intervening roadside tree cover.

8.6.35 During construction, there would be middle-distance views of construction operations taking place on site, seen beyond the arable land and short section of hedgerow that

will be retained. Effects on the visual amenity of road users are assessed as low-medium magnitude on low-medium sensitivity receptors (low susceptibility, low-medium value): not significant.

8.6.36 On completion of the construction works, once the development plot is operational, there would be views (similar to existing, but with built development in closer proximity and breaking the skyline to a considerable degree) of the 30m building developed on the Site, occupying the same field of view as the development taking place on site at present and obscuring views of this. In the longer term, the native tree and scrub planting proposed in the south-western corner of the Site would establish and provide some softening of the built development. Effects on visual amenity are assessed as medium-high magnitude, on low-medium sensitivity receptors (as above): not significant.

8.6.37 In relation to any cumulative effects from this viewpoint, these are assessed as:

- In relation to IAMP ONE Phase One, part of the consented site that is under development is already visible from this viewpoint location, seen in the distance; the development of the single 30m high building unit would obstruct views of the remainder of the IAMP ONE Phase One site. There are therefore no cumulative visual effects to assess in this regard.
- In relation to IAMP TWO, the northern development area would be some 1.8km distance from this viewpoint location, seen to the north of the development within the IAMP ONE Phase One site and separated from this by the proposed ELMA area. Other development areas within IAMP TWO would be located beyond the IAMP ONE Phase One site and are likely to be screened from view by the development of the Site. Any cumulative effects on visual amenity from the combination of the Site and IAMP TWO are assessed as of low magnitude on low-medium sensitivity receptors (as above): not significant.
- In relation to application ref. 18/02055/FUL, there would be no views of the solar panels from this location and therefore no cumulative visual effects to assess.
- In relation to application ref. 17/02085/MW4, any views of this gasification plant development from this location would be in a different field of view (seen in succession) and can be expected to be limited to views of the stack. Cumulative effects on visual amenity, from the combination of the Site and this proposed planning application are assessed as of low magnitude on low-medium sensitivity receptors (as above): not significant.

- In relation to application ref. 18/01964/FUL, there would be limited views of the proposed extension to Elm Tree Nursery from this location, seen in a different field of view to the Site. Cumulative effects on visual amenity from the combination of the Site and this proposed development are assessed as of low magnitude on low-medium sensitivity receptors: not significant.
- In relation to application ref. 18/01869/FUL, the proposed hotel building would be screened from view, from this location, by the intervening tree cover along the A1290. There are therefore no cumulative visual effects to assess.

8.6.38 Cumulative effects on visual amenity for this viewpoint location, from the combination of the Site with the totality of the above developments (those for which cumulative effects have been identified and assessed) relate to developments in the same and different fields of view (seen in succession). The overall magnitude of effects is assessed as no greater than medium, on low-medium sensitivity receptors, and would not be significant.

8.6.39 In summary, cumulative effects on visual amenity at this location would not be significant.

Cumulative visual effects

8.6.40 Cumulative visual effects have been considered for the three viewpoints (above); the potential for cumulative effects on visual amenity for the other visual receptors in the study area, with views of the proposed development, are considered below.

8.6.41 Of the developments shown on ES Figure 2.1 and described in ES chapter 2, those for which there would be the potential for cumulative effects in combination with the Site, are:

- IAMP ONE Phase One and IAMP TWO, by virtue of their extent and likely degree of visual influence;
- application ref. 17/02085/MW4 – gasification plant – as this includes a 57m high stack which will be visible from within much of the surrounding area; and
- application ref. 18/10964/FUL – extension to Elm Tree Nursery, within in succession and in sequential views for some visual receptors.

8.6.42 Application ref. 18/02055/FUL, for the Unipres solar panels (with the exception of the view from Penshaw Monument), and 18/01869/FUL, for the proposed hotel, are not included in the cumulative effects assessment (below) as these developments would

typically not be prominent and readily visible from within the wider area and as such, significant cumulative visual effects are unlikely to be incurred.

Residential receptors

8.6.43 For residential receptors on the north-eastern settlement edge of Washington (Sulgrave Road), there may be distant, partial views (seen through the intervening tree cover) of the IAMP ONE Phase One and IAMP TWO sites. Any cumulative effects on visual amenity from the combination of the Site and these two wider developments are assessed as a medium magnitude of effect, on medium-high sensitivity receptors: not significant. The intervening tree cover on the edge of the dismantled railway line is also likely to screen views of the proposed stack at the gasification plant to the west of Infiniti Drive; there would therefore be no cumulative effects on visual amenity associated with this application. For the other applications identified above, these developments would not be visible from this area and there would be no cumulative effects on visual amenity.

8.6.44 From North Moor Farm, there would be near and middle-distance views (seen in successive fields of view) of the Site in combination with areas within IAMP ONE Phase One and IAMP TWO (northern development area). Cumulative effects on visual amenity are assessed as being of high magnitude, on a medium-high sensitivity receptor: **significant** effect. This property may also have distant (c. 1.75km) views of the proposed gasification plant stack (assumed to be an off-white or grey colour, limiting its prominence), seen against the skyline to the south-west. The combination of the Site development and this development is assessed as a medium magnitude of effect on a medium-high sensitivity receptor: not significant. There would be no views of any of the other applications from this location.

8.6.45 From properties at Hylton Bridge Farm and the two roadside properties at Hylton Grove Farm, there would be near distance views of the IAMP ONE Phase One and IAMP TWO areas, seen in different fields of view. The proposed ELMA area extends to provide some separation between these properties and the development sites. The combination of the proposed Site development and IAMP ONE Phase One and IAMP TWO, for these properties, would not be significant (low-medium magnitude of change on medium-high sensitivity receptors). There would be no views of the other planning application sites, with the exception of the stack forming part of the gasification plant, the upper part of which may just be perceptible against the skyline,

beyond intervening trees. Any cumulative effects on visual amenity are not expected to be significant, therefore.

8.6.46 The properties at East House and Strother Farm are situated to the immediate west of the IAMP TWO northern development area, with scope for near distance views of this, albeit oblique and from areas surrounding the properties rather than from within the dwellings. Cumulative effects from the combination of the more distant Site with IAMP TWO, and similarly distant IAMP ONE Phase One development areas, are assessed as having a low magnitude of effect on medium-high sensitivity receptors: not significant. There would be no views of the other planning application sites from these properties, all of which are further to the south and south-east, with the possible exception of the upper part of the gasification stack, seen above intervening trees. Cumulative effects on visual amenity would not be significant, therefore (assessed as a low magnitude of effect on medium-high sensitivity receptors).

8.6.47 For the properties in the Down Hill Farm area to the north-east of the Site, views would be dominated more by the development areas of IAMP ONE Phase One and IAMP TWO, which are in closer proximity than the Site. These would extend across a relatively wide swathe of land beyond the A19(T) and development within the Site would be situated beyond this. Cumulative effects on visual amenity from the combination of the proposed development to that of IAMP ONE and IAMP TWO would not be significant (assessed as a negligible-low magnitude of effect on medium-high sensitivity receptors).

Users of transport routes and rights of way

8.6.48 In assessing cumulative visual effects on users of transport routes and rights of way, it is relevant to consider sequential visual effects (views experienced over the duration of a route, or part of a route) as these are the most likely effects to be incurred. With the exception of the IAMP ONE Phase One and IAMP TWO sites, the majority of proposals being considered in this cumulative assessment are sufficiently dispersed not to be visible at the same time and from the same location along a transport route.

8.6.49 For users of the A1290, there would be scope for sequential views for road users travelling in either direction, of all the developments included in the cumulative assessment. Travelling from west to east, this would commence in the area of the roundabout junctions on the eastern edge of Washington, from where there would be oblique views of the gasification plant and its stack, and (in a separate field of view) the development at Elm Tree Nursery. Continuing eastwards, there would then be

views of the IAMP ONE Phase Two development area, followed immediately by IAMP ONE Phase One and IAMP TWO, continuing along the length of the A1290 towards the junction with the A19(T). For road users travelling in the opposite direction, this experience would be reversed. The overall effect on road users would be one of extensive industrial development, set within a landscape framework that would establish over time. The cumulative effects on visual amenity, from the combination of IAMP ONE Phase Two with the remainder of the development on or close to the A1290, is assessed as a low-medium magnitude of effect on low-medium sensitivity receptors: not significant.

8.6.50 There would be no views of the Site from the A19(T) and therefore no cumulative visual assessment is required for this route.

8.6.51 From the elevated overbridge at the Downhill Lane junction, and from Downhill Lane, there would be scope for views of IAMP ONE Phase One and IAMP TWO development areas, seen just beyond the A19(T) and extending north-south and west-east. The gasification plant stack is likely to be visible, though the remainder of that site would form part of the overall extent of industrial development between the A19(T) and the eastern edge of Washington. Cumulative effects on visual amenity from the combination of the proposed development and these other sites would not be significant, notwithstanding that the proposed 30m building would be more noticeable than the remainder of the development within this part of the IAMP ONE site, due to its greater height. This is assessed as a low-medium magnitude of effect on low-medium sensitivity receptors.

8.6.52 From Follingsby Lane and from the BOAT between Follingsby Lane and East House, there would be near-distance views of the IAMP TWO northern development area, seen in a different field of view to IAMP ONE Phase One, which would occupy the middle distance, and the proposed development within the Site would sit within another arc of the view, to the south. Any views of the other application sites would be limited to the stack within the gasification plant, only. The cumulative effects on visual amenity from the combination of the Site with these other developments is assessed as a low-medium magnitude of effect on low-medium and medium sensitivity receptors: not significant.

8.6.53 Any views from the footpath east and north-east of Strother House Farm would be dominated more by the development within the IAMP TWO site, which would lie immediately to the south of this route. Development within the IAMP TWO site is

likely to obstruct the majority of views south towards the remainder of the IAMP development (IAMP ONE Phase One / IAMP ONE Phase Two) though there may be some scope for views of the gasification plant stack from the southern end of this footpath, on the approach to Follingsby Lane. Any cumulative effects on visual amenity from the combination of the Site with the wider proposed developments would not be significant: low magnitude of effect on medium sensitivity receptors.

8.6.54 From the dismantled railway line to the east of Sulgrave and Usworth Hall (if brought back into service) any views of IAMP ONE Phase One and IAMP TWO would be relatively distant, intermittent views; the Site would be the closest part of this development to this route. There would (sequentially) also be scope for near views of the gasification plant from the section of railway line following the western edge of this site. Any cumulative effects on visual amenity from the combination of the Site with these other proposed developments are assessed as not significant: low-medium magnitude of effect on medium sensitivity receptors.

Users of formal and informal open space and recreation areas

8.6.55 For visitors to the Penshaw Monument (VP13, ES Figure 8.7) the distant views northwards would, as discussed at para. 8.6.32 above, include the development areas of IAMP ONE Phase One and IAMP TWO in addition to the application sites shown on ES Figure 2.1. However, given the nature of this view, which includes extensive areas of industry, cumulative effects from the combination of the Site with these is assessed as not significant (negligible-low magnitude of effect on medium-high sensitivity receptors).

8.6.56 From the North East Aircraft Museum, as there are no effects on visual amenity from the site (para. 8.6.19) there are no cumulative visual effects to assess, for receptors at this location.

8.7 Mitigation Measures

8.7.1 As noted in section 8.4, above, an area of ecological and landscape mitigation is proposed (ELMA) within land to the north and north-east of the Site.

8.7.2 In addition, Site-specific mitigation is proposed to address the effects of the proposed development on the landscape character and visual amenity of the area. These will tie in with the works identified within the 2018 IAMP ONE ES, chapter F at section F6.0, in that there will be structural landscaping, associated with the site boundaries and main spine road as well as communal areas (maintained by Sunderland City

Council), and amenity planting, associated with the separate plots within the IAMP ONE area and maintained by the individual occupiers.

8.7.3 Landscaping of individual plots within the Site would be subject to separate detailed design and approval by Sunderland City Council and is therefore not considered here.

8.7.4 In relation to the landscaping of the perimeter of the Site, the parameter plan 3 Green Infrastructure (Appendix 3.1, drg. ref. 6600-055) identifies an area for native tree and scrub planting within the south-western corner of the Site. In addition to providing some softening of the proposed building(s) within the Site, including for views from the A1290 to the west, this would compensate for the loss of internal trees and hedging and provide some habitat (in the longer-term) for species of birds and other fauna.

8.7.5 In line with the information provided in the 2018 ES, this planting will comprise native tree and shrub species, including a percentage of grey poplar and some Scots pine and holly, for year-round visual colour. This planting could be raised up on low mounding using surplus excavated topsoil, both to increase its eventual height and to provide an improved growing medium. On the north-west boundary, planting will comprise largely hedging (to comply with the requirements for planting in proximity to overhead transmission lines) occasional trees where these can be accommodated, and areas of native scrub.

8.7.6 It is proposed that the existing hedging along the boundary with the A1290 be retained, where this is not at risk from future widening, and reinforced with additional native hedge plants where gaps occur. Hedgerow tree planting will also be incorporated into this boundary. A new roadside hedgerow, and hedgerow trees, should be provided to the northern edge of the widened section of the A1290 in this area.

8.7.7 As noted in the IAMP ONE 2018 ES, it is intended that the central spine road be planted with regularly spaced specimen trees to create an attractive access route and a bold unifying feature through the development area.

8.7.8 In order to minimise the visual effect of the proposed development, particularly for views from the A1290, the south-western corner of the site should remain as dark as possible, with no lighting within or directed into this area, and avoiding service yards or parking areas facing towards the ELMA.

8.7.9 Buildings within the Site would be painted in a recessive colour (as agreed with Sunderland City Council) in the same manner as proposed within the IAMP ONE 2018 ES.

8.7.10 In relation to the potential for cumulative effects on visual amenity on the occupants of North Moor Farm from the combination of the proposed development and the wider IAMP ONE and IAMP TWO (northern development area), it is recommended that consideration be given to the provision of additional hedgerow trees within the hedgerows to the south, east and north-east of North Moor Farm, planted as heavy standards (species as specified for the ELMA).

8.7.11 In relation to the demolition of the buildings within the West Moor Farm area, it is proposed that the root zones and canopies of adjacent trees and hedging be safeguarded against damage during demolition works, with Heras or other equivalent fencing erected as protection in accordance with the requirements of BS5837 (1991): Trees in Relation to Construction.

8.7.12 As noted within the IAMP ONE 2018 ES, all landscape works will be maintained in accordance with a landscape management plan, submitted to and agreed with Sunderland City Council.

8.8 Residual Effects

8.8.1 With these mitigation measures in place, it is anticipated that the longer-term effects of the proposed development on the landscape character and visual amenity of the local area would not be significant. **In the short to medium term, it is anticipated that significant effects (including cumulative effects) on visual amenity would remain for the occupants of North Moor Farm**. **Significant effects on visual amenity would also remain for the occupants of the properties at Hylton Bridge Farm and the two roadside properties at Hylton Grove Farm, for the short to medium-term**. In the longer-term, effects on landscape character and visual amenity would reduce to below significant and would make a positive contribution to the landscape character and visual amenity of the local area.

8.9 Limitations to the study

8.9.1 There have been no limitations to the study.

8.10 Conclusions

Summary and overview of potential landscape effects

8.10.1 The sensitivity of the landscape of the site, the landscape receptors present within the site, and surrounding landscape character areas has been considered in order to inform the consideration of the landscape effects arising from the proposed development of a large, 30m high building within the IAMP ONE Phase Two site, to the north of the A1290.

Effects on landscape character and the landscape resource – during construction

8.10.2 Although demolition and construction works would take place in close proximity to the area of Green Belt, effects would be indirect and temporary and are assessed as not significant.

8.10.3 There would be changes to the character of the landscape from the demolition of West Moor Farm and from the presence of plant and machinery within the Site, as well as from the permanent loss of internal lengths of hedgerow and some hedgerow trees. Effects would be adverse, but not significant.

8.10.4 Minimal changes to the landform are anticipated. Lighting would be required during construction, more particularly in winter months, or for security, but would be short term and temporary; effects would be adverse but not significant.

8.10.5 Effects of construction on the landscape character area within which the site is located are assessed as a high magnitude of effect, on a low-medium sensitivity receptor and would not be significant. Indirect effects on the wider landscape character areas would not be significant.

Effects on landscape character and the landscape resource – post-completion

8.10.6 The operational effects of the proposed development would be permanent and long-term.

8.10.7 Effects (indirect) on the adjacent areas of Green Belt land from the presence of the completed development would be partially buffered by the perimeter landscaping of the Site; these have been assessed as not significant.

8.10.8 There would be changes to the scale of the Site from the presence of the large-scale building and from its association with the wider IAMP ONE development area. The generally medium scale of the existing landscape (within a wider area of medium to large scale) is likely to increase to large scale. The scale of the wider landscape is

influenced by the presence of the existing and under-construction buildings within IAMP ONE Phase One; these are largely c. 13-15m in height, with one building that is c. 19m high at its tallest. The magnitude of effect is assessed as medium-high, on a low-medium sensitivity receptor, and as such **the change in landscape scale would be significant**.

8.10.9 There would be changes to the degree of enclosure experienced within the site, and from the presence of lighting associated with the development plots and spine road. Loss of existing hedgerows and trees would be compensated by the provision of replacement tree and scrub planting as well as the infilling of gaps within the retained hedging. This will in the longer-term make a positive contribution to the landscape character of the local area.

8.10.10 Overall, the effects of the developed site on the landscape resource of the local area are assessed as not significant, other than from the change in landscape scale.

8.10.11 Changes from the development of the Site will result in changes within the *Coalfield Lowland Terraces (Usworth Lowland)* LCA. This is assessed as **significant**. However, indirect effects on the wider landscape character areas from the presence of the developed Site are assessed as not significant.

Cumulative effects on landscape character and the landscape resource – post-completion

8.10.12 Cumulative effects on the landscape resource, from the presence of the operational Site in combination with the development of the IAMP ONE Phase One and IAMP TWO areas, would relate to the increased loss of hedgerows and trees from within the development area. This can be expected to be a significant effect for the larger IAMP ONE Phase One and IAMP TWO sites. The combination of the relatively small area which comprises the part of the Site without planning permission, with the wider IAMP development, is not considered to result in a significant cumulative effect on the landscape resource.

8.10.13 No significant cumulative effects are predicted on the landscape resource, from the combination of the Site with the various planning applications (as indicated on ES Figure 2.1).

8.10.14 Equally, no significant effects on landscape character are anticipated from the proposed development in combination with the wider IAMP ONE Phase One and IAMP TWO sites. Notwithstanding the prediction of a significant effect on the *Urban Fringe,*

Boldon Fell LCA as a result of IAMP TWO, the greater distance of the Site from this LCA suggests that cumulative effects would not be significant.

8.10.15 No significant cumulative effects on landscape character, direct or indirect, are identified for the combination of the Site and the various current planning applications.

Effects on visual amenity

8.10.16 There is relatively limited visibility of the existing Site from within the surrounding area. This is mainly limited to locations close to the Site, or more distant, elevated positions to the north-west and south of the Site. Effects have been assessed for the operational stage of the development, only, as it is considered that the short-term nature of construction works would not give rise to significant effects on visual amenity.

Residential receptors

8.10.17 Significant effects on visual amenity have been identified for the occupants of **North Moor Farm**, to the immediate north of the Site; also for the occupants of the **properties at Hylton Bridge Farm** and the **two roadside properties at Hylton Grove Farm**. No other significant visual effects have been identified for residential receptors.

Users of transport routes and rights of way

8.10.18 Notwithstanding the close proximity of visual receptors using the A1290, no significant effects on visual amenity have been identified for users of this or other roads or rights of way (including the dismantled railway line on the eastern edge of Washington, west of the Site). Views from the road for users of the A1290 within the section of road passing the site, when assessed in their totality, would experience a range of near-distance, transient and oblique views of the Site, seen in the context of the wider industrial development of this area; this is assessed as not significant.

Users of formal and informal open space and recreation areas

8.10.19 No significant effects on visual amenity have been identified for visitors to the Penshaw Monument, or for visitors to the North East Aircraft Museum.

Appraisal of key views

8.10.20 Three viewpoints have been selected for use in this assessment: two on the A1290, to the west and east of the Site, and a view from the Penshaw Monument, to the south. Viewpoint numbers reflect those used in the IAMP ONE 2018 ES, for consistency.

8.10.21 For **Viewpoint 1**, at the junction of the A1290 with the new access road into the IAMP ONE development areas, there would be significant effects on visual amenity associated with the **near distance views of the developed Site from this location**, for the short to medium term associated with the establishment of internal and perimeter planting. Effects on visual amenity during construction are not assessed as significant. Cumulative effects at this viewpoint are predicted to be significant for the **combination of the Site with the wider IAMP ONE Phase One development in the short to medium term**; in the longer term, with the assimilation of the development into the general area, and the establishment of the perimeter and internal landscaping, cumulative effects would reduce to below significant levels. No other significant cumulative effects are identified for this viewpoint.

8.10.22 For Viewpoint 13, at the Penshaw Monument, no significant effects on visual amenity have been identified for any stage of the proposed development on the views from this location, including cumulative visual effects.

8.10.23 For Viewpoint 16, from the A1290 to the west of the Site, no significant effects on visual amenity have been identified for any stage of the proposed development on the views from this location, including cumulative visual effects.

Cumulative effects on visual amenity

Residential receptors

8.10.24 A significant cumulative effect on the visual amenity of the occupants of **North Moor Farm** is identified for the combination of the proposed development and the wider IAMP ONE Phase One and IAMP TWO (northern development area).

8.10.25 No other significant cumulative effects on visual amenity have been identified for the remainder of the residential receptors within the study area.

Users of transport routes and rights of way

8.10.26 No significant cumulative effects on the visual amenity (including sequential effects) of users of the various transport routes and rights of way have been identified as part of this assessment.

Users of formal and informal open space and recreation areas

8.10.27 No significant cumulative effects on the visual amenity of users of the various formal and informal open space and recreation areas, have been identified as part of this assessment.

Proposed mitigation

8.10.28 Mitigation is proposed, along similar lines to that for IAMP ONE Phase One, in respect of the landscaping of the site perimeter and within development plots (including the longer-term management and maintenance of this).

8.10.29 An area in the south-western corner of the Site is proposed for native tree and scrub planting, providing some softening of the proposed building within the Site for views from the A1290 to the west as well as compensating for the loss of internal trees and hedging, and providing habitat (in the longer-term) for species of birds and other fauna.

8.10.30 Other mitigation will include reinforcement of the hedging alongside the A1290 (where this is to be retained, and along the new roadside edge), including hedgerow tree planting.

8.10.31 If possible, the south-western corner of the Site should remain as dark as possible, with no or limited lighting within or directed into this area and avoiding service yards or parking areas facing this corner.

8.10.32 In relation to the demolition of the buildings within the West Moor Farm area, it is proposed that adjacent trees and hedging be protected against damage during demolition works, with Heras or other equivalent fencing erected as protection in accordance with the requirements of BS5837 (1991): Trees in Relation to Construction.

8.10.33 In relation to the potential for cumulative effects on visual amenity on the occupants of North Moor Farm from the combination of the proposed development and the wider IAMP ONE Phase One and IAMP TWO (northern development area), it is recommended that consideration be given to the provision of additional hedgerow trees within the hedgerows to the south, east and north-east of North Moor Farm, planted as heavy standards (species as specified for the ELMA).

Residual effects

8.10.34 In the short to medium-term, **significant effects on visual amenity (including cumulative effects) would remain for the occupants of North Moor Farm**. **Significant effects on visual amenity would also remain for the occupants of the properties at Hylton Bridge Farm and the two roadside properties at Hylton Grove Farm, for the short to medium-term.** In the longer-term, effects would reduce to below significant with the assimilation of the development into the general area, and the softening

effect of the proposed perimeter and internal planting. would make a positive contribution to the landscape character and visual amenity of the local area.

Overall conclusion – landscape character and visual amenity

8.10.35 It can be concluded from the above that the proposed development of the Site would result in limited significant effects on the landscape character and landscape resource of the area, restricted to the operational phase of the Site, and limited significant effects on visual amenity, also during the operational stage, for properties close to the Site.

8.10.36 In the longer-term, with the assimilation of the proposed development into the general area and the implementation of the proposed mitigation, it is considered that there would, overall, be scope for some positive effects on the landscape character, landscape resource and visual amenity of the local area.

9 WASTE

9.1 Introduction and background

9.1.1 This chapter assesses the likely significant effects of the development of the IAMP ONE Phase Two site (construction and operation) on waste management. Both hazardous and non-hazardous wastes are assessed.

9.1.2 Wardell Armstrong LLP has prepared this chapter using a team of experienced waste management professionals.

9.2 Consultation and scope of the assessment

9.2.1 The informal consultation with Sunderland City Council (SCC) in 2019 concluded that the waste chapter of the ES would focus in particular on the demolition of West Moor Farm and the disposal of arisings from this, together with the disposal of the topsoil present on site (whether re-used within the wider IAMP site area or removed off site).

9.2.2 Two indicative masterplans have been prepared for the outline planning application; this waste assessment considers the layout included for the single unit development (ES Figure 3.1B), as the worst-case option in this regard, due to the greater development footprint.

9.2.3 Waste generated by the demolition of West Moor Farm will include general building materials including brick, stone, glass, timber, roof tiles / slates, metal sheeting, breezeblocks and may include asbestos if this is present within any of the farm buildings.

9.2.4 Waste generated during the construction phase will include topsoil and subsoil from excavations, packaging waste from material and equipment deliveries, as well as waste generated during construction (for instance, surplus building materials, food and paper/plastic waste from site offices, surplus oil/fuels).

9.2.5 Waste generated during the operational phase of the development includes that created by site staff and visitors, waste arisings generated by the operations carried out within the development unit(s) and waste from packaging of materials delivered to the manufacturing unit.

- The ability of the existing waste facilities within the region to accommodate deliveries of materials during the demolition, construction and operational phases of the site has been reviewed as part of this assessment. It is intended that

materials will be reused on the development site, on alternative development sites, reused, or as a last resort, sent to a local inert landfill. Further details of the local facilities are provided in section 9.5.

9.2.6 Methods for storing waste on site during the different phases will be discussed, as will methods for dealing with any hazardous or contaminated materials.

9.2.7 The assessment takes into account the Interim Advice Note prepared by Highways England, "Guidance on Environmental Assessment of Materials Resources" (Design Manual for Roads and Bridges, DMRB Volume 11).

9.3 Policy Context

International Policy

9.3.1 The following European policies are relevant for the assessment of waste management at this site:

- European Community (EC) Framework Directive for Waste, 2008/98/EC (the Waste Framework Directive); and
- EC Landfill Directive, 1999/31/EC.

9.3.2 The Waste Framework Directive requires the EC member states to take the appropriate measures to firstly encourage the prevention or reduction of waste production, and secondly to secure the recovery of waste by means of recycling, re-use or recovery, to extract secondary raw materials, or to make use of the waste as a source of energy.

9.3.3 The 'Waste Hierarchy' sets out the stages by which waste is intended to be dealt with, starting with 'Prevention', then 'Re-Use', followed by 'Recycling', 'Other Recovery' and finally 'Disposal' (as the least preferred option).

9.3.4 The EC Landfill Directive (1999 Directive) aims to prevent, or reduce as far as possible, adverse effects on the environment from landfilling of waste. This would be achieved by:

- ending co-disposal of hazardous and non-hazardous waste in landfill;
- introducing rigorous technical requirements for landfill sites and waste;
- phasing in the prohibition of disposal to landfill of specific wastes (including liquid hazardous waste, other hazardous waste, whole and shredded tyres);
- obliging operators to pre-treat all hazardous waste and all other wastes; and

- the introduction of phased targets for the reduction of biodegradable waste sent to landfill, through to 2020.

9.3.5 The new Resources and Waste Strategy for England is currently in consultation and is due to be published in 2020 which will provide further details on proposals beyond 2020. This will include details of targets for a zero avoidable waste economy by 2050, phasing out avoidable plastic waste by 2042 and eliminating food waste from landfill by 2030.

National Planning Policy

National Planning Policy Framework

9.3.6 The revised National Planning Policy Framework (NPPF) was published in February 2019 and replaces the NPPF published in March 2012. It outlines the Government's economic, environmental and social planning policies for England and sets out how these are to be applied against a background of a presumption in favour of sustainable development. It is expected that these policies will be interpreted and applied at the local level to meet the requirements of the local area.

9.3.7 With regard to waste and waste management, paragraph 4 of the NPPF states that the Framework should be read in conjunction with the Government's planning policy for waste. This is defined in the national Waste Management Plan (2013) and National Planning Policy for Waste (2014).

9.3.8 The national ***Waste Management Plan*** transposes the requirements of the Waste Framework Directive (WFD) (see above) into English law.

9.3.9 ***National Planning Policy for Waste*** (NPPW) 2014 sets out detailed waste planning policies and is intended to be read alongside the NPPF and the Waste Management Plan for England. Para. 8 of this states that, in determining non-waste related development, local planning authorities should ensure that:

- *"The likely impact of proposed, non-waste related development on existing waste management facilities, and on sites and areas allocated for waste management, is acceptable and does not prejudice the implementation of the waste hierarchy and/or the efficient operation of such facilities;*
- *New, non-waste development makes sufficient provision for waste management and promotes good design to secure the integration of waste management*

facilities with the rest of the development and, in less developed areas, with the local landscape. ....;

- *The handling of waste arising from the construction and operation of development maximises reuse / recovery opportunities, and minimises off-site disposal.*"

Local Planning Policy

Sunderland Core Strategy and Development Plan (CSDP) 2015-2033

9.3.10 The CSDP is the adopted Development Plan for Sunderland, though this retains some of the 'saved' policies within the UDP until such time as the Allocations and Designations Plan is in place. One of the themes of the CSDP is 'water, waste and energy'; strategic priority 10 is "*to manage waste as a resource and minimise the amount produced and sent to landfill*". This strategy is supported by a suite of policies (WWE5, WWE6, WWE7, WWE8, WWE9 and WWE10) set out within section 11 of the CSDP.

9.3.11 The CSDP notes at para. 2.71 that "*Sunderland is well served by waste infrastructure and is net self-sufficient in the management of waste. The area has significant built waste management capacity which provides for the needs of Sunderland and a number of other authorities across the North East region."*

9.3.12 CSDP para. 2.72 states that "*Local authority waste is managed under the South Tyne and Wear Waste Management Partnership (STWWMP) which is a collaboration between Sunderland, Gateshead and South Tyneside Councils and covers the management of this waste for the duration of the plan period."*

9.3.13 CSDP Policy WWE5 relates to the disposal of foul water; the Site is connected to the public sewers within the local area as discussed in Chapter 10 of this ES.

9.3.14 CSDP Policy WWE6, Waste management, primarily addresses the provision of waste management facilities but also states that development that minimises waste production and encourages the re-use and recovery of waste materials will normally be supported.

9.3.15 CSDP Policy WWE7 also relates to new waste facilities; policy WWE8 relates to the safeguarding of existing waste management sites; policy WWE9 relates to the development of new open waste management facilities; policy WWE10 addresses developments relating to the provision of energy from waste. These are therefore not relevant to this assessment.

9.3.16 Within other parts of the CSDP, Policy BH2 relates to sustainable design and construction; point 2 notes the requirement for major development, where possible, to reduce waste and promote recycling during construction and in operation.

The International Advanced Manufacturing Park, Area Action Plan (IAMP AAP)

9.3.17 The IAMP Area Action Plan (AAP) 2017-2032 was adopted by Sunderland City Council (SCC) and South Tyneside Council (STC) in November 2017. The AAP forms part of the SCC Local Plan and STC Local Plan and sets out the specific policies relating to the delivery of the IAMP.

9.3.18 In relation to waste management, the AAP includes the following specific objective:

- Objective 6: Support the efficient use of resources and minimise disposal of wastes to landfill.

South Tyne & Wear Municipal Waste Management Strategy

9.3.19 The waste management planning strategies of Gateshead, Sunderland and South Tyneside Councils (which together form the South Tyne & Wear Municipal Waste Management Partnership) are set out in the South Tyne & Wear Municipal Waste Strategy, published in 2007 and reviewed in 2012.

9.3.20 The Strategy runs from 2007 to 2027 and aims to reduce the waste sent to landfill across the region. It covers municipal waste but does not include demolition, industrial or commercial wastes and as such is not relevant to the IAMP site.

9.4 Assessment Methodology

9.4.1 This chapter assesses the potential quantities of waste and the various types of waste that can be anticipated from the demolition, construction and operational phases (including maintenance) of the site. Consideration is also given to the potential environmental impacts associated with the likely methods of storage of any excavated materials, as well as the management of the different waste streams present on site at the different phases of the works.

9.4.2 Mitigation measures are outlined that will be adopted in order to: minimise waste generation; facilitate the re-use or recycling of waste on site; and, minimise the potential exposure to harmful materials and nuisance as part of waste collection, temporary storage and transportation of waste from site. This will also include use of

appropriate controls for any waste stored on site, so as to avoid discharge of contaminated material to land or water.

9.4.3 As this is an outline application, it has been necessary to make a number of assumptions in order to assess the nature and extent of effects of waste material generated by the proposed development. These include:

- making an approximation of the quantities and types of waste arisings from the proposed demolition of West Moor Farm;
- where uncontaminated excavated material arises during construction, this will be considered for re-use on site; contaminated excavated material (if encountered) will either be treated on site or removed offsite for treatment and disposal;
- where materials are available and suitable for re-use, measures will be taken to incorporate this within the construction process, as detailed in the Construction Environmental Management Plan (CEMP);
- where figures are not available for the calculation of waste arisings, assumptions will be made based on similar, constructed major infrastructure projects;
- information on waste quantities and waste types is typically based on a defined plot size; therefore, this assessment has considered development parameters using the Rochdale Envelope (worst-case) principles, applied across the developable land extents; and
- an average depth of topsoil to be removed within the site, of 300mm, has been assumed within developable areas; this will either be re-used on site or transported off site to (if possible) another development site requiring topsoil, or (as a last resort) inert landfill.

Significance criteria

9.4.4 The significance criteria used when assessing potential effects of waste and waste management will follow the approach used for the IAMP ONE and IAMP TWO EIAs. This has had regard for the predicted level of waste arisings and local waste management capacity, strategies and policies.

9.4.5 Table 9.1 (below) defines the criteria used for the assessment of significance.

Table 9.1: Criteria used in the definition of significance of waste management	
Significance	**Definition**
Major adverse effect	An effect that in isolation could have a material influence on the decision-making process (significant effect)
Moderate adverse effect	An effect that on its own could influence decision-making, particularly if combined with other similar effects (potentially significant – professional judgement to be applied)
Minor adverse effect	An effect that on its own is likely to have negligible / no influence on decision-making, but when combined with other effects could have a more material influence (less likely to be significant – professional judgement to be applied)
Negligible effect	No effects (not significant)

9.4.6 In order to ensure that the worst-case scenario is considered, for the purposes of this assessment both major and moderate adverse effects will be considered 'significant'.

Assumptions and limitations

9.4.7 In line with the Rochdale Envelope principles, a worst-case scenario has been used for the impact assessment; this has assumed that all of the land required for the development of the main infrastructure components (including roads and drainage) as well as the plot areas within the site will require topsoil to be removed to a depth of 300mm.

9.4.8 In order to assess worst-case scenarios, it has been assumed that all demolition waste will be removed off site and that this includes small quantities of materials such as asbestos and invasive plant species.

9.4.9 Opportunities to segregate and recycle waste streams from the site during construction and operation have been identified, as detailed in sections 9.6 and 9.7 of this Chapter.

9.5 Baseline Conditions

Existing conditions

9.5.1 The information relating to the capacity of existing waste disposal sites within the region is set out in the 2018 ES for IAMP ONE (chapter H) and the PEIR for IAMP TWO (chapter H) and is therefore not repeated here.

9.5.2 The information[1] used in the capacity review concluded that "*there is no significant need to identify new waste management sites in the Plan Area for most reviewed waste types*." (PEIR 2018, chapter H, para. H4.2.4). There could be a shortfall post-2032 in inert landfill capacity, but it was considered by the 2018 Addendum Report[2] that increased recycling could mitigate any requirement to obtain additional capacity.

9.5.3 Para. H4.3.1 of the 2018 PEIR Chapter H concluded that, as part of the baseline assessment, void space should be available throughout the North East region sufficient to accommodate the proposed development.

Future baseline

9.5.4 With increased recycling and increase use of energy from waste facilities, it is anticipated that void space within existing disposal sites will continue to be available.

9.6 Potential Effects

During demolition of West Moor Farm buildings

9.6.1 The site development will involve the demolition of the West Moor Farm buildings. These buildings comprise a farmhouse, stable block, cottage and assortment of farm buildings and barns spread over two blocks. Using the WRAP net Waste tool an estimate of demolition waste arisings has been made. This is included in Table 9.2.

9.6.2 The buildings are constructed from an assortment of building techniques. To summarise, for each building, key characteristics consist of the following:

- Farmhouse – two storey stone built 4-bedroom house with slate pitched roof, timber and glass windows, and small porch.
- Cottages – single storey stone built 2-bed house with slate pitched roof, and timber and glass windows.
- Stables – single storey stone and brick masonry building with slate pitched roof.
- Assortment of farm buildings to south-west of plot – mixture of single and two storey barns. Construction mix including brick masonry, steel-framed and concrete block walls. Roof mix including slate and asbestos tiles. Some cladding used.

[1] Urban Mines report, "Model of Waste Arisings and Waste Capacity for the North East of England Waste Planning Authorities, July 2012

[2] Urban Mines report, "Model of Waste Arisings and Waste Capacity for the North East of England Waste Planning Authorities, July 2012, Addendum June 2018

- Barn to north of plot – single storey large steel-framed concrete block barn with possible asbestos roof.

Table 9.2: Projected waste arisings from demolition (tonnes)						
Material	**Farmhouse**	**Stable**	**Cottage**	**SW Barn**	**N Barn**	**Total**
Concrete	115.4	30.84	62.14	931.49	301.32	**1441.19**
Masonry	160.88	43	86.63	706.64	133.92	**1131.07**
Aggregates	13.41	3.58	7.22	177.86	72.82	**274.89**
Ferrous	67.03	17.92	36.09	859.2	502.2	**1482.44**
Non-Ferrous	4.47	1.19	2.41	25.85	8.37	**42.29**
Timber	16.09	4.3	8.66	83.01	10.04	**122.1**
Glass	0.45	0.12	0.24	2.95	0.84	**4.6**
Plasterboard	8.94	2.39	4.81	46.74	0	**62.88**
Slates	1.79	0.48	0.96	3.42	2.68	**9.33**
Concrete / asbestos roof tiles	0	0	0	21.91	16.75	**38.66**
Miscellaneous	0	0	0	0.74	0	**0.74**
Total	**388.46**	**103.82**	**209.16**	**2859.81**	**1048.94**	**4610.19**

9.6.3 It is anticipated that demolition waste totalling approximately 4,610 tonnes will be generated for disposal off-site. It should be noted that this total is indicative, based on assumptions around standard building construction and building footprints.

9.6.4 As a worst-case scenario, it is assumed that all materials will require removal from site. In practice, where opportunities are available, material will be re-used on site as part of the development. This could be as part of landscaping proposals or reuse as aggregate for subbase, for example.

9.6.5 Assuming demolition in 2020, this accounts for 0.12% of total regional C&I arisings. In the UK, C&I waste arisings account for 19% of waste generated, compared with 61% for construction, demolition and excavation (CD&E). No reliable and recent data exists for CD&E waste generation at a regional level; however, it can be assumed that using the regional C&I generation forecast is a conservative approach on this basis. As such the impact on regional waste generation from the planned demolition of West Moor Farm can be considered to be negligible.

During construction of the development site

9.6.6 Excavation of the site will result in removal of topsoil. An indicative, worst case, calculation has been made based on the assumption that 300mm depth of topsoil will be removed. This forecasts that there will be requirements to remove an estimated 86,000m^3. However, there is a lack of clarity regarding the existing survey data, in terms of the depths of topsoil across the Site, and therefore this can be revised

following more detailed surveying of the final agreed landtake. The actual quantities of soil removed will be recorded once excavation activities commence. The worst-case scenario assumes that all material will be removed from site and disposed to inert landfill, whereas in practice some or all of this may be re-used as part of the landscaping works, and this approach will be encouraged.

9.6.7 General construction waste will arise from the development of the site. This will be sent to a local inert landfill facility or will be re-used or recycled wherever possible, as described below.

9.6.8 Some materials used as part of construction will be suitable for re-use:

- plastic sheeting can be re-used as weather protection;
- pallets can be re-used for moving materials;
- polypropylene bags can be re-used for storing waste; and
- packaging will be returned to suppliers for re-use where possible.

9.6.9 Other materials will be suitable for recycling applications:

- scrap metal will be segregated and sent for recycling;
- Waste Electrical and Electronic Equipment (WEEE) will be segregated and sent for specialist recycling;
- some plastic wastes will be suitable for segregation and sent for recycling;
- paper and cardboard will be segregated and sent for recycling; and
- timber and wood will be segregated and sent for recycling.

9.6.10 Waste that cannot be re-used or recycled, or which is hazardous, will be sent for appropriate disposal. This can be anticipated as including a small amount of waste oil.

9.6.11 All waste will be handled by licensed operators and disposed of at secure sites.

9.6.12 Most waste arisings from the excavation and construction phase will, in the worst-case scenario, be disposed of to landfill. The potential effects of the development are therefore assessed as moderate and not significant.

During operation

9.6.13 Commercial and Industrial Waste will be generated during the operation of the development site. Waste sources will include staff employed in the manufacturing units, staff employed in the offices, and from the manufacturing processes.

9.6.14 Waste storage facilities will be made available in all locations at which waste is generated. Waste will be collected from these units regularly and stored in centrally located storage units.

9.6.15 The development will operate under a 'segregation at source' policy. This will involve separating waste streams at generation, facilitating high recycling and recovery rates. Waste generated at site will be collected by a suitable waste collection contractor and sent to an appropriate facility, depending on the waste stream. As far as is practicable, waste streams such as packaging and containers will be returned to suppliers for re-use.

9.6.16 The operator(s) of the manufacturing facilities will regularly audit waste management facilities and procedures on site and will ensure that all waste is recorded, handled and managed appropriately.

9.6.17 Likely waste streams anticipated to be generated on site could include:

- waste oils;
- hydraulic fluids and hoses;
- fluorescent tubes and light bulbs;
- paint cans;
- food and beverage waste and containers;
- general office waste;
- batteries; and
- packaging.

9.6.18 All waste generated during operation will be managed in accordance with the Site Waste Management Plan (SWMP[3]). This will be developed when the site occupants are known and will reflect the likely waste streams to be generated.

9.6.19 The expected waste generation during operation, assuming consistency with the 2012 BRE SMARTwaste benchmarks, estimates a total of 11,097 tonnes per annum of manufacturing waste and 1,048 tonnes per annum of office waste to be generated by

[3] The preparation of a SWMP is expected to be a condition of planning requested by Sunderland City Council. It will detail the proposals for the management of demolition waste, excavation waste and construction waste during the development of the site, as well as principles for the management of wastes during the operational phase. The SWMP will be prepared before any works commence on the site. This will include an estimate of waste generation, against which actual generation will be measured. The principal construction contractor will be responsible for updating the SWMP periodically as works progress.

the development. Combined, this represents 0.33% of regional waste generation from commercial and industrial sources, and the development can therefore be considered to present a minor environmental impact that is not considered to be significant.

9.7 Mitigation

9.7.1 As a condition of the planning permission, it is anticipated that the demolition and construction contractors will be required to produce a SWMP. This will include details of the types and volumes of demolition, excavation, construction and decommissioning wastes expected from the development.

9.7.2 Mitigation measures will be used which focus on promoting sustainable waste management practices. They will ensure that all activities are undertaken with due regard to legislation and policy, including the waste hierarchy principles.

9.7.3 Mitigation measures will help to embed good site management practices at the site. They will cover resource efficiency, litter prevention and environmental protection.

During demolition of West Moor Farm buildings

9.7.4 In order to minimise waste during the demolition phase of the development the contractor will explore opportunities to reuse or recycle waste streams, where possible. This will focus on ensuring that the correct outlet for all material streams is identified so that they are appropriately treated.

9.7.5 To mitigate the impact of demolition wastes on the surrounding environment, good practice site management techniques will be used. An approved person will be nominated to ensure that good practice is maintained. Their responsibilities will include arranging collection of wastes and effective disposal to an appropriate facility.

9.7.6 Areas designated for the safe storage of the various anticipated waste types to be generated during demolition will be provided. Suitably sized allocated areas and containers (as appropriate) will include storage for such materials as rubble, metals (i.e. ferrous and non-ferrous), plastics and waste liquids.

9.7.7 The storage containers will be arranged so that they can safely be accessed by appropriately trained staff members, with clear labelling (e.g. in line with the nationally agreed colour-coded scheme detailed within Waste Aware Construction) and suitable containment for each material type. Site staff will be trained as appropriate in the use of these waste storage facilities and clear labelling and signage will be employed to ensure that materials are handled and stored in line with

legislative and company requirements (e.g. avoiding rainwater entering certain containers and sealed storage to discourage pests and mitigate nuisance). This will form part of the induction for permanent and temporary staff and visitors.

9.7.8 To prevent accidental damage, liquid waste will be stored in double skinned containers placed upon impermeable surfacing and away from any vehicle manoeuvring areas.

9.7.9 The development contractor will also be required to consider the options for utilising any waste materials produced during the demolition works on the site, rather than disposing of them as waste or recycling. Specifically, this will include consideration of landscaping, secondary aggregate use for hardstanding and access roads and the potential for reuse of any previous building materials in the construction of the new structures. This might involve numerous activities, including directly re-using the materials in the construction, minor reprocessing such as crushing and sieving or as part of refurbishment work. This will be in line with government legislation and will aim to demonstrate best practice where economically and technically practicable.

During construction of the development site

9.7.10 In order to minimise waste during the construction of the development the Construction Contractor will prepare a detailed SWMP covering good practice, waste reduction, re-use, recycling, and disposal options.

9.7.11 An approved person will be nominated to manage waste during construction. Their responsibilities will include arranging collection of wastes and effective disposal to an appropriate facility.

9.7.12 Good practice measures will ensure that the site waste management is effective and achieves high standards, through:

- a system of recording and monitoring to track waste generation, recycling performance, re-use performance and disposal; and
- training will be undertaken to ensure proper waste management handling procedures are implemented.

9.7.13 Waste reduction will be a key objective of waste management practices at the development. A number of measures will be enacted to support this:

- site practices implemented to minimise damage or contamination of construction materials;

- effective planning will ensure that over-ordering is prevented, and that wastage is minimised;
- prefabricated construction panels will be used where feasible to reduce material handling, associated risk of wastage and associated transportation impacts;
- sustainable procurement practices will be implemented, seeking to minimise packaging and exert influence on contractors to undertake best practice; and
- materials will be returned to suppliers where not required, or alternatively used elsewhere as part of the development and associated works.

9.7.14 Where waste cannot be prevented, recycling and re-use will be encouraged:

- cut and fill management will be employed seeking to minimise waste removal off site using both inert demolition materials and soil;
- waste will be monitored, sorted and stored in as many segregated waste streams as appropriate to make material available for re-use and recycling applications;
- on-site processing of waste and re-use of materials to supply secondary aggregate will be investigated and all necessary licences obtained to undertake such operations;
- where it is possible to do so, and without compromising building integrity, materials with recycled content will be specified;
- all suppliers will be requested to take back unwanted packaging; and
- where inert demolition and construction wastes which cannot be used on site are generated, potential off-site users will be identified and approached as part of the development of a materials management plan.

9.7.15 Ultimately some materials will require disposal where none of the above practices are suitable. General site waste will be securely stored in bins, or compaction units if appropriate. Wastes will only be removed from the Site by registered waste carriers. Waste movements will be accompanied by a Duty of Care Controlled Waste Transfer Note or a Special Waste Consignment Note, if appropriate, and copies of these will be stored on the site throughout construction. Waste permits will be required (and obtained) for any facilities use for off-site recovery, recycling or disposal of waste, and copies of these kept on-site.

9.7.16 Any excavated soils will undergo waste acceptance criteria testing to ensure that they are correctly classified prior to disposal at an appropriate landfill or remediation site.

9.7.17 Hazardous waste materials will be handled by appropriate licensed operators.

During operation

9.7.18 The SWMP will cover the management of waste generated during the operational phase of the development. All waste materials will be segregated and stored separately. Appropriate outlets will be identified for each recycling and waste stream, with the proximity principle applied to minimise transportation impacts.

9.7.19 Occupants will be required to regularly audit their waste management systems from generation to treatment or disposal point to ensure compliance with the SWMP. Where non-conformances are identified, changes to working practices will be made. The SWMP will be regularly reviewed and updated to ensure that it is suitable and reflects best practice development throughout the development's lifetime.

9.8 Residual effects

During demolition of West Moor Farm buildings

9.8.1 The residual effects of the waste arisings from demolition are assessed to have a minor adverse effect and therefore not significant, with the successful implementation of the SWMP. This is because the expected type of waste arising will be largely inert, so will be safely disposed of to landfill or re-used on/off site. This represents a small proportion of similar waste arisings regionally. Any hazardous waste, including waste oils and asbestos, will be handled and disposed of in a safe and appropriate manner using specialist contractors.

During construction of the development site

9.8.2 The residual effects of the waste arisings from excavation and construction are assessed to be of minor significance with the successful implementation of the SWMP. This is because the main expected type of waste arising, i.e. soil and earth, will be inert, and will be safely disposed of to landfill or re-used on/off site, and represents a small proportion of similar waste arisings regionally. Any hazardous waste will be handled and disposed of in a safe and appropriate manner using specialist contractors.

9.8.3 Previous ground investigations at the IAMP ONE site have not encountered any significant concentrations of contaminated soils. If contamination is encountered during site works, it will need to be reported to the Local Authority and may require remediation works or collection by a specialist hazardous waste operator. Details of

suitable licensed treatment facilities would be included in the Construction Environment Management Plan (CEMP).

During operation

9.8.4 There will be no additional requirements over and above those included in the mitigation section 9.7 that will affect waste management operations during the site's operational phase. There is no additional mitigation or monitoring recommended to further reduce the identified effects, which remain minor to negligible.

9.9 Cumulative effects

9.9.1 Cumulative effects of waste generation from neighbouring developments, namely the wider IAMP ONE development, IAMP TWO, and also those identified within chapter 2 of this ES, which include a gasification facility, extension to a farm shop, a hotel and roof mounted solar panels have been considered. These have potential to increase the significance of environmental burden of the development. These are unlikely to generate significant volumes of waste materials, and the local treatment and disposal facilities assessed are deemed to have capacity to accommodate materials from the cumulation of these developments.

9.9.2 During the demolition phase of the development no other demolition works are programmed for the IAMP ONE site. However, there is likely to be some degree of demolition involved in IAMP TWO. Both IAMP ONE and IAMP TWO, and the other planned developments identified on Figure 2.1 are likely to include ground works / excavation of soils. Waste quantities produced are estimated to be minor, and initial assessment indicates that the cumulative effect of demolition remains of minor adverse effect and not significant.

9.9.3 Excavation works for the entire IAMP site (IAMP ONE and TWO) are programmed to be undertaken as part of the development. It was determined that the overall site development has a minor adverse impact in terms of potential excavation wastes.

9.9.4 Similarly, cumulative construction impacts will result from development of the wider IAMP ONE and IAMP TWO site. The application of consistent mitigation measures across the entire site means that the cumulative development impacts are likely to be moderate to minor adverse effect and not significant.

9.9.5 During operation, cumulative waste arisings will arise from the IAMP ONE and IAMP TWO development sites. In line with the Environmental Statement for the wider site the cumulative impacts will remain minor to negligible adverse and not significant.

9.10 Summary and Conclusions

9.10.1 The proposed development will require demolition of existing farm buildings; levelling and grading of the existing site, including excavation of an estimated 300mm depth of topsoil from areas of agricultural land; construction of the new manufacturing buildings; construction of ancillary buildings and infrastructure; and landscaping. This assessment has focused on the likely quantities and waste types arising from these activities and how they can best be managed.

9.10.2 It is expected that the majority of waste arisings will be sent for disposal to local landfill sites or to suitable off-site locations for re-use. The anticipated waste volumes form a small fraction of regional waste generation and capacity. Any hazardous waste arisings would be dealt with by a specialist hazardous waste operator.

9.10.3 No significant environmental effects have been identified as a result of waste arisings and management practices in relation to the proposed IAMP ONE Phase Two development.

10 WATER RESOURCES

10.1 Introduction

10.1.1 This chapter of the Environmental Statement (ES) identifies and assesses the effects of the development proposals during the construction and operational stages on water resources and the water environment of the local area, including flood risk.

10.1.2 The baseline situation is considered, before any likely significant environmental effects of the proposed development upon the current environment are identified, during the construction and operational phases, taking into account any cumulative effects. Mitigation measures to reduce negative environmental effects are identified as appropriate, before the residual environmental effects are assessed.

10.1.3 This chapter has been prepared by Wardell Armstrong (WA). The accompanying Flood Risk Assessment (FRA) and Drainage Strategy (Appendix 10.1) has been prepared by Systra.

10.1.4 The International Advanced Manufacturing Park (IAMP) is a development located on land to the north of the A1290, Washington Road. Figure 1.1 shows the location of the Site in context of the surrounding area. The IAMP development is separated into two areas referred to as IAMP ONE and IAMP TWO, see Figure 1.2 which identifies the different parcels of land within the overall IAMP site. IAMP ONE is separated into IAMP ONE Phase One and IAMP ONE Phase Two. This ES refers to IAMP ONE Phase Two, hereafter known as the Site. The Site is located to the west of IAMP ONE Phase One as shown within Figure 2 of Appendix 10.1.

10.2 Policy Context

Legislation

10.2.1 The UK government has advised that, following the exit of the UK from the EU, the EU Withdrawal Act 2018 will ensure that all existing EU environmental law will continue to operate in UK law[1]. The UK government and devolved administrations will "*amend current legislation to correct references to EU legislation and ensure we meet international agreement obligations.*"

[1] DEFRA (2018) Upholding Environmental Standards if there's no Brexit Deal [online]. Accessed 15/01/2020. Available at: https://www.gov.uk/government/publications/upholding-environmental-standards-if-theres-no-brexit-deal/upholding-environmental-standards-if-theres-no-brexit-deal

European Directive: The Water Framework Directive (2000/60/EC)

10.2.2 Directive 2000/60/EC of the European Parliament and Council (the Water Framework Directive) came into force on 22 December 2000 and established a framework for community action in the field of water policy. The WFD required member states to aim to reach good chemical and ecological status in inland and coastal waters by 2015. The WFD is designed to enhance the status and prevent further deterioration of aquatic ecosystems and associated wetlands, to promote sustainable water use, to reduce pollution of water and to ensure a progressive reduction in groundwater pollution. The WFD established a strategic framework for managing the water environment and requires a Management Plan for each river basin to be developed every six years. In cases where good status/potential could not be achieved by 2015, a provision is given under Article 4.4 of the WFD extending the deadline to 2021 or 2027. The date has been extended to 2027 in respect of a large number of waterbodies. The competent authority (in England) for delivering the WFD is the Environment Agency (EA); the Site lies within the Northumbria River Basin Management Plan area. The WFD is transcribed into English and Welsh law under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

European Directive: The Groundwater Daughter Directive (2006/118/EC)

10.2.3 Directive 2006/118/EC of the European Parliament and Council (the Groundwater Daughter Directive) came into force on 12 December 2006 and aims to protect groundwater against pollution and deterioration. The Groundwater Daughter Directive was developed in response to the requirements of Article 17 of the WFD (2000/60/EC) and specifies measures to prevent and control groundwater pollution (by providing criteria for the assessment of good groundwater chemical status, criteria for the identification and reversal of significant and sustained upward trends and for defining a baseline status).

European Directive: The Priority Substances Directive (2008/105/EC)

10.2.4 Directive 2008/105/EC of the European Parliament and Council (the Priority Substances Directive) came into force on 16 December 2008 and sets environmental quality standards in the field of water policy. The Priority Substances Directive amended and subsequently repealed Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amended the WFD of the European

Parliament and Council. The Priority Substances Directive was developed in response to the requirements of Article 16 of the WFD and requires the identification of priority substances to set Environmental Quality Standards (EQSs) for the concentrations of the priority substances in surface waterbodies and to review periodically the list of priority substances.

Act of Parliament: The Environment Protection Act 1990

10.2.5 The Environmental Protection Act 1990 brought in a system of integrated pollution control for the disposal of wastes to land, water and air and covers statutory nuisances.

Act of Parliament: The Land Drainage Act 1991

10.2.6 The Land Drainage Act 1991 requires the owner of a watercourse to maintain the watercourse in such a condition that the free flow of water is not impeded. The owner must accept the natural flow from upstream but need not carry out work to cater for increased flows resulting from some types of works carried out upstream, for example a new housing development.

Act of Parliament: The Water Resources Act 1991, Water Act 2003 and Water Act 2014

10.2.7 The Water Resources Act 1991 aims to prevent and minimise pollution of water (surface and groundwater) and tasks the policing of this Act to the EA. The Water Act 2003 amended the Water Resource Act 1991 to improve long-term water resource management by making changes to licencing. The Water Act 2003 also aims to promote water conservation, increase competition, strengthen the voice of consumers and promote the suitable use of water resources. The Water Act 2014 aims to reform the water industry to make it more responsive to customers and to increase the resilience of water supplies to droughts and flooding. It also brings in measures to address the availably and affordability of insurances in high flood risk areas.

Policy

National Policy: The Revised National Planning Policy Framework

10.2.8 The Department for Communities and Local Government (DCLG) first published the National Planning Policy Framework (NPPF) in March 2012 and this was revised in February 2019. The NPPF replaces the guidance previously contained within Planning Policy Statement 25 (PPS25): Development and Flood Risk. All local development

plans and neighbourhood plans must take account of the NPPF, and the NPPF is a material consideration in planning decisions. The NPPF contains numerous paragraphs concerning water resources, flooding, water quality and protection of the environment during development.

National Policy: Planning Practice Guidance: Flood Risk and Costal Change (2014)

10.2.9 In March 2014, the DCLG published the Planning Practice Guidance (PPG), which replaced the Technical Guidance to the NPPF. This document provides additional guidance to local planning authorities to ensure the effective implementation of the planning policies set out in the NPPF on development in areas at risk of flooding. It identifies that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk. Where development is necessary, it should be made flood resilient without increasing flood risk elsewhere.

Local Policy: Sunderland Core Strategy and Development Plan 2015-2033

10.2.10 The Sunderland Core Strategy and Development Plan (CSDP) was adopted in January 2020. In relation to water, strategic priority 9 of the CSDP is:

- *"To adapt to and minimise the impact of climate change by reducing carbon emissions, maximising the use of low carbon energy solutions and seeking to reduce the risk/impact of flooding."*

10.2.11 This strategic priority is supported by policies BH1, BH2, NE1, WWE1, WWE2, WWE3, WWE4, WWE5 and WWE10. The relevant policies to this assessment of effect on water resources are BH2, NE1, WWE2, WWE3, WWE4 and WWE5.

10.2.12 CSDP Policy BH2, Sustainable design and construction, notes at point 3 that major development should *"conserve water resources and minimise vulnerability to flooding."*

10.2.13 CSDP Policy NE1, Green and blue infrastructure, looks to maintain and improve the Green Infrastructure Network through the enhancement, creation and management of multifunctional green and blue spaces, well connected to each other and the wider countryside. The policy sets out the requirements for developments to achieve this, including:

- (at iv) applying climate change mitigation and adaptation measures, including flood risk and watercourse management;

- (at vi) including and/or enhancing formal and natural greenspace and bluespace provision; and
- (at ix) the protection, enhancement and restoration of watercourses, ponds, lakes and water dependent habitats.

10.2.14 There are Green Infrastructure corridors identified to the north of the Site (the River Don corridor) and to the west (running north along the eastern edge of the Washington conurbation).

10.2.15 CSDP Policy WWE2 Flood risk and coastal management seeks to reduce flood risk through following the sequential approach to determining the suitability of land for development, applying the exception test where necessary; Flood Risk Assessments will be required to show that development will not increase flood risk on site or elsewhere (and if possible reduce the risk of flooding); and developments will be required to include or contribute to flood mitigation, compensation and/or protection measures, where necessary to manage flood risk. The policy also requires development to comply with the WFD by contributing to the Northumbria River Basin Management Plan (see para. 10.2.2 above). Development adversely affecting the quantity of surface or groundwater flow must demonstrate that no significant adverse impacts would occur (with mitigation implemented as necessary).

10.2.16 CSDP Policy WWE3 Water management relates to flood risk (on and off site) and sets out the requirements that developments must comply with in order to manage the risk of flooding. These requirements can be summarised as:

- provision of a Flood Risk Assessment;
- demonstrating that they pass the Sequential Test (and Exceptions Test, if relevant);
- meeting specific greenfield run-off rates;
- incorporating a Sustainable Drainage System (SuDS) to manage surface water drainage, including arrangements for the whole life management and maintenance of these;
- setting out in order the means by which surface water run-off is to be discharged;
- ensuring adequate protection against over land flooding;
- incorporating allowances for climate change in accordance with EA guidance;
- making any necessary developer contribution to drainage infrastructure;

- demonstrating control of surface water run-off during construction and operation, in addition to the management of water generally; and
- not impacting adversely on aquifers and groundwater protection zones and improving water quality where possible.

10.2.17 CSDP Policy WWE4 Water quality sets out the means by which the quantity and quality of surface and groundwater bodies and bathing water are to be protected and, where possible, enhanced in accordance with the Northumbria River Basin Management Plan. This includes incorporation of appropriate water pollution control measures within infiltration-based SuDs.

10.2.18 CSDP Policy WWE5 relates to the disposal of foul water and identifies the hierarchy to be applied to foul drainage, as well as any disposal of trade effluent.

International Advanced Manufacturing Park Area Action Plan (IAMP AAP)

10.2.19 As stated within the IAMP ONE ES 2018, "The IAMP AAP was developed in accordance with the requirements of the National Planning Policy Framework (NPPF). IAMP AAP highlights that policies within adopted and emerging development plans will continue to apply, except where IAMP AAP provides site specific policy. The IAMP AAP lists the IAMP objectives, including "improve flood alleviation, water quality and habit connectivity along the River Don". Specific policies in relation to water in the IAMP AAP are:

- Policy D1: Masterplan Design – "*This policy formalises the design concept and masterplan objectives for the IAMP, to encourage a compact, permeable development, which is attractive to future occupiers and flexible enough to accommodate a range of businesses*"[2];
- Policy IN2: Flood Risk and Drainage – "*The River Don corridor runs through the centre of the overall IAMP area and therefore represents a key constraint to development. The River Don however does not run through the Site, nor does any watercourse. The IAMP AAP needs to take account of flood risk and drainage issues*

[2] IAMP (2017). Area Action Plan 2017 -2032. Last accessed: 16/01/2020. Available at: https://www.sunderland.gov.uk/media/19834/International-Advanced-Manufacturing-Park-Area-Action-Plan-2017-2032-Adopted-Nov-2017/pdf/International_Advanced_Manufacturing_Park_(IAMP)_Area_Action_Plan_2017-2032_-_Nov_2017.pdf?m=636477263205830000

to mitigate the risks of fluvial and surface water flooding and maintain effective operation of the site."[2]*;* and

- Policy EN2: Ecology – "*This policy sets out principles to protect and enhance the ecological value of the IAMP and to encourage development based on sound sustainability principles."*[2]

10.2.20 Further information relating to the IAMP AAP is provided within Chapter I: Water Resources and Flood Risk of the IAMP ONE ES 2018.

10.3 Consultation and Scope of Assessment

10.3.1 The informal consultation undertaken with Sunderland City Council (SCC) for the Site concluded that, given the extensive work completed to date in relation to the wider development area (IAMP ONE), which has been designed to take account of the potential drainage requirements of the Site, a limited assessment of effects on water resources (including flood risk) would be undertaken. An assessment under the Water Framework Directive is not proposed as this has been completed separately as part of IAMP TWO, covering the whole IAMP area.

10.3.2 Two indicative masterplans have been prepared for the outline planning application; this water resources assessment considers the layout included for the multiple unit development, as the worst-case option in this regard. ES Figure 3.1A shows an indicative masterplan illustrating this potential scenario.

10.3.3 Consultations with Sunderland City Council (SCC) and South Tyneside Council (STC) were undertaken in December 2019 with regards to private water supplies as well as with the Environment Agency (EA) with regards to local water resources information, including groundwater and surface water quality. WA made the data request to the EA on 05/12/2019. The EA requested an extension in January 2020. WA is still awaiting receipt of the EA data.

10.3.4 A desk-based study of the Site and its surroundings (including for the presence of water related infrastructure, water management and Water Framework Directive status) has made use of the following sources of information:

- Meteorological Office UK Climate Averages – Tynemouth Long Term Annual Average Rainfall data between 1981 to 2010;
- Meteorological Office – Land Projection Maps: Probabilistic Projections;
- British Geological Survey (BGS) geology maps;

- BGS Onshore GeoIndex interactive viewer;
- Historic borehole logs and records of groundwater strikes from borehole investigations undertaken in 2017 by Dunelm Drilling and Aecom within the Site and in the wider IAMP area;
- EA Flood map for planning interactive viewer;
- EA groundwater and surface water monitoring data including information on abstractions and discharges
- Information requested from SCC and STC;
- MAGIC website; and
- EA Northumbria River Basin Management Plans (RBMP).

Extent of Study Area

10.3.5 A desk study has been undertaken to establish the baseline water environment and other relevant features located within 2km of the boundary of the Site. The 2km study area was chosen following an initial review of potentially sensitive water environment receptors.

10.4 Assessment Methodology and Significance Criteria

General approach

10.4.1 The aims of the assessment are to:

- establish the water environment baseline condition;
- identify water environment sensitive receptors;
- identify potential likely impacts as a result of the proposed development at the Site and arrive at a conclusion about the likely effects of this;
- discuss embedded design mitigation and good industry practice that would be implemented during the Site development;
- determine the scale of any potential effects, assuming design mitigation and good industry practice, by assessing the degree of sensitivity of the hydrological and hydrogeological receptors and the potential magnitude of change from the baseline condition;
- establish if the scale of the effect is considered significant;
- if required, provide specific mitigation measures; and

- identify any cumulative and residual effects.

Assessment Methodology

10.4.2 The sensitivity of receptors to hydrological and hydrogeological impacts has been determined using Table 10.1, which details a hierarchy of factors relating to the water environment. Examples of the criteria contained within Table 10.1 include international and national designations, and work undertaken by the EA, together with the professional judgement of the assessment team. When a receptor meets multiple criteria or there is an absence of verified published data, the highest applicable sensitivity category is assigned to allow an assessment of the worst-case scenario.

Table 10.1 Criteria for Determining Receptor Sensitivity

Sensitivity	Criteria	Typical Examples			
		Groundwater	**Surface Water**	**Abstractions**	**Hydro-ecological receptors**
Very High	Receptor has a high quality and rarity on a national or regional scale and limited potential for substitution. Receptor is highly vulnerable to impacts that may arise from the project and recoverability is long-term or not possible.	• Source Protection Zone 1		• Abstractions for public or private drinking water supply	
High	Receptor has a high quality and rarity on a local scale and limited potential for substitution. Receptor is generally vulnerable to impacts that may arise from the project and recoverability is slow and/or costly.	• Principal Aquifer providing a regionally important resource or supporting a site protected under EU and UK habitat legislation (i.e. Groundwater Dependent terrestrial ecosystems GWDTEs)	• Protected under EU or UK habitat legislation (e.g. SSSI, SAC, Ramsar Site) • Designated Salmonid / Cyprinid Waters and/or fishery present • Surface water providing a regionally important resource or supporting a	• Abstractions for non-potable use >20m^3/d (e.g. industry / process water, spray irrigation, river augmentation)	• Nationally and internationally designated sites where hydrology/ hydrogeology is a key factor in designation (e.g. Ramsar / Sites of Special Scientific Interest / Special Areas of Concern / Special Protection Areas sites)

Table 10.1 Criteria for Determining Receptor Sensitivity					
Sensitivity	**Criteria**	**Typical Examples**			
		Groundwater	**Surface Water**	**Abstractions**	**Hydro-ecological receptors**
		• Source Protection Zone 2 or 3	site protected under EU and UK habitat legislation (i.e. water dependent ecological receptors)		
Medium	Receptor has a medium quality and rarity, local scale and limited potential for substitution / replacement. Receptor is somewhat vulnerable to impacts that may arise from the project and/or has moderate to high recoverability.	• Secondary A Aquifer • Secondary B Aquifer providing water supply to private abstractions • Principal Aquifer providing a locally important resource or supporting river ecosystem • Groundwater in peat deposits	• Classified as a main river with no further designations Large lakes and non-potable reservoirs	• Abstractions for non-potable use <20m^3/d (e.g. industry / process water, spray irrigation, river augmentation)	• Statutory designated sites where hydrology / hydrogeology is a key factor in designation. (National Nature Reserves, Local Nature Reserves)
Low	Receptor with a low quality and rarity, local scale and limited potential for substitution. Receptor is not generally vulnerable to impacts that may arise from the project and/or has high recoverability.	• Secondary B Aquifer • Secondary Undifferentiated Aquifer • Aquifers supporting potentially water dependent ecosystems i.e. Local Wildlife Sites LWS wetland.	• Ordinary watercourse and no designated features • Non-sensitive water resources (non-EA/WFD classified i.e. small lakes, ponds) • Man-made feature not in hydraulic	• Abstractions for industrial use (e.g. dust suppression/ washing machinery)	• Non-statutory designated sites where hydrology / hydrogeology is a key factor in designation. (Sites of Importance for Nature Conservation, Local Wildlife Sites)

Table 10.1 Criteria for Determining Receptor Sensitivity					
Sensitivity	**Criteria**	**Typical Examples**			
		Groundwater	**Surface Water**	**Abstractions**	**Hydro-ecological receptors**
			continuity (i.e. canal)		
Very Low	Attribute has a very low environmental importance and/or rarity on local scale. Receptor is of negligible value, not vulnerable to impacts that may arise from the project and/or has high recoverability.		• Man-made feature with no ecological importance (i.e. land drains)		
Note Professional judgement based on the baseline condition of the receptor should be used to determine a receptor's sensitivity.					

10.4.3 Table 10.2 describes the guideline criteria used to assess the magnitude of change from the baseline condition that may result from the Site.

Table 10.2 Criteria for Determining the Magnitude of Change	
Magnitude of Change	**Typical Example**
High	Total loss of, or alteration to, the baseline resource such that post- development characteristics or quality would be fundamentally and irreversibly changed.
Medium	Loss of or alteration to the baseline resource such that post-development characteristics or quality would be partially changed.
Low	Small changes to the baseline resource, which are detectable, but the underlying characteristics or quality of the baseline situation would be similar to pre-development conditions.
Negligible	A very slight change to the baseline conditions, which is barely distinguishable, and approximates to the 'no change' situation.

10.4.4 The scale of effects is determined in relation to the sensitivity of the receptor and the potential magnitude of change from baseline conditions, using the matrix shown in Table 10.3. Effects can be either beneficial or adverse; within a scale of negligible, minor, moderate or major.

Table 10.3 Matrix for Determining Scale of Potential Effects						
		Receptor Sensitivity				
		Very High	**High**	**Medium**	**Low**	**Very Low**
Magnitude of Change from Baseline Condition	**High**	Major	Major	Moderate	Moderate	Minor
	Medium	Major	Moderate	Moderate	Minor	Minor
	Low	Moderate	Minor	Minor	Negligible	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Significance Criteria

10.4.5 Guideline criteria for categories of effect are included in Table 10.4. Effects that have been determined to be major or moderate are considered to have a significant effect and require additional mitigation to address them. Effects that are identified as minor or negligible are not considered to have a significant effect and no further mitigation is required.

Table 10.4 Guideline Criteria for Categories of Effect			
Scale of Effect	**Significant Effect?**	**Definition**	**Guideline Criteria**
Major	Yes	A fundamental change to the environment	Changes in water quality or quantity affecting widespread catchment or groundwater resources of strategic significance or changes resulting in substantial loss of conservation value to aquatic habitats and designations.
Moderate	Yes	A large, but non-fundamental change to the environment	Changes in water quality or quantity affecting part of a catchment or groundwaters of moderate vulnerability, or changes resulting in loss of conservation value to aquatic habitats or designated areas.
Minor	No	A small but detectable change to the environment	Localised changes in drainage patterns or groundwater flow, or changes resulting in minor and reversible impacts on surface and groundwater quality or aquatic habitats.
Negligible	No	No detectable change to the environment	No impact on drainage patterns, surface and groundwater quality or aquatic habitat.

10.5 Baseline Conditions

Rainfall

10.5.1 Long term average (LTA) monthly rainfall data has been obtained from Met Office freely available data[3]. Averages have been calculated over a 30-year period between 1981 to 2010 at Tynemouth weather station, located at approximate national grid reference (NGR) NZ 37504 69429, c.12km north-east of the Site. These data have been used to estimate monthly rainfall for the Site, as shown in Table 10.5. The UK Climate Projection (UKCP18)[4] are available on the Met Office website for the Northumbria River Basin District.

10.5.2 Table 10.5 presents the percentage change in precipitation for the 90th percentiles for the four emission scenarios for winter and summer periods for the available time slices, referred to in the Note in Table 10.5 as Representative Concentration Pathways (RCP). The UKCP18 for the 2020-2039, 2040-2059, 2060-2079 and 2080-2099 time slices predicates a change in winter periods between +20 to 50% (i.e. wetter) and for the summer periods a change between -10% (i.e. reduction in rainfall) to +20% (i.e. wetter).

[3] The Met Office (2020). Tynemouth Climate [online]. Last Accessed: 16/01/2020. Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcybzz9xh

[4] The Met Office (2018). Land Projection Maps: Probabilistic Projections. Last Accessed: 16/01/2020. Available at: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/land-projection-maps

Table 10.5 Average Rainfall and Climate Change Projections

Month	Average Rainfall (mm)	Projective Change in Precipitation (%) for the Northumbria River Basin for the Winter and Summer Periods						
		Time Slice: 2020 - 2039		Time Slice: 2040 - 2059		Time Slice: 2060 - 2079		Time Slice: 2080 - 2099
		RCP2.6*		RCP2.6*		RCP2.6*		RCP2.6*
		RCP4.5*		RCP4.5*		RCP4.5*		RCP4.5*
		RCP6.0*		RCP6.0*		RCP6.0*		RCP6.0*
		RCP8.5*		RCP8.5*		RCP8.5*		RCP8.5*
		Winter						
		20 - 30%		20 - 40%		20 - 40%		40 - 50%
		Summer						
		10 - 20%		0 - +10%		0 - +10%		(-10) - 0%
		Average Rainfall (mm) With Projective Change in Precipitation						
		-10%	**0%**	**10%**	**20%**	**30%**	**40%**	**50%**
January	45.5	41.0	45.5	50.0	54.6	59.2	63.7	68.3
February	37.8	34.0	37.8	41.6	45.4	49.1	52.9	56.7
March	43.9	39.5	43.9	48.3	52.7	57.1	61.5	65.9
April	45.4	40.9	45.4	49.9	54.5	59.0	63.6	68.1
May	43.2	38.9	43.2	47.5	51.8	56.2	60.5	64.8
June	51.9	46.7	51.9	57.1	62.3	67.5	72.7	77.9
July	47.6	42.8	47.6	52.4	57.1	61.9	66.6	71.4
August	59.6	53.6	59.6	65.6	71.5	77.5	83.4	89.4
September	53.0	47.7	53.0	58.3	63.6	68.9	74.2	79.5
October	53.6	48.2	53.6	58.9	64.3	69.7	75.0	80.4
November	62.8	56.5	62.8	69.1	75.4	81.6	87.9	94.2
December	52.9	47.6	52.9	58.2	63.5	68.8	74.1	79.35
Annual Total	597.2	537.5	597.2	656.9	716.6	776.4	836.1	895.8

Notes
Average rainfall does not include provision for evaporation and evapotranspiration.
Emission Scenarios:
RCPs (Representative Concentration Pathways) are scenarios of future concentrations of greenhouse gases and other forces
RCP2.6 = 1.6°C (0.9-2.3°C) change in global temperature by 2081-2100
RCP4.5 = 2.4°C (1.7-3.2°C) change in global temperature by 2081-2100
RCP6.0 = 2.8°C (2.0-3.7°C) change in global temperature by 2081-2100
RCP8.5 = 4.3°C (3.2-5.4°C) change in global temperature by 2081-2100
* 90th Percentile selected - the three percentiles (10th, 50th and 90th) reflect the likelihood of those temperatures occurring under that emissions scenario

Topography

10.5.3 The elevation of the Site varies between 34m and 38m Above Ordnance Datum (AOD). The Site is relatively flat with higher elevation within the central and western regions of the Site and lower elevations towards the north-east.

Surface Water Features

10.5.4 There are no mapped surface watercourses on-site. The closest watercourse to the Site is the Usworth Burn, a tributary of the River Don, located approximately 195m

north of the Site. The River Don is located approximately 280m north of the Site; both the River Don and its tributary are classified by the EA as 'Main' Rivers. Both watercourses flow in a north-easterly direction parallel to the Site's northern boundary. The confluence of the two rivers is approximately 280m north-north-east of the Site at National Grid Reference (NGR) NZ 33216 59420. The River Don is a tributary of the River Tyne. The River Wear is located approximately 2km south of the Site and flows in an easterly direction before discharging into the North Sea.

10.5.5 According to the IAMP ONE 2018 ES, a series of drainage channels and ditches are located along the road to the south of the Site and along field boundaries. These are not mapped on MAGIC[15] and rely on field-based data collected for the IAMP ONE 2018 ES. The majority of these discharge to the south-east via culverts beneath the A1290 (road). Two ponds are located to the south-west of the Site; approximately 850m and 1250m respectively, near Barmston. There are two ponds located to the south of Site, approximately 700m and 1100m from the Site, just north of the Vantec Turbine Business Park. There is also a pond located 1200m north-west of the Site located near Washington Riding Centre. The surface water features can be seen on Figure 10.1. There are no other surface water features within 2km of the Site.

10.5.6 The Site is located within the Northumbria River Basin District[4]. A watershed runs through the middle of the Site. The south-west and north areas of the Site lie within the Tyne Management Catchment, the Tyne and Lower Estuary Operational Catchment and the Don from Source to Tidal Limit Surface Water Catchment (ID: GB103023075690) (Figure 10.1). The south-eastern and central areas of the Site are located within the Wear Management Catchment and the Wear Lower and Estuary Operational Catchment[4]. However, this area of the Site is not located within an assigned surface water catchment (see Figure 10.1).

Surface Water Quality

10.5.7 The EA holds a list of the reasons why waterbodies in the Northumbria River Basin District are not achieving Good WFD status. The Don from Source to Tidal Limit Surface Water Catchment has an overall water catchment classification of Moderate, a Chemical classification of Good and an Ecological classification of Moderate. The

[4] Environment Agency (2020). Data Catchment Explorer: Don from Source to Tidal Limit [online]. Last Accessed: 09/01/2020. Available at: https://environment.data.gov.uk/catchment-planning/WaterBody/GB103023075690

ecological classification is a result of ecological supporting elements (mitigation measures assessment).[4] Reasons for not achieving Good Status are attributed to urbanisation, agricultural and rural land management, sewage, water treatment and industry.[3]

10.5.8 The EA has one surface water monitoring station within 2km of the Site. The 'Don Just downstream Confluence of Tributary at Wardley' sampling point is located at NGR NZ 31919 59686 c.1200m north-west of the Site. Results were available between April and December 2019. No measurements exceeded Environmental Quality Standards (EQS)[5]. Information from this monitoring point is limited and a small number of parameters were tested (see Appendix 10.2).

10.5.9 The Site is not located within a Surface Water Safeguard Zone[6] or within an existing or proposed surface water or eutrophic Nitrate Vulnerable Zone.[7]

Flood Risk

10.5.10 A full Flood Risk Assessment (FRA) has been undertaken by SYSTRA Ltd and is provided within Appendix 10.1. A summary of the results from the FRA are presented below:

- Fluvial Flood Risk – the majority of the Site sits within flood zone 1 (less than 0.1% chance of flooding in any year). Medium to high flood risks are identified in the northern margins of the Site with increasing climate change impact;
- Surface Water Flood Risk – the majority of the Site is at low risk from surface flooding. Small isolated areas with medium – high risk of flooding are present within the Site boundary;
- Artificial Resources – no risk of flooding associated with artificial resources;
- Groundwater – no groundwater risk identified within the Site boundary. Small isolated areas to the north-west of the Site have identified shallow groundwater; and
- Sewer – No material risk of sewers flooding on-site.

[5] Water Framework Directive (2015). Standards and Classification Directions (England and Wales). Last Accessed: 10/01/2020. Available at: http://www.legislation.gov.uk/uksi/2015/1623/pdfs/uksiod_20151623_en_auto.pdf

[6] Environment Agency (2017) Drinking Water Safeguard Zones [online]. Accessed 09/01/2020. Available at: https://environment-agency.cloud.esriuk.com/farmers/

[7] Environment Agency (2017) Nitrate Vulnerable Zones [online]. Accessed 09/01/2020. Available at: https://environment-agency.cloud.esriuk.com/farmers/

Geology

Soils and Made Ground

10.5.11 According to Cranfield University 1:250,000 scale soil mapping (Soilscapes)[8] the soils on-site and within the surrounding area consist of slowly permeable, seasonably wet, slightly acid but base-rich loamy and clayey soil. Soils were experienced on-site between 0.1 – 0.6m thick.

10.5.12 No made ground is recorded to be present on the BGS 1:50,000 scale published artificial land mapping.[9]

Superficial Geology

10.5.13 According to BGS 1:50,000 scale mapping the Site is entirely underlain by the Pelaw Clay Member.[10] Seven boreholes and four trial pits were drilled on-site in August 2017 by Dunelm Drilling, supervised by Aecom (see Chapter I, Appendix 5 of the IAMP ONE 2018 ES for a figure indicating borehole and trial pit locations). Each borehole and trial pit excavated on-site encountered the Pelaw Clay Member. The Pelaw Clay member was reported to comprise soft – stiff, dark brown – grey clay with varied amounts of sand and gravel (slightly sandy/gravelly to sandy/gravelly). The thickness of the clay deposits varied between 14.7m (encountered between 0.6m below ground level (BGL) and 15.3m BGL), recorded within the north-eastern areas of the Site in BH47, to 1.7m (encountered between 0.4m BGL and 2.1m BGL) recorded in TP37 located in the south-western corner of the Site, indicating a potential shallowing of clay deposits from north-east to south-west. TP38, BH51 and BH52, also located within the south-western margins of the Site (see Chapter I, Appendix 5 within the IAMP ONE 2018 ES), also indicate a shallowing of clay deposits. The thickness of clay within these boreholes/trial pits varied between 1.7m - 3.7m. Weathered bedrock was encountered below the clay deposits in each of these boreholes/trial pits.

[8] Cranfield University (2020). Soilscapes. Last Accessed: 09/01/2020. Available at: http://www.landis.org.uk/soilscapes/

[9] British Geological Survey (2020) GeoIndex Onshore [online]. Artificial Ground. Accessed 09/01/2020. Available at: http://mapapps2.bgs.ac.uk/geoindex/home.html

[10] British Geological Survey (2020) GeoIndex Onshore [online]. Superficial Geology. Accessed 09/01/2020. Available at: http://mapapps2.bgs.ac.uk/geoindex/home.html

Bedrock Geology

10.5.14 According to BGS 1:50,000 scale mapping, the bedrock that underlies the Site is comprised of the Pennine Middle Coal Measures Formation.[11] The Pennine Middle Coal Measures is characterised by interbedded mudstone, siltstone, sandstone and coal seams.[11]

10.5.15 Boreholes drilled on-site recorded the upper boundary of the Pennine Middle Coal Measures between 2.1m BGL in TP37 and 15.3m BGL in BH47. No boreholes encountered the base of the Pennine Middle Coal Measures. Weathered bedrock was encountered within all boreholes drilled on-site at the boundary between with the Pelaw Clay Member.

Hydrogeology

Groundwater Designations and Classifications

10.5.16 The Pelaw Clay Member is classified by the EA as an Unproductive Aquifer, defined as "*rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.*"[12]

10.5.17 The Pennine Middle Coal Measures are classified by the EA as Secondary A aquifers, defined as "*permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.*"[12]

10.5.18 According to BGS Hydrogeology 1:625 000 scale mapping[13] the Pennine Middle Coal Measures comprises part of the Pennine Middle Coal Measures Formation and South Wales Middle Coal Measures Formation (Undifferentiated), a moderately productive aquifer. This group is summarised "*as a regional cyclic multi-layered aquifer with moderate yields from sandstones and many springs. Mine water quality poor, but elsewhere reasonable.*"[13]

10.5.19 The Site does not lie within a Source Protection Zone (SPZ), nor are there any within 2km of the Site.

---

[11] British Geological Survey (2020) GeoIndex Onshore [online]. Bedrock Geology. Accessed 09/01/2020. Available at: http://mapapps2.bgs.ac.uk/geoindex/home.html

[12] Environment Agency (2017). Aquifers. Last Accessed 09/01/2020. Available at: http://apps.environment-agency.gov.uk/wiyby/117020.aspx

[13] British Geological Survey(2020). Geoindex (onshore) – Hydrogeology Mapping 1:625,000 Scale (online). Last Accessed: 09/01/2020. Available at: http://mapapps2.bgs.ac.uk/geoindex/home.html

Groundwater Elevations and Flow

10.5.20 Groundwater strikes were recorded in the Pelaw Clay Member within one borehole drilled on-site (BH45). Information relating to groundwater strikes and rest elevation is provided in Table 10.6. Rest elevation refers to the groundwater elevation measured 20 minutes after a water strike is encountered during drilling. Groundwater was also encountered within two other boreholes (BH32 and BH27), located within the wider IAMP area, to the east (see Chapter I, Appendix 5 of the IAMP ONE 2018 ES). Groundwater information is included in Table 10.6, below. In each of these boreholes superficial deposits exceeded 10m in thickness. Each water strike was recorded toward the base of the Pelaw Clay Member.

Table 10.6 Occurrences of groundwater within the Pelaw Clay Member

Borehole ID	Groundwater Strike (mBGL / mAOD)	Groundwater Level (rest) (mBGL / mAOD)	Lithology where Groundwater was encountered
BH45	13.2 / 21.8	3.4 / 31.6	Sandy, gravelly clay. Directly underlain by weathered bedrock.
BH32	13.8 / 18.2	13.5 / 18.5	Gravelly sand lens, between thick clay horizons.
BH27	17.2 / 16.8	6.1 / 27.9	Gravelly sand at the base of the superficial deposits. Directly underlain by weathered bedrock.

mBGL = Meters Below Ground Level
mAOD = Meters Above Ordnance Datum

10.5.21 Groundwater encountered within BH32 was recorded within a thin sand lens located between thick clay deposits. This is likely to be an isolated pocket of perched groundwater with minimal hydraulic connection to the rest of the formation. This is indicated by the small rise in groundwater elevations recorded following water strike.

10.5.22 Groundwaters rose considerably in BH45 and BH27 following water strike. Each of these strikes were recorded directly above the weathered bedrock. It is likely that the more permeable base of the superficial deposits within these areas are in continuity with the underlying Pennine Middle Coal Measures. The Pennine Middle Coal Measures are confined by the overlying clay, giving rise to an upward pressure head gradient. This would explain the pressurised nature of the water and rise in groundwater levels. The strikes may also represent errors in logging where the water strikes were actually within the upper weathered bedrock horizons.

10.5.23 The Middle Pennine Coal Measures form a multi-layered aquifer dominated by sedimentary strata including sandstones, siltstones, mudstones, shales and coal. Low permeability strata act as aquitards and aquicludes, isolating thicker sandstone horizons, which act as individual aquifers. Sandstones within the Middle Pennine Coal Measures are very well cemented, dense and hard, resulting in very limited primary porosity (intergranular porosity). Therefore, groundwater flow and storage predominantly occur within fractures and fissures within sandstone horizons.

10.5.24 BH47 and BH48 located on-site, recorded groundwater strikes at the top of the Pennine Middle Coal Measures within the weathered sandstone bedrock zone. Water was recorded to rise by 3.5m and 12.7m respectively, indicating that the bedrock aquifer is confined by the overlying clay and therefore possesses an upward pressure head gradient.

10.5.25 No other groundwater elevations and strikes within the bedrock were recorded on-site or within the wider IAMP area (it is unclear whether they were not recorded, or if water strikes weren't encountered).

10.5.26 Groundwater elevations provided in Table 10.6 indicate that there is unlikely to be a laterally continuous water table within the superficial deposits. This is indicated by the absence and varying depths of water strikes associated with the presence of sand horizons and the strikes directly overlying weathered bedrock.

10.5.27 There are no BGS borehole logs within the surrounding area that indicate a potential groundwater flow direction within the Coal Measures. However, due to thick superficial deposits and the presence of various aquitard/aquiclude units within the formation, it is likely groundwater within the Middle Pennine Coal Measures is confined.

10.5.28 WA is awaiting receipt of EA data with regard to groundwater elevations.

Groundwater Quality

10.5.29 The Site is located entirely within the Northumbria River Basin District, the Northumbria GW Management Catchment, the Tyne Carboniferous Limestone and Coal Measures Operational Catchment and the Tyne Carboniferous Limestone and Coal Measures groundwater catchment (ID: GB40302G701500).[14] The Tyne

[14] Environment Agency (2020). Catchment Data Explorer – Groundwater. Last Accessed: 09/01/2020. Available at: https://environment.data.gov.uk/catchment-planning/WaterBody/GB40302G701500

Carboniferous Limestone and Coal Measures groundwater catchment was classified by the EA as having a Quantitative Status of Good and a Chemical Status of Poor.[12]

10.5.30 The reasons relating to Poor Chemical Status are related to Chemical Dependant Surface Water Body Status and General Chemical Test classifications[14] as a result of point and diffuse pollution from abandoned mines.

10.5.31 The EA does not hold any groundwater quality information within 2km of the Site.

Private Water Supplies, Abstractions and Discharges

10.5.32 South Tyneside Council and Sunderland City Council have confirmed that there are no known private water supplies within 2km of the Site. WA is awaiting receipt of EA data regarding licenced abstractions and discharges.

Hydro-Ecology and Designated Sites

10.5.33 According to the MAGIC website[15] there are no hydro-ecological or designated sites (Ramsar, Sites of Special Scientific Interest, Special Area of Conservation etc) relating to water resources within 2km of the Site.

Modifying Influences

10.5.34 The UKPC18[4] have predicted an increase of up to 50% change in rainfall values by 2099. An increase in rainfall could affect runoff across the Site and may alter river processes (e.g. erosion, deposition and the frequency and intensity of river and groundwater flooding and ponding in depressions). A decrease in rainfall could lead to seasonal and prolonged drying out of watercourses and drains, which may affect aquatic ecology. In addition, a reduction in rainfall may also affect groundwater recharge time and decrease groundwater elevations.

10.5.35 If the development did not occur, the sections of the Site within IAMP ONE would be constructed and operated as identified in the 2018 ES, with the remaining areas of the Site remaining as agricultural land. In this instance water would move through the Site much as it does at present; however, over time, changes in rainfall may affect water flow pathways as described above.

[15] Magic (2020). Land-Based Designations. Last Accessed 10/01/2020. Available at: https://magic.defra.gov.uk/MagicMap.aspx

10.6 Conceptual Site Model

10.6.1 The Conceptual Site Model (CSM) illustrates the water movement pathways from the ground surface on-site to surface water features and bedrock. There are three main pathways: surface runoff, soil water movement (infiltration, throughflow, percolation) and groundwater flow.

10.6.2 The key features affecting water movement through the Site include:

- the Site is located on the watershed of two surface water catchments (see Figure 10.1). Areas to the north of the watershed (south-western and northern areas of the Site) are located within the Don from Source to Tidal Limit Surface Water Catchment, within the Tyne and Lower Estuary Operational Catchment. Water in this area of the Site drains to the north/north-east towards the Usworth Burn and the River Don. Areas to the south of the watershed (south-eastern and central areas of the Site) are located within an area not designated in a surface water catchment. Water in this area of the Site is collected within drains that flow in an easterly/south-easterly direction, discharging through culverts beneath the A1290. The Site is not located within the River Wear catchment;
- the Don from Source to Tidal Limit Surface Water Catchment has an overall WFD status of Moderate, which the EA has identified as being down to urbanisation, agricultural and rural land management, sewage, water treatment and industry, and has a target of achieving WFD status of Good by 2027;
- the amount of rainfall on-site will affect water levels and flow rates in the watercourses (Usworth Burn and the River Don), as well as on-site infiltration concentrations to the soil zone and surface water run-off volumes. Elevated levels of and/or prolonged rainfall can lead to flooding as watercourses overtop. Conversely, periods of prolonged absence of rainfall can lead to drought conditions on-site, leading to ephemeral watercourses drying up, reduction in groundwater recharge and reduction in vegetation cover;
- a number of ponds are located within 2km of the Site (see Figure 10.1). It is unlikely that water within these ponds will come into contact with water on-site. The ponds are likely to be isolated, water filled depressions located on low permeability clays;

- the Site is entirely underlain by the Pelaw Clay Member, reported to comprise soft – stiff, dark brown – grey clay with varied amounts of sand and gravel, up to 14.7m thick. The Pelaw Clay Member is classified by the EA as an Unproductive Aquifer;
- superficial deposits with high clay content tend to have low vertical and lateral hydraulic conductivity, therefore reducing the rate of infiltration and percolation of rainwater. The superficial deposits are therefore likely to inhibit recharge to the underlying Bedrock aquifer. Rainwater is therefore likely to move within the soil horizons, or as surface runoff when the soils are saturated;
- perched groundwater was recorded within isolated sandy/gravelly lenses of the Pelaw Clay Member; however, these are limited. Groundwater strikes were also recorded at the base of the formation. These strikes led to significant rises in in groundwater elevations, suggesting where the base of the formation is more permeable the underlying bedrock groundwater may be in limited continuity with the superficial deposits. The bedrock is confined by the overlying clay deposits, giving rise to upward head gradients and confining pressures;
- as a result of the upward head gradient within the bedrock aquifer and low permeability nature of the Pelaw Clay Member, there is likely to be no significant pathway for recharge between the Site, superficial groundwater and underlying bedrock aquifer;
- the bedrock underlying the Site belongs to the Pennine Middle Coal Measures Formation, which is formed of sequences of sandstones, siltstones, mudstones and associated coal seams. The Pennine Middle Coal Measures Formation is classed by the EA as being a Secondary A Aquifer and by the BGS as being a moderately productive aquifer. Groundwater is largely confined to secondary permeability within sandstone bands. As demonstrated within BH47 and BH48 (IAMP ONE 2018 ES) groundwater within the bedrock is confined. Thick clay superficial deposits confine groundwater within the Pennine Middle Coal Measures, giving rise to an upward head gradient. Upward head gradients limit downward migration, affording the aquifer protection from the Site;
- water quality within these sandstones has been affected by mining; and
- there are no surface water or groundwater Private Water Supplies within 2km of the Site. There are no hydro-ecological or designated sites relating to water resources within 2km of the Site.

10.6.3 The following Source-Pathway-Receptor relationships have been identified for the Site in relation to the water environment:

Potential Contamination Sources:

Construction Sources

- Release or mobilisation of sediment through earthworks, laying of foundations, soil stripping, compaction of soils during the construction phase may increase the sediment contents of the watercourses in close proximity to the Site.
- Use of concrete, cement and asphalt – risk of mobilisation through surface water run-off.
- Use of machinery and storage on-site - accidental spills or leakage of fuel and oil from machinery and storage on-site.

Operational Sources

- Contaminants associated to light industry including but not limited to; diesels, oils, solvents, paints, degreasers and heavy metals.
- Use of de-icing salts – leading to mobilisation in surface run-off.
- Car Parking – Storage and use of motorised vehicles on-site may lead to the release of hydrocarbons on-site.

Potential Pathways

Construction Pathways

- drainage ditches located on-site, along the road and along field boundaries; and
- surface water runoff.

Operation Pathways

- remaining drainage ditches;
- drainage infrastructure including; networks of swales, attenuation ponds, and pipe drains; and
- surface water run-off.

Potential Receptors:

- surface watercourses to the north-west of the Site: Usworth Burn and the River Don;
- attenuation ponds;

- existing on-site ditches receiving site discharge;
- perched groundwater in the Pelaw Clay Member; and
- ponds located within 2km of the Site.

10.7 Identification of Potential Effects

Sensitive Receptors

10.7.1 Table 10.7 summarises the potential sensitive receptors and the reasons for inclusion or exclusion from the assessment.

Table 10.7 Summary of Receptors and Sensitivity

Receptor	Distance from Site (m)	Summary of Receptor Characteristics	Receptor Sensitivity	Receptor at Risk from Proposed Development?
Usworth Burn (tributary of the River Don)	195	EA Main River	Medium	Yes – the Site is located within the surface water catchment.
River Don	280	EA Main River	Medium	Yes – the Site is located within the surface water catchment.
Existing drainage ditches receiving site discharge	On-site and along southern site margin	Field Drains located on-site and along southern boundary	Very Low	Yes – located on-site, potential influence from surface water run-off.
Groundwater in Pelaw Clay Member	Underlying Site	Pockets of groundwater within sandy/gravelly horizons.	Very Low	No – The Pelaw Clay Member is classified as an Unproductive Aquifer. Perched groundwater is either: confined to small pockets of sand and gravel which are likely to be hydraulic isolated; or within the base of the formation in continuity with the underlying bedrock aquifer. The thickness of low permeability clay along with the Bedrock aquifer confining pressures and upward head gradient limits downward migration.
Ponds within 2km of Site	700 -1250	Small ponds	Very Low	No – The ponds are unlikely to be influenced by site activities due to their locations, at a higher elevation than the site. It is likely these are water filled depressions located on low permeability clay deposits.

Table 10.7 Summary of Receptors and Sensitivity				
Receptor	**Distance from Site (m)**	**Summary of Receptor Characteristics**	**Receptor Sensitivity**	**Receptor at Risk from Proposed Development?**
Attenuation ponds	On-Site	Attenuation ponds associated with drainage	Very Low	Yes - located on-site potential influence from surface water run-off.

10.7.2 The water resources receptors identified within Table 10.7 that are not at risk from the Site have been scoped out of the assessment and are not considered further.

During Construction

10.7.3 Construction effects can be categorised into two types: i) those that relate to the act of carrying out construction (e.g. earthworks causing sedimentation of watercourses); and ii) those that relate to the construction of the development itself (e.g. the creation of impermeable surfaces, such as roads and buildings, within the catchment). Table 10.8 details potential effects that may arise from the activities of the development during construction.

Table 10.8 Potential Construction Phase effects	
Activity	**Potential effects**
Earthworks including excavation	Excavation and removal of the topsoil and superficial deposits has the potential to reduce the pathway to the underlying bedrock aquifers and therefore may increase the vulnerability of the aquifer to potential contamination/oil spills during construction. Mobilisation of sediment, which could enter watercourses and waterbodies causing increased erosion altering deposition. This may also result in harm to aquatic flora and fauna.
Soil stripping and vegetation removal	Soil stripping reduces soil moisture storage capacity and may increase runoff and lead to flooding. Removal of vegetation reduces interception and evapotranspiration rates, increases runoff and may lead to flooding and increased suspended solids entrained in runoff.
Use of machinery and storage on-site	Accidental spills or leakage of fuel and oil from machinery and storage on-site during the construction phase could affect the underlying groundwater and enter surface water watercourses and waterbodies and lead to a degradation of water quality.
Soil compaction	Compaction due to use of heavy machinery reduces infiltration, increases runoff and shortens the rainfall–runoff response time and may lead to flooding.
Construction of impermeable surfaces such as roads/pavements	Reduction in recharge to the underlying soils, therefore potentially reducing groundwater levels. This will also increase runoff to surface water drains/ponds and may lead to flooding.

Table 10.8 Potential Construction Phase effects	
Activity	**Potential effects**
Construction of subsurface infrastructure such as foundations	Impediment to shallow groundwater which can cause groundwater mounding on the upgradient side and reduce groundwater levels on the downgradient side. Potentially coming into contact with confined groundwater leading to dewatering requirements.
Laying foundations	Release of sediment and silt-laden water from the discharge of water removed from excavations to watercourse and/or ground, which could cause a degradation in water quality.

During Operation

10.7.4 There are two types of operational effects on the water environment: i) those which result from the creation of the Site (e.g. the creation of impermeable surfaces causing changes in the hydrologic regime); and ii) those that occur associated with the use of the Site (e.g. accidental releases of chemicals associated with, for instance, car paint).

10.7.5 Table 10.9 details the potential effects that may arise from the activities of the Site during operation.

Table 10.9 Potential Operational Phase effects	
Activity	**Potential effects**
Use of Motorised Vehicles	Pollution from leaks or spills, which may cause a degradation in water quality.
Contaminants associated with car manufacturing	Solvents including VOCs such as formaldehyde used in paints, heavy metals used during welding, degreasers, oils and diesels for manufacturing, servicing and machinery.
Impermeable surfaces such as roads/pavements	Reduction in infiltration and recharge to the underlying soils water. This would also increase runoff to surface water drains/ponds and may lead to flooding.
Subsurface infrastructure such as foundations	Impediment of shallow groundwater flow which can cause groundwater mounding on the upgradient side and reducing groundwater levels on the downgradient side.
Creation of new drainage regime in developed areas of the Site	The creation of a new drainage regime may alter the amount of runoff within the surface water catchments, thereby altering the flow rates and volumes within the watercourses in these catchments. An increase in flow rates may lead to a corresponding increase in flood risk.
De-icing of roads, walkways and parking areas	The use of de-icing salts may cause the release of sodium chloride and anti-caking agents into the water environment may cause changes to water chemistry such as salination.

10.8 Mitigation measures

10.8.1 Mitigation measures are required in order to avoid, reduce, remedy or compensate for any adverse effects of the development. The principle of mitigation commences with the design of the development and is an iterative process, in that measures are taken, wherever possible, to adjust the design to minimise adverse effects.

10.8.2 The development will be undertaken in line with the current guidance and codes of best practice. Table 10.10 lists accepted, good practice industry guidance that is intended to prevent adverse environmental effects during construction. The measures detailed in the guidance documents will limit the potential for disturbance or contamination of water resources and will be adopted.

Table 10.10 Good Practice Guide and Guidance Documents to Protect the Water Environment

Documents
CIRIA C741: Environmental Good Practice on Site Guide (4th edition). CIRIA C750: Groundwater control: design and practice (2nd edition). CIRIA C753 Sustainable Urban Drainage Systems Manual CIRIA C768 Guidance on the Construction of SuDS CIRIA C532 Control of Water Pollution from Construction Sites. CIRIA C650 Environmental Good Practice on Site (Expansion of C502). CIRIA C689 Culvert Design & Operational Guide. Pollution Prevention Guidelines (PPG) 1 General Guide to The Prevention of Pollution. PPG2 Above Ground Oil Storage. PPG4 Treatment & Disposal of Sewage Where No Foul Sewer. PPG5 Works & Maintenance in, or near Water. PPG6 Working at Construction and Demolition Sites. PPG8 Safe Storage & Disposal of Used Oils. PPG21 Polluting Incident Response Planning. PPG22 Dealing with Spills. UK Technical Advisory Group on the WFD, UK Environmental Standards & Conditions (Phase 2), Final, 2008.

10.8.3 Although all PPGs have been withdrawn by the EA, as the legislative requirements contained within the documents are, in many cases, no longer correct, the PPGs are still considered to be a relevant and effective source of best practice information and are widely used and accepted within the construction industry.

10.8.4 The same embedded mitigation measures stated within the IAMP ONE 2018 ES are considered for this development:

- incorporation of freeboard to design flood levels;
- finished floor levels set 600mm above design flood levels;

- ground raising/embankment;
- flood storage compensation area;
- development catchments to mimic baseline catchments;
- attenuation of run-off to greenfield run-off rate using sustainable drainage;
- provision of pollution hazard reduction by sustainable drainage;
- sediment settlement prior to drainage discharge;
- pollution incident response plans; and
- sediment run-off containment.

10.8.5 Further mitigation measures with regard to flood risk are provided with section 5.3 of the FRA in Appendix 10.1.

During Construction

10.8.6 A Construction Environmental Management Plan (CEMP) (or equivalent) will be produced that will incorporate key principles of the good practice, legislation, regulations and guidance. The CEMP will provide practical measures to avoid and minimise the effect of the proposed development on ground and surface waters, as well as providing emergency preparedness and corrective actions together with measures for monitoring, recording and disseminating of information.

10.8.7 The key principles of the water-related components of the CEMP will include (but are not limited to) the following:

- construction design to minimise disruption to the natural flow regime;
- planning and preparation of works to ensure all precautions are taken in order to provide protection to watercourses, groundwater and attenuation features, including the supervision of sub-contractors and liaison with the Local Authority and the EA area staff;
- installation of attenuation features at the outset to allow establishment before any surface connections from the new development. The programming and phasing as part of the overall final site layout and subsequent planning permission(s) will ensure this is carried out on the ground;
- adoption of measures to prevent and control the release of sediment, such as directing surface water across vegetated zones or through mesh fencing in order to capture the sediment. Sediment traps or settlement lagoons may be considered

if the quantity of sediment-laden water is anticipated to be large. The CEMP will specify the maintenance requirements to ensure that sediment control measures are put in place, e.g. sediment settlement prior to drainage discharge and sediment run-off containment;

- drains and potholes are regularly inspected, cleared, infilled and/or repaired;
- secure storage of all fuel, oils and other polluting substances within suitably bunded containers and placed upon impermeable surfaces, in accordance with PPG2: Above Ground Oil Storage and PPG8: Safe Storage & Disposal Of Used Oils;
- the use of integral drip trays (of 110% of the capacity of the fuel tank) for any static machinery/ plant, where practicable. All plant, vehicles and machinery will also be regularly inspected for leaks;
- refuelling will be undertaken in a designated refuelling area and the use of biodegradable oils and lubricants will be considered where possible;
- the preparation of pollution incident response plans, identifying the type and location of on-site resources (spill kits, absorbent materials, oil booms etc.) available for the control of accidental releases of pollution and other environmental incidents. These resources will be available to contractors at all times of operation; and
- cement/concrete mixes will be calculated to ensure that sufficient quantities are supplied without needing disposal of excess and cement/sand mix ratio will be monitored for consistency and suitability.

During Operation

10.8.8 Mitigation of effects upon flow rates and volumes of watercourses within the surface water catchments would be achieved through design of a suitable surface water drainage scheme for the Site, which takes into account climate change. The surface water management scheme in the (Appendix 10.1) has considered simple pollution hazard and mitigation indices for sustainable drainage systems (SuDs). The FRA indicates that the phases of SuDs used in the scheme will control any pollution hazard.

10.8.9 All fuel, oils, paints, lubricants and other polluting substances will be stored within suitably bunded containers and placed upon impermeable surfaces in accordance with PPG2: Above Ground Oil Storage and PPG8: Safe Storage & Disposal of Used Oils. Pollution incident response plans will also be used.

10.8.10 The use of integral drip trays (of 110% of the capacity of the fuel tank) for any static machinery/ plant, where practicable. All plant, vehicles and machinery will also be regularly inspected for leaks.

10.8.11 All workings using chemicals will take place on impermeable surfaces with appropriate bunding and separates to inhibit escape to the environment. All spilt/used fuels, oils and chemical will be disposed of in accordance with the relevant legislation.

10.8.12 The proposed development would have an operation and maintenance management team who, as part of their role, would ensure all drainage systems are fully maintained and managed in accordance with best practice/guidance. The British Standard: BS 3247:2011+A1:2016 Specification for salt for spreading on highways for winter maintenance and Highways Agency Trunk Road Maintenance Manual: Volume 2 – Routine and Winter Maintenance Code, would be followed for the use of de-icing and storage of salts on-site.

10.8.13 Further mitigation measures with regards to flood risk are provided with section 5.3 of the FRA in Appendix 10.1.

10.9 Potential Effects Assessment

10.9.1 Table 10.11 identifies the assessment of residual effects on the water environment, with appropriate mitigation (as detailed in Section 10.8) in place.

During Construction

10.9.2 With appropriate mitigation in place, the magnitude of change from the baseline condition caused by the construction operations identified in Table 10.11 has been assessed as negligible for all operations. The potential change to the water environment is likely to be slight and barely distinguishable from the current baseline condition due to the use of such measures as sediment settlement prior to drainage discharge, pollution incident response plans and sediment run-off containment.

10.9.3 The assessment has concluded that with mitigation and good industry practice in place, no effect was found to be greater than negligible, which is not significant. As such, no additional receptor-specific mitigation is considered to be required.

During Operation

10.9.4 The magnitude of change from the baseline condition caused by the operational changes identified in Table 10.11 have all been assessed as low to negligible. The

potential change to the water environment would be slight and barely distinguishable from the current baseline condition due to the implementation of a suitably designed surface water drainage scheme, pollution control measures for the use of chemicals, including spill kits and storage facilities and mitigation measures associated to address the increased risk of flooding, including flood compensation areas and sustainable drainage schemes as outlined in the FRA.

10.9.5 The assessment of effects has found that with mitigation and good industry practice no effect was found to be greater than negligible, which is not significant. As such, no additional receptor-specific mitigation is considered to be required.

Table 10.11 Summary of Assessment with Mitigation

Activity	Potential Effect	Nature & Geographical Significance of Effect	Receptor	Sensitivity of Receptor (Determined by Table 10.1)	Magnitude of Change (Determined by Table 10.2)	Scale of Effect* (Determined by Table 10.3)	Significant Effect?** (Determined by Table 10.4)
Construction Phase							
Earthworks including excavation	Excavation and removal of the topsoil and superficial deposits has the potential to reduce the pathway to the underlying bedrock aquifers and therefore may increase the vulnerability of the aquifer to potential contamination/oil spills during construction. Mobilisation of sediment, which could enter watercourses and waterbodies causing increased erosion altering deposition. This may also result in harm to aquatic flora and fauna.	R, St, Ad, Lo	Usworth Burn (tributary of the River Don)	Medium	Negligible	Negligible	No
			River Don	Medium	Negligible	Negligible	No
			Existing drainage ditches receiving site discharge	Very Low	Negligible	Negligible	No
			Attenuation ponds	Very Low	Negligible	Negligible	No
Soil stripping and vegetation removal	Soil stripping reduces soil moisture storage capacity, may increase runoff and may lead to flooding.	R, St, Ad, Lo	Usworth Burn (tributary of the River Don)	Medium	Negligible	Negligible	No
			River Don	Medium	Negligible	Negligible	No
			Existing drains and drains receiving site discharge	Very Low	Negligible	Negligible	No
			Attenuation ponds	Very Low	Negligible	Negligible	No
	Removal of vegetation reduces interception and evapotranspiration rates, increases runoff and may lead to flooding and increased suspended solids entrained in runoff.	R, St, Ad, Lo	Usworth Burn (tributary of the River Don)	Medium	Negligible	Negligible	No
			River Don	Medium	Negligible	Negligible	No
			Existing drains and drains receiving site discharge	Very Low	Negligible	Negligible	No
			Attenuation ponds	Very Low	Negligible	Negligible	No
Use of machinery and storage on-site	Accidental spills or leakage of fuel and oil from machinery and storage on-site during the construction phase could affect the underlying groundwater and enter surface water watercourses and waterbodies and lead to a degradation of water quality.	R, St, Ad, Lo	Usworth Burn (tributary of the River Don)	Medium	Negligible	Negligible	No
			River Don	Medium	Negligible	Negligible	No
			Existing drains and drains receiving site discharge	Very Low	Negligible	Negligible	No
			Attenuation ponds	Very Low	Negligible	Negligible	No
Soil compaction	Compaction due to use of heavy machinery reduces infiltration, increases runoff and shortens the rainfall–runoff response and may lead to flooding.	R, St, Ad, Lo	Usworth Burn (tributary of the River Don)	Medium	Negligible	Negligible	No
			River Don	Medium	Negligible	Negligible	No
			Existing drains and drains receiving site discharge	Very Low	Negligible	Negligible	No
			Attenuation ponds	Very Low	Negligible	Negligible	No
Construction of impermeable surfaces such as roads/pavements	Reduction in recharge to the underlying soils therefore potentially reducing groundwater levels. This will also increase runoff to surface water drains/ponds and may lead to flooding.	Ir, Lt, Ad, Lo	Usworth Burn (tributary of the River Don)	Medium	Negligible	Negligible	No
			River Don	Medium	Negligible	Negligible	No
			Existing drains and drains receiving site discharge	Very Low	Negligible	Negligible	No
			Attenuation ponds	Very Low	Negligible	Negligible	No
Construction of subsurface infrastructure such as foundations	Impediment of shallow groundwater which can cause groundwater mounding on the upgradient side and reduce groundwater levels on the downgradient side. Potentially coming into contact with confined groundwater leading to dewatering requirements.	Ir, Lt, Ad, Lo	Usworth Burn (tributary of the River Don)	Medium	Negligible	Negligible	No
			River Don	Medium	Negligible	Negligible	No
			Existing drains and drains receiving site discharge	Very Low	Negligible	Negligible	No
			Attenuation ponds	Very Low	Negligible	Negligible	No
Laying foundations	Release of sediment and silt laden water from the discharge of water removed from excavations to watercourse and/or ground, which could cause a degradation in water quality.	R, St, Ad, Lo	Usworth Burn (tributary of the River Don)	Medium	Negligible	Negligible	No
			River Don	Medium	Negligible	Negligible	No
			Existing drains and drains receiving site discharge	Very Low	Negligible	Negligible	No
			Attenuation ponds	Very Low	Negligible	Negligible	No
Operational Phase							
Use of Motorised Vehicles	Pollution from leaks or spills, which may cause a degradation in water quality.	R, St, Ad, Lo	Usworth Burn (tributary of the River Don)	Medium	Negligible	Negligible	No
			River Don	Medium	Negligible	Negligible	No
			Existing drains and drains receiving site discharge	Very Low	Low	Negligible	No
			Attenuation ponds	Very Low	Low	Negligible	No
Contaminants associated with car manufacturing	Solvents including VOCs such as formaldehyde used in paints, heavy metals used during welding, degreasers, oils and diesels for manufacturing, servicing and machinery.	R, Lt, Ad, Lo	Usworth Burn (tributary of the River Don)	Medium	Negligible	Negligible	No
			River Don	Medium	Negligible	Negligible	No
			Existing drains and drains receiving site discharge	Very Low	Low	Negligible	No
			Attenuation ponds	Very Low	Low	Negligible	No

Table 10.11 Summary of Assessment with Mitigation

Activity	Potential Effect	Nature & Geographical Significance of Effect	Receptor	Sensitivity of Receptor (Determined by Table 10.1)	Magnitude of Change (Determined by Table 10.2)	Scale of Effect* (Determined by Table 10.3)	Significant Effect?** (Determined by Table 10.4)
Impermeable surfaces such as roads/pavements	Reduction in infiltration and recharge to the underlying soils water. This would also increase runoff to surface water drains/ponds and may lead to flooding.	Ir, Lt, Ad, Lo	Usworth Burn (tributary of the River Don)	Medium	Negligible	Negligible	No
			River Don	Medium	Negligible	Negligible	No
			Existing drains and drains receiving site discharge	Very Low	Negligible	Negligible	No
			Attenuation ponds	Very Low	Low	Negligible	No
Subsurface infrastructure such as foundations	Impediment of shallow groundwater flow which can cause groundwater mounding on the upgradient side and reducing groundwater levels on the downgradient side.	Ir, Lt, Ad, Lo	Usworth Burn (tributary of the River Don)	Medium	Negligible	Negligible	No
			River Don	Medium	Negligible	Negligible	No
			Existing drains and drains receiving site discharge	Very Low	Negligible	Negligible	No
			Attenuation ponds	Very Low	Low	Negligible	No
Creation of new drainage regime in developed areas of the Site	The creation of a new drainage regime may alter the amount of runoff within the surface water catchments, thereby altering the flow rates and volumes within the watercourses in these catchments. An increase in flow rates may lead to a corresponding increase in flood risk.	Ir, Lt, Ad, Lo	Usworth Burn (tributary of the River Don)	Medium	Negligible	Negligible	No
			River Don	Medium	Negligible	Negligible	No
			Existing drains and drains receiving site discharge	Very Low	Low	Negligible	No
			Attenuation ponds	Very Low	Low	Negligible	No
De-icing of roads, walkways and parking areas	The use of de-icing salts may cause the release of sodium chloride and anti-caking agents into the water environment and may cause changes to water chemistry such as salination.	R, St, Ad, Lo	Usworth Burn (tributary of the River Don)	Medium	Negligible	Negligible	No
			River Don	Medium	Negligible	Negligible	No
			Existing drains and drains receiving site discharge	Very Low	Negligible	Negligible	No
			Attenuation ponds	Very Low	Low	Negligible	No

Note
* The assessment has considered the magnitude of change from the baseline with mitigation (as described in Section 6) in place.
** Effects that have been determined to be major or moderate are considered to have a significant effect. Effects that are identified as minor or negligible are not considered to have a significant effect.
R= Reversible, Ir = Irreversible, Lt = Long Term, St = Short Term, Ad = Adverse, Be = Beneficial, Ne = Neutral, Lo = Local, Re = Regional, Na = National

10.10 Residual effects

10.10.1 As demonstrated in Table 10.11, there are no aspects of the development that are likely to give rise to significant effects. Therefore, no additional mitigation is required, above those measures already considered in the assessment (Section 0) such as the use of SuDS and good practice included in a CEMP. Consequently, no residual effects have been identified.

10.11 Cumulative effects

10.11.1 There is a possibility of cumulative effects on the water environment occurring when two or more major developments are constructed within the same catchment at the same time. Potential cumulative effects include deterioration in water quality as a result of pollutants entering waterbodies during construction and alteration to the hydrological regime from inappropriate drainage design resulting in increased flood risk downstream of both developments. In terms of the water environment, the greatest risk to water receptors generally occurs during construction periods; therefore, this assessment considers where there is likely to be an overlap of construction periods. It has been assumed that other developments would be designed and implemented with mitigation measures such as the use of SuDS and restriction of greenfield runoff rates, which mitigates operational phase effects of these developments. Therefore, this assessment has not considered the cumulative operational effects of the proposed development and other developments.

10.11.2 The Site (IAMP ONE Phase Two) forms part of the larger IAMP development, which also includes IAMP ONE Phase One, and IAMP TWO, shown on Figure 1.2. Chapter I (Water Resources) of the IAMP ONE ES 2018 concluded that the potential changes to the receptors during construction, operation and decommissioning are predicted to be low, very low, or negligible. The effects, considering embedded mitigation, are predicted to be neutral or minor, and therefore, not significant. As a result, it is considered that any cumulative effects on the water resources of the local area as a result of the construction, operation or decommission of the two phases of the IAMP ONE development would be negligible.

10.11.3 The following developments (ES Figure 2.1 refers) have also been noted as being within the same surface water catchment and groundwater catchment as the Site and potentially could be constructed at the same time:

- Application ref. 18/02055/FUL – provision of solar panels on building roof, Unipres, Washington Road (approved but not constructed) - The Unipres site is directly to the south of the Site, on the south side of the A1290. The application proposes the installation of 17,500 photovoltaic (PV) panels on the roof of the existing building, delivering renewable energy for use by the Unipres site. Due to the nature of works, there would be no scope for cumulative effects on the water resources of the local area.
- Application ref. 17/02085/MW4 – gasification plant (Sunderland Renewable Energy Centre), Infiniti Drive, Washington (awaiting determination) - This application relates to the proposed development of a renewable energy centre (gasification plant) on land to the west of Infiniti Drive, Washington. The site is located on the west side of Infiniti Drive and would be some 1.175km to the south-west of the Site.
- Application ref. 18/01964/FUL – extension to existing farm shop, tea room and other facilities at Elm Tree Nursery, Washington Road (awaiting determination) - Elm Tree Farm Nursery lies west-south-west of and some 800m from the Site, on the eastern side of Washington Road and is accessed from the northern end of Infiniti Drive. The existing nursery site lies within the Green Belt. This application proposed generally low-level extensions of the existing parking area, agricultural building and canopy structure, in addition to an additional polytunnel, new outdoor eating area and new children's play area. Solar panels are proposed for the south-facing elevation of the existing building.
- Application ref. 18/01869 – proposed 3 storey, 36 bed hotel on land adjacent to the Three Horse Shoes, Washington Road (consented, but variation application awaiting determination) - The Three Horse Shoes pub is located on the west side and at the southern end of the Usworth Cottages road, on the north side of the declassified section of Washington Road, east of the A1290. This application relates to the development of land to the west and north of the public house, some 710m to the east-north-east of the Site. The proposed hotel (reduced in size from 60 bed to 36 bed) would comprise a rectangular building, three storeys in height, with a flat roof, assumed to be some 9.1m above ground level.

10.11.4 Owing to strict planning guidance and regulation over the water environment, other major developments within the same catchment as the Site, including IAMP TWO, will have to demonstrate that appropriate drainage design and pollution prevention

measures have been incorporated into their site design and will be in place during the construction and operational periods. Any development requiring permitted activities would also be subject to control and regulation by the relevant issuing authority. Given the proposed SuDS for the Site, it is likely that any adjacent developments will involve the same systems as those proposed for the Site and not use features such as deep soakaways, as they are not supported by the geology.

10.11.5 In addition, pollution prevention measures in a CEMP (or equivalent) including emergency response plans are likely to be implemented during the construction of other developments. Therefore, the potential cumulative effects on the water environment, arising from other major developments within the same catchments as the Site, are considered to be negligible.

10.12 Summary and conclusion

Summary

10.12.1 The Site is located on the watershed of two surface water catchments. To the north of the watershed, water drains to the River Don, to the south of the watershed, water drains to watercourses/drains that are not located within a WFD surface water catchment.

10.12.2 The Site is located within the Tyne Carboniferous Limestone and Coal Measures groundwater catchment.

10.12.3 Superficial deposits that underlie the Site are comprised of the Pelaw Clay Member. According to the EA, these deposits are classified as Unproductive Strata (aquifer). There are limited isolated pockets of groundwater within permeable horizons; however, these are likely to be small and hydraulically isolated from each other. Groundwater was also encountered at the base of the formation overlying weathered bedrock. In these areas it is likely that the basal superficial deposits are in continuity with the underlying weathered bedrock and therefore are under confining pressure from the above clay deposits.

10.12.4 The bedrock underlying the Site belongs to the Pennine Middle Coal Measures Formation, which is formed of sequences of sandstones, siltstones, mudstones and associated coal seams. The Pennine Middle Coal Measures Formation is a Secondary A Aquifer. The bedrock aquifer is entirely confined by the Pelaw Clay Member on-site. Due to the low permeability of the Pelaw Clay Member and the upward head gradient within the bedrock aquifer there is no pathway between the Site and the bedrock,

therefore affording the aquifer protection from any potential contamination associated with the works on-site.

10.12.5 There are no surface water or groundwater private water supplies within 2km of the Site. There are no groundwater abstractions within 2km of the Site.

10.12.6 The assessment found that, with appropriate mitigation in place, the scale of potential effects was no greater than negligible. As such, there would be no significant effect from the proposed development on the water environment.

10.12.7 Appendix 10.1 (FRA and Drainage Strategy) found that the majority of the Site is located within flood zone 1 (less than 0.1% chance of flooding every year) from fluvial flooding. Climate change impacts are estimated to have potential medium to high flood risks within the northern corners of the Site, associated with fluvial flooding; however, these are mitigated by the introduction of a set development platform. There are small areas of the Site located within areas of medium to high risk of surface water flooding; however, the majority of the Site is at a low risk of surface water flooding. With appropriate mitigation in place the risk level has been assessed as between very low and low.

Conclusion

10.12.8 This ES chapter provides an assessment of the potential effects of the proposed development of the Site upon the water resources of the Site and surrounding area, focusing on effects relating to changes to the hydrological and hydrogeological regime, and from potential pollution and degradation in water quality. The assessment has concluded that, with appropriate mitigation in place, the scale of potential effects would be no greater than negligible. Additionally, an assessment of potential cumulative impacts as a result of the wider IAMP development and additional nearby developments has concluded that any cumulative impacts on the water environment would be no greater than negligible.

10.12.9 As such, there would be no significant effect on the water environment from the proposed development.

11 GEOLOGY AND SOILS

11.1 Introduction

11.1.1 This chapter of the Environmental Statement (ES) assesses the potential impacts on the geology and soils of the IAMP ONE Phase Two site (the Site), from the construction and operation of the Proposed Development.

11.1.2 A detailed description of terms referred to in this Chapter can be found in Appendix 11.1.

11.1.3 As illustrated in Figure 11.1, there is overlap between the IAMP ONE Phase Two boundary (red line) and that of IAMP ONE Phase One (blue dashed line). All land within the area of overlap was, prior to the commencement of IAMP ONE Phase One construction works, agricultural in nature. The loss of the 18.74 ha of agricultural land which lies within the IAMP ONE Phase One boundary, and the associated impacts to the soil resource has already been approved by Sunderland City Council (SCC) through the granting of planning permission for IAMP ONE Phase One. Therefore, IAMP ONE Phase Two will only require the loss of a further 6.26 ha of agricultural land above that already consented. Therefore, this assessment only considers this additional area; however, the good practice and mitigation measures described can be applied to the whole Site.

11.1.4 For completeness the Study Area includes all agricultural land within the Site boundary as illustrated in Figure 11.1, and the chapter provides discussion of the pre-development (baseline) condition of all land within the Site. Additionally, to provide context and inform the assessment of cumulative effects, Agricultural Land Classification (ALC) is described at the regional scale, within the administrative boundary of Sunderland City Council (SCC).

11.2 Consultation and scope of the assessment

11.2.1 Informal consultation relating to this outline application and EIA was undertaken with SCC in August 2019. In relation to the topic of Geology, Soils and Groundwater, the consultation identified that, based on the findings of the IAMP ONE ES chapter J, the main aspect to be addressed under this heading is the issue of the topsoil present within the Site. Effects on geology and groundwater were considered unlikely to be significant adverse, but nevertheless this chapter of the ES would reference the findings of the 2018 IAMP ONE ES, in relation to these aspects (see Section 11.5).

11.2.2 Sunderland City Council confirmed (meeting, 15.11.2019) that this approach would be acceptable.

11.2.3 Two indicative masterplans have been prepared for the outline planning application; the single unit option (Figure 3.1B), and the multiple unit option (Figure 3.1A). It is important to note that these designs are only indicative and therefore likely to be subject to change prior to reserved matters submissions being made. Nevertheless, this assessment is based on these designs as the most current available data and hence considers the layout included for the multiple unit development as the worst-case option as it provides less greenspace and hence less opportunity for the reuse of site-won soils within the Site. However, it must be noted that a total loss of all agricultural land within the Site will occur regardless of which development option is followed, as the whole of the Site forms part of the overall IAMP area (as shown on ES Figure 1.2).

11.3 Methodology – soils and agricultural land

11.3.1 As no detailed assessment of geology and groundwater is proposed within this ES, information on assessment methodology is limited to the topic of soils and agricultural land.

11.3.2 Information regarding the soils and agricultural land present in and surrounding the Site was obtained from the following published sources:

- MAFF (1993). Provisional Agricultural Land Classification 1:250,000 map, North East Region.
- MAFF (1996). Sunderland UDP: Land north of the A1290, Agricultural Land Classification, (Appendix 11.2).
- Soil Survey of England and Wales (1984). Soils and their Use in Northern England, with accompanying 1:250,000 map, Sheet 1.
- Soil Environment Services Ltd (for SCC) (2018). Agricultural Land Classification: Site North of Nissan Plant (Appendix 11.3).

11.4 Policy and guidance

11.4.1 The relevant legislation, policy and guidance are listed below and described in detail in Appendix 11.4.

Legislative Framework

11.4.2 The applicable legislative framework to the soils and agriculture assessment is summarised as follows:

- Town & Country Planning (Development Management Procedure) (England) Order 2015.

Planning Policy

11.4.3 The planning policy applicable to the soils and agriculture assessment is summarised as follows:

- National Planning Policy Framework (2019); and
- The Sunderland Core Strategy and Development Plan (2015 to 2033).

11.4.4 It is noted that the IAMP Area Action Plan (AAP) does not include policy relating to the development of agricultural land or the protection of soil resources and is therefore not considered within this chapter.

Guidance

11.4.5 The applicable guidance is summarised as follows:

- DEFRA (2009). Code of Practice for the Sustainable Use of Soils on Construction Sites;
- Natural England (2012). Technical Information Note 049; Agricultural Land Classification: Protecting the Best and Most Versatile Agricultural Land; and
- MAFF (2000). Good Practice Guide for Handling Soils.

11.5 Baseline conditions

Geology and groundwater

11.5.1 Information relating to the geology and groundwater conditions present within the Site and surrounding area is set out in the 2018 IAMP ONE ES, chapter J, but is summarised here for completeness. The bedrock geology of the local area comprises the Pennine Middle Coal Measures formation, consisting of interbedded grey mudstone, siltstone, sandstone and, commonly, coal seams. The observed local geology of the Site is consistent with this; however, coal seams were absent with only coal fragments detected within the mudstones.

11.5.2 The superficial geology of the Site consists of the Pelaw Clay Member, glaciolacustrine and alluvium deposits. These are all types of silty clay, though the alluvium deposits may also comprise layers of silt, sand, peat and basal gravel.

11.5.3 The Pelaw Clay Member aquifer designation is 'unproductive strata' and the alluvium mapped along watercourses (outwith the boundaries of the Site) and underlying bedrock aquifer is classified as a 'Secondary A' aquifer, meaning it has permeable layers capable of supporting water supplies at a local rather than strategic scale.

11.5.4 Groundwater vulnerability across the area is designated as 'soils of low leaching potential'. Pollutants are unlikely to penetrate the soil layer as water movement is largely horizontal.

11.5.5 The Site comprises agricultural land (Grade 3b) with the concentrations of contaminating substances within the soil all below the Generic Assessment Criteria (GAC) for commercial development of land[1]. Typically, organic substances, inclusive of phenol and Total Petroleum Hydrocarbon (TPH) were also absent from the soil, as was asbestos. There are consequently no contamination issues at the Site.

11.5.6 Effects from construction and during the operation, or any decommissioning of the IAMP ONE site were considered to be no greater than minor adverse and not significant[2]. Mitigation measures, including via procedures set out within Construction Environmental Management Plans and any Environmental Permitting requirements associated with specific industrial activities, were considered sufficient to control levels of effect on the environment[3].

11.5.7 As such, geology and groundwater are not considered further within this chapter.

Desk study - soils

11.5.8 Soil series are the lowest soil classification and are precisely defined based upon particle-size distribution, parent material (substrate) type, colour and mineralogical characteristics. The mapping provided by the Soil Survey of England & Wales (1984) however describes soil associations; which are groups of related soil series. Additionally, the scale of the mapping is such that it is not accurate to the field level and does not pick up small-scale local variations. The mapping therefore provides a

[1] IAMP ONE 2018 ES, chapter J, section J4.6 and Table J8.
[2] IAMP ONE 2018 ES, chapter J, Tables J11 and J12
[3] IAMP ONE 2018 ES, chapter J, section J6.0

general indication of the soils types likely to be present within the Site and the wider area.

11.5.9 The Soil Survey of England and Wales (1984) data indicates that the soil within the Site belongs to the Foggathorpe 1 Association. A summary of the key characteristics of this Association is shown in Table 11.1.

Table 11.1: Soil associations mapped within the Site

Soil Association	Soil Series	Geology	Soil group	Soil characteristics	Wetness Class	Erodibility *
Foggathorpe 1 (712h)	Foggathorpe Hallsworth Dunkeswick	Glacio-lacustrine drift and till	Stagnogley	Slowly permeable seasonally waterlogged clayey and fine loamy over clayey soils, often stoneless.	Class IV (Due to the slow permeability, excess rain runs off rapidly or remains)	Very small risk of water erosion

*Knox *et al*., (2015). *Research to Develop the Evidence Base on Soil Erosion and Water Use in Agriculture: Final Technical Report*.

Desk Study – Land use and topography

11.5.10 With the exception of West Moor Farm and associated infrastructure, all land within the Site is agricultural and, from a review of historic aerial imagery, has been under arable rotation since at least 2001. The 1996 ADAS survey (Appendix 11.2) describes the Site as 'generally under cereal stubble, recently sown winter cereals and oilseed rape'; whilst the 2018 survey (Appendix 11.3) describes the Site as 'in an arable crop'.

11.5.11 Ordnance Survey Mapping[4] shows the Site to be relatively flat and at an approximate height of 35m to 40m Above Ordnance Datum (AOD). All slopes on the Site are less than 7° (Appendix 11.2) resulting in no limitation to the use of standard farm machinery and no associated reduction in Agricultural Land Classification (ALC) grade.

Desk Study – Soils and Agricultural Land Classification

11.5.12 As the Site is covered by previous detailed survey data, no additional site survey was carried out in relation to this assessment.

11.5.13 As shown in Figure 11.1, to inform the City of Sunderland Unitary Development Plan (UDP), the majority of the Site was subject to detailed soil and ALC survey in 1996 by

[4] https://www.bing.com/maps

ADAS on behalf of MAFF. This includes the 6.26 ha of land which is solely within the IAMP ONE Phase Two boundary. The detailed survey was carried out using soil cores and pits at a density of approximately one sample per hectare and identified the soils within the Site as being poorly drained medium or heavy clay loam topsoils overlying gleyed, slowly permeable, heavy clay loam or clay subsoils at between 25cm and 35cm depth. The combination of soil wetness and topsoil workability restricted the land within the Site to Subgrade 3b (moderate quality, non-BMV, agricultural land). The detailed survey data including ALC mapping are contained in Appendix 11.2.

11.5.14 As part of a wider survey of approximately 60ha of land 'to the north of Nissan plant' undertaken on behalf of Sunderland City Council, the area of Site which lies within the IAMP ONE Phase One boundary (to the east of the access road to North Moor Farm) was subject to detailed (approximately 1 sample per ha) soil and ALC survey in May 2018. The survey was conducted by Soil Environment Services Ltd. (SES) and encompassed a proportion of the 1996 ADAS survey area as well as previously unsurveyed land to the south of the Site (Figure 11.1). The survey data have been previously presented in the 2018 IAMP ONE ES.

11.5.15 Although the development of this land has already been approved through the planning system, these data are important as the comparison of the results for the overlapping areas of the 1996 ADAS and 2018 SES surveys allow a judgement to be made as to whether there has been any change to land quality in the intervening period and hence whether the 1996 ADAS data covering the 6.26 ha of previously unassessed land is still a suitable baseline on which to base the assessment. Furthermore, discussion of these data provide a complete picture of the pre-development baseline for the Site as a whole.

11.5.16 The survey identified one general soil type of clay loam over clay to depth; and, in line with the 1996 ADAS survey) concluded that land within the Site is limited to Subgrade 3b (moderate quality, non-BMV, agricultural land) due to soil wetness. The detailed survey data including ALC mapping are contained in Appendix 11.3.

11.5.17 All land within the Site has therefore been surveyed as Subgrade 3b; with the 2018 survey also verifying that no change in ALC grading (land quality) has occurred since the 1996 ADAS survey was undertaken. The soils within the Site are identified as slowly permeable clay loams over clays. The key soil characteristics identified during

the surveys are consistent with those of the Foggathorpe 1 soil association identified by the Soil Survey of England and Wales mapping (Table 11.1).

Site Survey – Soils

11.5.18 As described above, as the Site is covered by previous detailed survey data, no additional site survey was carried out in relation to this assessment.

11.6 Assessment of impacts

11.6.1 This chapter assesses the likely significant effects of the Proposed Development due to the loss of agricultural land and loss of, or damage to, soil resources.

11.6.2 The Site will undergo a permanent land use change from agriculture to non-agriculture during the construction phase. As there would be no agricultural land present within the Site during the operational phase and no potential for further loss of agricultural land to occur, the effects of loss of agricultural land is limited to the construction phase, only.

11.6.3 Under intensive arable agricultural practices, such as those historically undertaken within the Site, the soil resource can become degraded through the loss of organic carbon, erosion and compaction, which results in an impairment of their delivery of ecosystem services.

11.6.4 During the operational phase, the soils remaining on Site would most likely only experience very low levels of disturbance due to works in landscaped areas. The scale of this disturbance (cultivation) would be lower than is currently experienced within the Site due to agricultural activities. Consequently, it is considered that there would be no effects on soils during the operational phase and this topic is not discussed further in this chapter.

11.6.5 Therefore, the impacts with regards to agricultural land and soil resources would only occur during the construction phase; consequently, only the construction phase is assessed in this chapter.

Agricultural land loss

11.6.6 The loss of agricultural land has been assessed by estimating the amount and quality of land that may be affected by the Proposed Development. The assessment is based on a threshold of the permanent loss of 20ha of Best & Most Versatile (BMV) agricultural land (i.e. land of ALC Grades 1, 2 and Subgrade 3a). This is in consideration

of the Schedule 4, Part (y) of The Town and Country Planning (Development Management Procedure) (England) Order 2015 (Statutory Instrument 2015/595).

11.6.7 The Town and Country Planning Order does not state that this threshold should be used to determine loss significance for impact assessment. However, as this is the area of BMV loss that triggers a requirement to consult Natural England, it implies that this is also the point at which the loss is considered to be significant. Therefore, a total permanent loss of BMV land which exceeds 20ha is considered significant; whilst any loss of non-BMV land or loss of BMV land which is temporary, or which falls below the 20ha threshold is considered as being not significant. As such no receptor sensitivity or magnitude of impact classifications are assigned for this receptor.

11.6.8 The impact of the Proposed Development on the soil resource was evaluated by assessment of the sensitivity of each receptor and the magnitude of change the Proposed Development will have on each receptor. There are no defined criteria, or policy guidance on the assessment of the effects of development on soil resources. Therefore, the assessment has considered the identified soil resources; the sensitivity of these soil resources to damage (the resistance and resilience of the soil environment, not the importance of the land for agricultural use) in terms of susceptibility to erosion and/or presence of organic rich soils/peat; and the degree of loss of soil resource that could potentially occur due to the Proposed Development.

11.6.9 Soil erodibility is a measure of the susceptibility of soils to loss both in situ (i.e. as an undisturbed soil profile) and during soil stockpiling, due to wind or water erosion (natural erosion potential).[5] Generally, heavy (clay-rich) soils are classified as low sensitivity (low soil erodibility), whilst fine sandy and silty soils are classified as high sensitivity (high soil erodibility).

11.6.10 However, it is important to note that soils of differing texture and structural development will behave differently following reinstatement. For example, the incorrect handling/reinstatement of a heavy (clay-rich) soil whilst in a plastic state may result in a reinstated soil profile with poor natural drainage and a subsequent increased risk of soil loss (erosion) due to surface water runoff; whereas, the permeable nature of sandy soils means that the permeability to water of the soils is more easily maintained upon reinstatement. However, as appropriate mitigation

[5] Research to Develop the Evidence Base on Soil Erosion and Water Use in Agriculture: Final Technical Report (Knox et al., 2015).

measures will mitigate against any potential adverse impacts during reinstatement regardless of the soil texture or prevailing structure, only soil erodibility (i.e. the sensitivity of the undisturbed soil profile or soil stockpiles) is considered in the sensitivity criteria of the soil assessment.

Sensitivity of soils

11.6.11 The sensitivity of the baseline environment is set out in Table 11.2. The criteria relate to areas of agricultural land quality and the associated soil resource.

Table 11.2: Sensitivity of soils

Soil type	Sensitivity	Justification
Soils with high risk of erosion (e.g. silty and fine sandy soils) and organic soils (peat).	High	Development on those soils should be avoided; however, if this is not possible, they require careful consideration and site-specific planning of construction methods, for example, use of temporary working surfaces, sensitive storage, protection from drying out, to preserve their functions. Soils of high biodiversity value. High importance as a carbon store and active role in carbon sequestration, which have little capacity to tolerate change. Increased mitigation requirements beyond standard measures are required for organically managed land.
Soils with moderate risk of erosion.	Medium	Standard mitigation measures will provide appropriate protection to these soils; however, damage is likely to occur if worked in less than ideal conditions, for example when above their plastic limit. The soils should be given appropriate consideration because of their importance for agricultural production.
Soils with low risk of erosion and resistant to damage (e.g. coarse sandy loam soils).	Low	These soils are generally more resistant to damage. Only standard mitigation measures are required.
Poor quality soils within an urban environment not supporting biodiverse habitats, no risk of erosion.	Negligible	These soils are already highly disturbed and of poor quality. Only standard mitigation measures are required.

Magnitude of change

11.6.12 The levels of magnitude of change used within the assessment are presented in Table 11.3. The magnitude of change has been assessed in terms of the degree of change from baseline conditions.

Table 11.3: Magnitude of change to soil resources

Magnitude	Damage to soil resource	Loss of soil resources
High	Permanent irreversible or long-term (> two years) reversible damage to soil quality through handling, and stockpiling	< 25% of soil resources retained for reuse
Medium	Medium-term (six months to two years) reversible damage to soil quality for example through handling, stockpiling and machinery traffic	25% - 49% of soil resources retained on site
Low	Short-term (<six months) reversible damage to soil quality for example through handling, stockpiling and heavy machinery traffic	50% - 94% of soil resources retained on site
Negligible	No damage or very small-scale surface damage equivalent to that done by a typical farm machinery traffic	≥ 95% of soil resources retained on site

Significance Criteria

11.6.13 The loss of agricultural land has been assessed by estimating the amount and quality of land that may be affected by the Proposed Development, with a threshold of 20ha of permanent BMV loss used to determine whether the loss is significant or not. Any permanent BMV loss that exceeds 20ha is assessed as significant, whilst any that is temporary or occupies less than 20ha is assessed as not significant. Consequently, magnitude of impact and receptor sensitivity classifications are not assigned, and no reference is made to Table 11.4 for this aspect.

11.6.14 The scale of impacts to soil resources is determined in relation to the sensitivity of the receptor and magnitude of change from baseline conditions, using the matrix shown in Table 11.4. Only impacts rated as moderate or major are considered to result in significant effects on the receptor.

Table 11.4: Scale of impact matrix

Sensitivity of receptor	Magnitude of change			
	High	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Minor/Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor/Negligible	Negligible	Negligible	Negligible

11.7 Assessment of impacts

11.7.1 The potential impacts are those impacts which could occur in the absence of appropriate mitigation measures or strategies.

Agricultural land quality

11.7.2 All 25.00 ha of Subgrade 3b, non-BMV agricultural land within the Site boundary will be permanently lost as a consequence of the Proposed Development. However, as previously stated, the loss of 18.74 ha of this land has already been approved by the granting of planning permission for IAMP ONE Phase One and consequently the additional loss due to IAMP ONE Phase Two is 6.26 ha.

11.7.3 Using the criteria set out in Section 11.6, the loss of agricultural land to the Proposed Development is considered not to be significant when considering either the whole Site area (25 ha) or the additional loss due to IAMP ONE Phase Two works only.

Soil resource

11.7.4 The soil survey data (Appendix 11.2 and 11.3) identify the soils at the Site as being as slowly permeable clay loams over clays; with characteristics indicative of the Foggathorpe 1 Association. These heavy textured soils are at very small risk of erosion and are therefore considered to be of low sensitivity.

11.7.5 The incorrect handling (or handling in inappropriate conditions) and storage of soils along with uncontrolled trafficking of vehicles/plant can cause damage to soil structure through compaction and smearing (both effects are sometimes referred to as deformation); loss of soil nutrients; loss of soil biota (for example bacteria, fungi, earthworms) and/or reduction of its activity; and the mixing of soil horizons (especially topsoil with subsoil). These impacts reduce the soils' potential for reuse and their future productivity and may result in the impairment of soil function (delivery of ecosystem services), quality and resilience.

11.7.6 The risk of compaction and smearing increases with soil moisture content, so it is greater during the autumn to spring period when the soil is most likely to be wet and plastic. Furthermore, incorrect handling, storage and trafficking can also lead to soil loss through erosion, excess trafficking on plant wheels, or unauthorised export. The loss of soil resource could result in the impairment of the remaining soils' function, quality and resilience. This effect also comprises such changes as reduction of topsoil depth. The mixing of topsoil and subsoils and/or the contamination of soil with

overburden also constitutes a loss of soil as these mixed or contaminated soils would no longer be of a quality suitable for reuse. Additionally, unregulated soil loss increases the potential for disease and pathogen transfer between different areas of agricultural land (a biosecurity risk). Therefore, in the absence of appropriate construction mitigation measures, there is the potential for the permanent irreversible or long-term reversible damage to the soil structure and soil quality to occur (high magnitude of change). In the absence of mitigation, there is a potential Major adverse, **Significant effect.**

11.7.7 Similarly, in the absence of appropriate construction mitigation measures, there is the potential for the permanent loss of >75% of the soil resources on Site to occur, largely due to incorrect handling and soil mixing rendering the soil unsuitable for re-use elsewhere (high magnitude of change). In the absence of mitigation, there is a potential Major adverse, **Significant effect.**

11.8 Mitigation Measures

11.8.1 The permanent loss of the agricultural land within the Site as a consequence of the Proposed Development cannot be mitigated, as it is not possible to reinstate land to agricultural use as part of the Proposed Development or to create additional agricultural land elsewhere.

11.8.2 Soil resources will be protected against damage during stripping, handling and storage by adoption of standard good practice measures for soil management, such as those listed in Defra's Code of Practice for the Sustainable Use of Soils on Construction Sites or MAFF's Good Practice Guide for Handling Soils (Appendix 11.4).

11.8.3 These standard good practice measures will include, but will not be limited to:

- limiting the number of machine movements across the Site to minimise compaction and damage to soil structure;
- avoiding or limiting soil handling after periods of heavy rainfall or when the soils are waterlogged to minimise compaction and damage to soil structure;
- clear marking of topsoil and subsoil storage areas on plans and on the ground;
- seeding of temporary topsoil storage mounds to reduce runoff and erosion;
- establishing vegetation cover on landscaped areas as soon as possible to maintain soil structure and prevent soil loss through erosion;
- separate handling and storage of topsoil and subsoil to prevent mixing;

- limiting the height of soil mounds;
- restricting construction traffic to specific areas;
- monitoring condition of soil stockpiles, preventing establishment of weeds;
- ensuring that staff are competent to perform soil handling and management tasks, through the provision of appropriate training and awareness of the principles of good practice in soil management;
- promoting good practice in oil and chemical storage, and vehicle maintenance to prevent unintentional leaks or spillages which could contaminate the soil resource; and
- keeping the soil within the Site vegetated for as long as possible prior to stripping, to ensure that the vegetation can remove as much moisture as possible from greater depths. This will ensure the subsoil is near to or at its lower plastic limit and subsequently at ideal handling conditions.

11.8.4 Site-won soils will be reused on Site, for example in landscaping areas, areas of green infrastructure and open spaces; with the preferred option for any excess soils being export to an alternative receptor or transfer site for beneficial reuse elsewhere (subject to necessary permissions). As the soil would be reused, the export of soil to a receptor or transfer site is not considered to be a loss of soil resources. The on- or off-site reuse of soils will be prioritised and therefore it is anticipated that the majority of soils would be treated in this manner. Disposal of excess soils to landfill would only be contemplated as a last resort and (unless the soils were to be used in landfill restoration) would be considered a loss of soil resources. Depending upon the scale/volume of soil exported for disposal, the loss has the potential be significant; however, it is considered that implementation of the measures taken to minimise soil loss will ensure that a significant effect does not occur.

11.9 Residual effects

Agricultural land quality

11.9.1 The residual effects remain as previously assessed – not significant.

11.9.2 The Provisional ALC mapping (Plate 11.1) shows all agricultural land within the administrative boundary of Sunderland City Council to be Grade 3, with the remaining land being non-agricultural or urban. It should be noted that the Provisional mapping is not accurate at the field scale as it does not map variations in ALC grade of less than

c. 80ha; nor does it provide a differentiation between Subgrade 3a (BMV) and Subgrade 3b (non-BMV) land. It does however provide a general indication of the most commonly occurring ALC grading across a wider area. It is known from available detailed survey within the City region that there is a mix of Subgrade 3a and 3b present along with some areas of Grade 2 (very good quality) land, which is not represented on the Provisional mapping.

11.9.3 Therefore, it can be concluded that delivery of a similar scheme elsewhere in the locality would result either in a similar loss of non-BMV land, or would impact on BMV land.

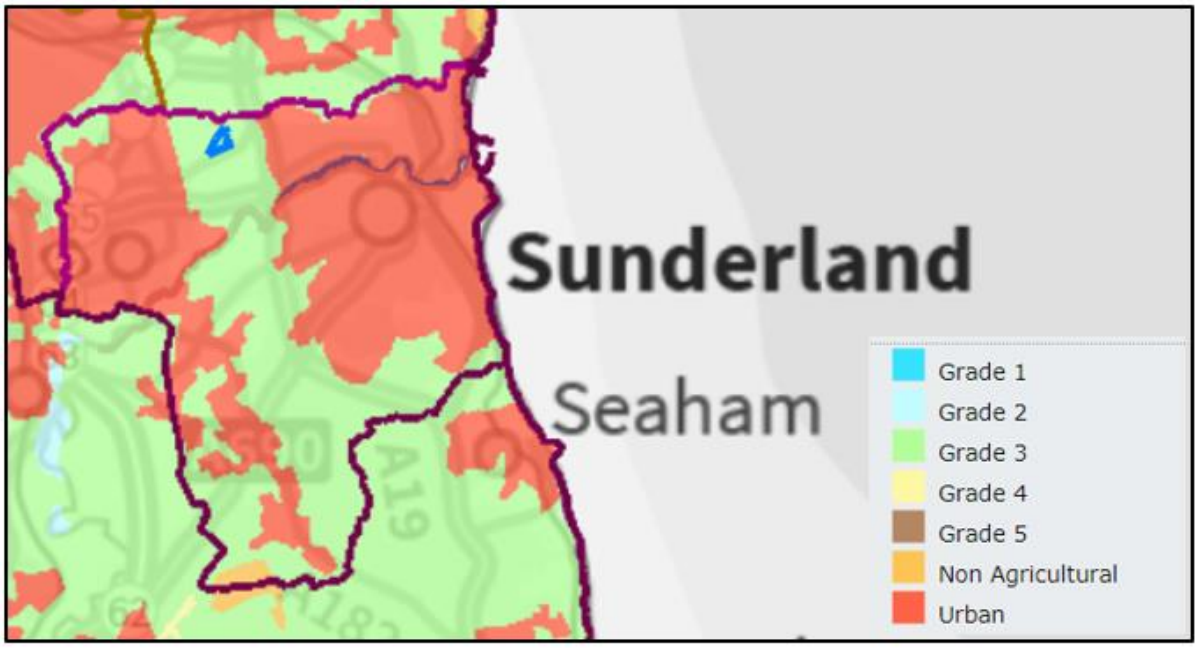

Plate 11.1: Provisional ALC Mapping with boundary of Sunderland City Council administrative area shown (reproduced from www.Magic.gov.uk; blue outline indicates approximate site location)

11.9.4 As the mapping was produced in c. 1977, to determine the current area of agricultural land in Sunderland City the mapping was overlain on a current aerial image and any areas mapped as agricultural land, but imaged as built development reassigned. This resulted in a land use calculation as follows:

- Grade 3: 5,041ha
- Non-agricultural: 107ha
- Urban: 8,627ha.

11.9.5 The loss of the 25ha of non-BMV agricultural land within the Site accounts for approximately 0.50% of the available agricultural land within the City's administrative boundary. However, as the loss of 18.74ha has already been approved through the planning system, the loss of 6.26ha of non-BMV agricultural land due to the additional landtake of IAMP ONE Phase Two accounts for only 0.12% of the available agricultural land.

Soil resource

11.9.6 The soil survey data (Appendix 11.2 and 11.3) identify the soils at the Site as being slowly permeable clay loams over clays; with characteristics indicative of the Foggathorpe 1 Association. These heavy textured soils are at very small risk of erosion and are therefore considered to be of low sensitivity. With the standard good practice measures and the embedded mitigation (by design), only minimal and temporary damage will occur; loss of soil resources will be restricted to unavoidable small-scale (< 5%) losses arising from factors such as trackout of soils on construction vehicle wheels.

11.9.7 Additionally, the on- or off-site reuse of soils will be prioritised with disposal to landfill used only as the last resort. Consequently, it is anticipated that the vast majority of soils would be reused and the magnitude of change to soils (damage or loss) would be low, resulting in a negligible effect, and not significant.

11.10 Cumulative impacts

11.10.1 Cumulative effects have been considered both in terms of the cumulative effects of the various elements of the Proposed Development (intra-project) and the accumulated effects of the Proposed Development with other development proposed in the vicinity (inter-project).

Intra-project cumulative effects

11.10.2 There are no intra-project cumulative effects on the permanent loss of BMV land, as the only source of impact is permanent development including permanent land use change, on land that is non-BMV.

11.10.3 There are no intra-project cumulative effects on soil resources. There are no intra-project cumulative effects on the disturbance to or loss of soils as the only sources of impact are construction activities.

Inter-project cumulative effects

11.10.4 Inter-project cumulative effects occur when two or more planned developments have an effect on the same receptor, leading to an overall effect of greater significance. The list of 'other developments' considered for inter-project cumulative effects is provided in Table 11.5 below, in ES Chapter 2 and as shown on ES Figure 2.1.

Agricultural land

11.10.5 The permanent loss of 6.26ha of Subgrade 3b (non-BMV) agricultural land due to the Proposed Development accounts for approximately 0.12% of the total available agricultural land in the administrative area of SCC and was assessed as being non-significant. Therefore, it is not possible for a significant cumulative effect to arise due to the effect of the Proposed Development combined with any of the 'other developments' listed.

11.10.6 However, for completeness, as there is the potential for the other considered developments to also permanently remove land from agricultural use, the scale of these other losses are presented in Table 11.5.

Table 11.5: Cumulative developments

Application reference	Name / Description of development	Area of agricultural land lost
18/00092/HE4 (plus subsequent reserved matters applications)	IAMP ONE Phase One The IAMP ONE Phase One site boundary covers 61ha. However, due to the overlap of the IAMP ONE Phase One and Phase Two boundaries, 18.74ha also lies within IAMP ONE Phase Two (see Figure 11.1); and consequently the loss of this 18.74ha is already included in the assessment presented in this chapter.	42.26ha (18.74ha already considered in the loss of agricultural land due to IAMP ONE Phase Two).
DCO application to be submitted in 2020	IAMP TWO Data taken from the IAMP TWO PEIR. The DCO boundary encompasses a total area of 210.97ha. The ALC data provided in the PEIR chapter J accounts for 73.3ha of this land (11.5ha Grade 2; 3.9ha Subgrade 3a and 26.9ha Subgrade 3b), but referring to the aerial imaging this does not account for all the agricultural land within the Site. Therefore, to present a worst case it is assumed that all land in the Site is agricultural.	210ha (presented as a worst case, but subject to change should more detailed information become available)

Table 11.5: Cumulative developments		
Application reference	**Name / Description of development**	**Area of agricultural land lost**
18/02055/FUL	Provision of solar panels on building roof, Unipres, Washington Road	None
17/02085/MW4	Renewable energy centre (gasification plant) on land to the west of Infiniti Drive, Washington. The site was previously agricultural, but has undergone land use change (landscaping and other works) in preparation for development.	None
18/01964/FUL	Extension to existing farm shop, tea room (etc) at Elm Tree Nursery, Washington Road. The proposed development site is non-agricultural and consists of a complex of buildings, polytunnels and outdoor display areas, with a large car park.	None
18/01869/FUL	Proposed three storey 36 bed hotel with parking (etc.) on land adjacent to the Three Horse Shoes, Washington Road. The majority of the site is non-agricultural, but a small area of improved field cuts into the middle of the site on the western elevation.	Approximately 0.1ha

11.10.7 The total loss of agricultural land due to the Proposed Development (IAMP ONE Phase Two) in combination with the 'other developments' considered in Table 11.5 is, as a worst case, 250.59ha. This accounts for 4.97 % of the total available agricultural land in the administrative area of SCC. However, as the Proposed Development had a non-significant impact regarding loss of agricultural land, there is not a significant inter-project cumulative effect.

Soil resources

11.10.8 The residual impacts for disturbance and loss of soil resources for the Proposed Development were assessed as not significant. As such, it is not possible for a significant cumulative effect to arise due to the effect of the Proposed Development combined with any of the 'other developments' listed.

11.10.9 It is also noted that in order to conform with planning policy and good practice guidance, all developments would be expected to apply similar standard soil management measures to those presented in Section 11.8 so as to ensure that the disturbance and loss of soil resources is reduced to a level where it was acceptable in planning terms.

11.11 Limitations of study

11.11.1 There are no imitations to the Study.

11.12 Summary and conclusion

11.12.1 The Proposed Development is located on 25ha of arable agricultural land plus 0.85ha of non-agricultural land (the site of West Moor Farm). The loss of 18.74ha of the agricultural land within the Site has already been consented by the grant of planning permission for IAMP ONE Phase One; therefore, the grant of planning permission for the Proposed Development (IAMP ONE Phase Two) would only involve a further loss of 6.26ha.

11.12.2 Two detailed soil and ALC surveys have been conducted within the Site, both showing the soils to be slowly permeable clay loams over clays, the wetness of which limits the agricultural quality of the land to ALC Subgrade 3b (moderate quality, non-BMV).

11.12.3 All land within the Site would be permanently removed from agricultural use due to the Proposed Development. However, as the land is non-BMV the loss is considered not to be significant.

11.12.4 The application of standard good practice soil management measures would reduce levels of soil loss and disturbance to negligible and not significant. Additionally, where practicable, the reuse of soils within areas of landscaping and greenspace would be maximised, with excess soils transported from Site for beneficial reuse elsewhere.

11.12.5 As the effects of the Proposed Development are negligible and not significant, there is no scope for any significant inter-project cumulative effect when the proposed Development is considered in combination with 'other developments' in the locality.

12 ECOLOGY AND BIODIVERSITY

12.1 Introduction

12.1.1 This chapter of the ES has been prepared by Wardell Armstrong LLP and E3 Ecology and assesses the impact of the development proposals upon the ecology and biodiversity of the local area.

12.1.2 This chapter describes the methods used to assess the baseline habitats and species currently existing at the site and surrounding area, the effects of the development on them, the measures required to avoid, mitigate or compensate for any significant adverse effects and the likely residual effects after these measures have been adopted.

12.1.3 This chapter is supported by the following technical appendices:

- Appendix 12.1 Bat Survey Update, West Moor Farm, Washington (E3 Ecology Ltd, July 2019)
- Appendix 12.2 Ecological Appraisal, IAMP ONE Phase Two, Washington (E3 Ecology Ltd, February 2020)
- Appendix 12.3 Wintering Birds Survey, Final Report, International Advanced Manufacturing Plant (IAMP), North of Nissan, Sunderland (Durham Wildlife Services, May 2019)
- Appendix 12.4 Biodiversity Net Gain Calculations (E3 Ecology, March 2020).

12.1.4 The location of the site and the site boundary are shown on ES Figures 1.1 and 1.2 respectively. Full details of the proposed development and development parameters for assessment are included in the introductory chapters to this ES.

12.2 Consultation and scope of the assessment

12.2.1 The informal consultation undertaken with Sunderland City Council (SCC) in the preparation of the ES identified that this would include a chapter on ecology and biodiversity, but that this would be limited to the provision of an update on the potential presence of bats and barn owl within the West Moor Farm buildings (proposed for demolition as part of the development of the IAMP ONE area).

12.2.2 A meeting with Sunderland City Council on 15th November 2019 confirmed that this approach would be acceptable. The delivery of mitigation in relation to the loss of the existing ecological interest of the Phase Two site was also emphasised as being an

important element of this project. To assess mitigation, some wider consideration of the ecology of the Site is required, particularly in the context of cumulative effects.

12.2.3 An updated walkover of the site has been carried out to inform this assessment. The assessment also draws on the findings of the surveys undertaken for the wider IAMP ONE site, part of which falls within the planning application boundary.

12.2.4 Two indicative masterplans have been prepared for the outline planning application; this ecology and biodiversity assessment considers the layout included for the multiple unit development, as the worst-case option in this regard. ES Figure 3.1A refers.

12.2.5 Sunderland City Council, following the adoption of their Core Strategy and Development Plan (CSDP) (2015 to 2033), asked that the assessment include consideration of biodiversity net gain within the Site (CSDP Policy NE2 and supporting text refers).

12.2.6 This has been completed in respect of the area of the Site that has not yet been consented; the relevant information is included in Appendix 12.4. The findings of this analysis have also informed the mitigation and compensation measures proposed within this ES chapter (section 12.7), which are also reflected in Parameters Plan 3, Green Infrastructure (Appendix 3.1).

12.3 Assessment Methodology

12.3.1 Desk-based and site survey work has informed this assessment of effects.

12.3.2 The extent of the study area has been determined based on professional judgement taking into consideration the characteristics of the site and its surroundings, the nature of the proposed development and the likely associated zone of influence.

12.3.3 The extent of the study area (the IAMP ONE Phase Two area) is shown on Figure 1.2. Surveys carried out for the adjacent areas of IAMP ONE and the wider IAMP development area have also been used to inform this assessment.

Consultation and desk study

12.3.4 Consultation has been undertaken as follows:

- Environmental Records Information Centre (NE);
- search of the Multi-Agency Geographic Information for the Countryside (MAGIC) website for relevant notable site or habitat/species records; and

- Ordnance Survey mapping and aerial imagery for the survey area and surrounding area has also been reviewed.

Site surveys

12.3.5 The approach taken to assess ecological effects takes account of the guidance document produced by the Chartered Institute of Ecology and Environmental Management (CIEEM)[1]. These guidelines set out the process for assessment and include the following stages:

- describing the ecological baseline through survey and desk study;
- assigning a value to key ecological resources - these are the sites, habitats and species of highest ecological value;
- identifying and characterising the potential effects on these ecological resources based on the nature of construction, operation and decommissioning activities associated with the development;
- describing any mitigation, compensation and/or enhancement measures associated with the development and assessing residual significance; and
- identification of any monitoring requirements.

12.3.6 The magnitude of effects is predicted quantitatively, where possible. The assessment also takes into account whether the effect is beneficial or adverse, short term (for example only during construction) or long term (throughout the lifetime of the development), reversible or permanent. The degree of confidence in the assessment is provided where relevant.

12.3.7 The significance of predicted environmental effects is determined through an assessment of the magnitude and likelihood of change arising from the development, coupled with the sensitivity of the ecological resource affected. Impacts can be either beneficial or adverse.

Value / importance of ecological resources

12.3.8 The following levels of value / importance can be applied to the ecological resources of an area:

- International:

[1] Chartered Institute of Ecology and Environmental Management, Guidelines for Ecological Impact Assessment in the UK and Ireland – Terrestrial, Freshwater, Coastal and Marine, September 2018

  - an internationally designated site or candidate site;
  - a viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat, which are essential to maintain the viability of a larger whole;
  - any regularly occurring population of an internationally important species, which is threatened or rare in the UK;
  - any regularly occurring, nationally significant population/number of any internationally important species.
- National:
  - a nationally designated site;
  - a viable area of a priority habitat identified in the former UK BAP, or smaller areas of such habitat, which are essential to maintain the viability of a larger whole;
  - any regularly occurring population of a nationally important species, which is threatened or rare in the region or county;
  - a regularly occurring regionally or county significant population/number of any nationally important species;
  - a feature identified as of critical importance in the (former) UK BAP.
- Regional:
  - a regionally designated site;
  - a viable area of a priority habitat identified in the former UK BAP which is important in maintaining the viability of a larger whole;
  - a regularly occurring population of a regionally important species, which is at below optimum levels;
  - a feature identified as important in the (former) UK BAP.
- County:
  - a site designated at County level;
  - a viable area of a habitat of importance at the County level;
  - a regularly occurring population of a regionally important species, which is at near optimum levels;
  - a feature identified as important in any local BAP.
- Local (e.g. district, borough, parish or other):

- a site designated at local level;
- a viable area of a habitat of importance at the local level;
- a regularly occurring population of a species common at the local level;
- a feature identified as locally important in any local BAP.

Sensitivity of the receptor / resource

12.3.9 Sensitivity of the ecological receptor / resource is classified with reference to the value levels set out above and is typically identified as:

- **High**: the ecological resource is of International or National importance / value.
- **Medium**: the ecological resource is of Regional, County or District importance / value.
- **Low**: the ecological resource is of Parish or other Local/lower importance / value.

12.3.10 Sensitivity can be adjusted to have regard for the vulnerability of the ecological resource or receptor to the specific impact and its ability to be tolerant to change of the nature predicted; i.e. a Barn Owl breeding site (an ecological resource of District importance) would not necessarily be vulnerable to short-term disturbance of a nesting site during the winter months. In such an instance, sensitivity would be downgraded.

Magnitude of effect

12.3.11 The magnitude of an effect references aspects such as the size of area affected, the quantity or amount of change (e.g. habitat loss), intensity and volume (e.g. percentage decline in a species population).

12.3.12 Aspects such as the timing and frequency or duration of an effect and its reversibility are also relevant considerations when assessing potentially significant adverse effects.

12.3.13 The criteria used in determining the magnitude of change are:

- **Major**: Total loss or major/substantial alteration to key elements or features of the baseline (pre-development) conditions such that the post-development character/ composition/attributes will be fundamentally changed.
- **Moderate**: Loss or alteration to one or more key elements or features of the baseline conditions such that post-development character / composition / attributes of the baseline will be materially changed.

- **Minor**: A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible/detectable but not material. The underlying character/composition/attributes of the baseline condition will be similar to the pre-development circumstances/situation.
- **Negligible**: Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation

Assessment criteria

12.3.14 The significance of an environmental effect is determined through the consideration of sensitivity and magnitude and may be beneficial or adverse. The assessment is undertaken using a matrix (Table 12.1, below), noting that the preferred approach set out in the CIEEM guidance is to avoid the use of matrices (albeit that the guidance notes that these can be used to provide consistency across ES topics).

Table 12.1: Effect Significance Matrix

	Sensitivity		
Magnitude	**High**	**Moderate**	**Low**
Major	Major Adverse / Beneficial	Major-Moderate Adverse / Beneficial	Moderate-Minor Adverse / Beneficial
Moderate	Major-Moderate Adverse / Beneficial	Moderate Adverse / Beneficial	Minor Adverse / Beneficial
Minor	Moderate-Minor Adverse / Beneficial	Minor Adverse / Beneficial	Minor-Negligible
Negligible	Negligible	Negligible	Negligible

12.3.15 An effect of moderate or greater is considered to be significant, for the purpose of this assessment.

12.4 Legislation and policy context

Legislation

12.4.1 Relevant legislation relating to ecology and biodiversity comprises:

- The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations (2019), which protects species including otter, all bat species and great crested newt (GCN).
- The Wildlife and Countryside Act (1981) (as amended), which protects a range of species including all wild birds.

- The Protection of Badgers Act (1992), which affords protection to badger setts and protects the animals from disturbance.
- Hedgerow Regulations (1997) which protects old and particularly diverse hedgerows.
- Natural Environment and Rural Communities (NERC) Act 2006 which requires the Secretary of State to publish a list of habitats and species of principal importance for the conservation of biodiversity in England.

12.4.2 Although not afforded any legal protection, national priority species (species of principal importance, as listed in Section 41 of the NERC Act (2006)), and local and regional priority species, as detailed within the relevant biodiversity action plans, are material considerations in the planning process and as such have been assessed accordingly within this report.

12.4.3 Section 40 of the Natural Environment and Rural Communities Act 2006 places a duty on all public authorities in England and Wales to have regard, in the exercise of their functions, to the purpose of conserving biodiversity.

12.4.4 The Durham Biodiversity Action Plan is now managed via the North East England Nature Partnership. Barn owl is a priority species, as are species of bats. Native hedgerows and woodland and scrub are Durham BAP lowland priority habitats.

National Planning Policy Framework (2019)

12.4.5 Table 12.2 details the key paragraphs from the National Planning Policy Framework (NPPF) relating to the natural environment and of relevance to the proposed development site.

Table 12.2: National Planning Policy Framework: Natural Environment
Statement
Paragraph 170 Planning policies and decisions should contribute to and enhance the natural and local environment by: a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan); b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services–including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland; c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate; d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;

Table 12.2: National Planning Policy Framework: Natural Environment
Statement
e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.
Paragraph 171 Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework[53]; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries. Footnote 53: Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality.
Paragraph 174 To protect and enhance biodiversity and geodiversity, plans should: a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity[56]; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation[57]; and b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity. Footnote 56: Circular 06/2005 provides further guidance in respect of statutory obligations for biodiversity and geological conservation and their impact within the planning system. Footnote 57: Where areas that are part of the Nature Recovery Network are identified in plans, it may be appropriate to specify the types of development that may be suitable within them.
Paragraph 175 When determining planning applications, local planning authorities should apply the following principles: a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused; b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest; c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons[58] and a suitable compensation strategy exists; and

Table 12.2: National Planning Policy Framework: Natural Environment
Statement
d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity. Footnote 58: For example, infrastructure projects (including nationally significant infrastructure projects, orders under the Transport and Works Act and hybrid bills), where the public benefit would clearly outweigh the loss or deterioration of habitat.

12.4.6 Planning Practice Guidance states:

"The National Planning Policy Framework is clear that pursuing sustainable development includes moving from a net loss of biodiversity to achieving net gains for nature, and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution."

"Information on biodiversity impacts and opportunities should inform all stages of development …. An ecological survey will be necessary in advance of a planning application if the type and location of development are such that the impact on biodiversity may be significant and existing information is lacking or inadequate."

"Where an Environmental Impact Assessment is not needed it might still be appropriate to undertake an ecological survey, for example, where protected species may be present."

"Local planning authorities should only require ecological surveys where clearly justified, for example if they consider there is a reasonable likelihood of a protected species being present and affected by development. Assessments should be proportionate to the nature and scale of development proposed and the likely impact on biodiversity."

"Biodiversity enhancement in and around development should be led by a local understanding of ecological networks, and should seek to include:

- *habitat restoration, re-creation and expansion;*
- *improved links between existing sites;*
- *buffering of existing important sites;*
- *new biodiversity features within development; and*
- *securing management for long term enhancement."*

Local Planning Policy – Sunderland City Council

IAMP Area Action Plan

12.4.7 The IAMP Area Action Plan (AAP) forms part of the local development plan; policies EN2 and EN3 are relevant to ecology and nature conservation.

12.4.8 Policy EN2: Ecology states:

a) To protect and enhance biodiversity, development must:

i) avoid, minimise and mitigate or compensate any adverse impacts on biodiversity and provide net gains where possible;

ii) maintain and enhance the River Don as a functional wildlife corridor, through improvements to its water quality and geomorphology, and through the implementation of an ecological buffer along the River Don corridor and around Local Wildlife Sites (with the exception of the new bridge crossing);

iii) design swales and Sustainable Drainage Systems (SuDS) to take account of additional wildlife benefits;

iv) restrict or minimise public access to areas of ecological sensitivity;

v) create ecological links between retained and new habitat areas within and beyond the IAMP AAP area; and

vi) secure through requirements in a DCO or planning conditions and/or planning obligations, provision for the maintenance and monitoring of appropriate mitigation and or compensation measures.

b) To support proposed development an Ecological Impact Assessment must be included as part of the Environmental Impact Assessment. This is required to ensure potential impacts are prevented or mitigated and/or compensated where mitigation is not feasible. Ecological mitigation measures must be designed in conjunction with landscape and drainage specialists (where applicable), to maximise the ecological value of landscape planting and drainage features. Proposals must include an appropriate long-term Management and Maintenance Plan that will ensure long-term ecological value is maintained.

c) The designated Ecological and Landscape Mitigation Area, as shown on the Policies Map, will provide the focus for necessary ecological mitigation and compensation measures.

12.4.9 The supporting text (paras. 145-153) reinforces and expands on the reasoning for this policy.

12.4.10 Policy EN3: Green Infrastructure states:

a) To provide green and open spaces for recreational use, development must:

i) incorporate a minimum 50m wide buffer from the riverbanks on both sides along the River Don (to maintain a total minimum 100m wide corridor), linking with the wider Green Infrastructure corridor to the east and west beyond the Plan boundary, and allow recreational access within this buffer where there is a low risk of harm to ecological receptors;

ii) retain and enhance existing mature trees, woodland and hedges around the edges of the development, along the River Don, and east of Elliscope Farm;

iii) create green linkages along main roads through the provision of tree-lined streets and landscaped areas of public rights of way; and

iv) Incorporate informal open spaces within the IAMP AAP boundary to provide recreational and wildlife benefits and green links between habitats.

12.4.11 Supporting text at paras. 154-156 also expands on the reasoning behind this policy and the types of habitat to be included in the River Don buffer.

Core Strategy and Development Plan 2015-2033

12.4.12 Policy NE1, Green and blue infrastructure, sets out how development should maintain and improve the Green Infrastructure Network; development that would sever or significantly reduce green infrastructure will not normally be permitted.

12.4.13 Policy NE2, Biodiversity and geodiversity requires development to demonstrate how it will provide net gains in biodiversity, and avoid or minimise adverse impacts on biodiversity and geodiversity, in accordance with the mitigation hierarchy. The Policy also requires development not to adversely impact on the integrity and value of European designated sites, Sites of Special Scientific Interest (SSSI), Local Wildlife (or Geological) Sites (LWS), Local Nature Reserves (LNR) or local wildlife corridors (directly or indirectly) will not be permitted unless there are exceptional circumstances, and suitable mitigation is provided.

12.4.14 Policy NE3, Woodlands/hedgerows and trees relates to the conservation of significant trees, woodland and hedgerows from loss as a result of development proposals; if such loss is unavoidable then justification, mitigation / compensation and

maintenance measures will be required. The Policy also notes that development should provide biodiversity net gain.

12.4.15 Policy NE4, Greenspace, notes that the Council will protect, conserve and enhance the quality, community value, function and accessibility of greenspace and wider green infrastructure, including requiring development to contribute towards the provision of new and/or enhanced greenspace, where evidence shows this is required.

12.4.16 The proposed development of the IAMP site as a whole has addressed the provision of mitigation and compensation through the identification of the ELMA area. Works to implement the requirements of the ELMA Habitat Management Plan (HMP) have now commenced.

12.4.17 Mitigation for the loss of ecologically sensitive features within the Site, in particular the triangle of land in the SW corner which does not yet have planning consent, is proposed to address this aspect. This is detailed in section 12.7, below.

Other relevant guidance

12.4.18 The following guidance documents have informed the preparation of this assessment:

- Guidelines for Ecological Impact Assessment in the United Kingdom, 2018, Chartered Institute of Ecology and Environmental Management.
- Bat Surveys for Professional Ecologists: Good Practice Guidelines, 3rd Edition. Bat Conservation Trust.
- Handbook for Phase 1 Habitat Survey, Joint Nature Conservancy Council.
- Barn Owl Conservation Handbook, A comprehensive guide for ecologists, surveyors, land managers and ornithologists, The Barn Owl Trust, Pelagic Publishing.
- Birds of Conservation Concern 4: The Population Status of Birds in the UK, Channel Islands and Isle of Man, British Birds 108.

12.5 Baseline conditions

Statutory protected sites

12.5.1 The Site itself does not lie within any ecological designated area. There are no international or nationally designated ecology sites within 2km of the Site. The IAMP ONE 2018 ES (chapter K, section K4.1) identifies the statutory protected sites within 10km (SAC, SPA and Ramsar) and 3km (SSSIs) of that site.

12.5.2 Two Local Nature Reserves (LNRs) are within 2km of the Site, these are:

- Barmston Pond; and
- Hylton Dene.

12.5.3 There is no ecological connectivity between the Site and these LNRs.

12.5.4 Two non-statutory designated sites (candidate Local Wildlife Sites, or cLWS) occur within 2km and have potential for ecological connectivity with the Site; the citations provided for these by ERIC NE state:

- Elliscope Farm East / Hylton Bridge cLWS: *"consists of two small woodlands and the linking section of the River Don, leading east from Hylton Bridge Farm. Elliscope Farm East is a linear, mature broadleaf plantation dominated by sycamore, with ash and elder. The understorey has bramble and species-poor neutral grassland."*
- The River Don, East House cLWS *"consists of a section of the River Don between East House Farm and Hylton Bridge Farm. In this stretch the Don has mostly unmodified riverbank with features such as meanders, eroding earth cliffs, riffles and pools, and dead wood. Substrates vary from coarse silts to gravel, cobbles and the occasional boulder. The aquatic and marginal vegetation within the river channel typically includes branched bur-reed, reed canary-grass, fool's watercress and Himalayan balsam."*

Habitats and species present within the Site

12.5.5 Land within the Site comprises former agricultural land (within the area to the west of the north-south hedgerow adjacent to West Moor Farm) and land which has been affected by the ongoing development works within the wider IAMP ONE Phase One site (to the east of this hedgerow boundary).

12.5.6 Agricultural land comprises a mix of arable, improved grassland and poor semi-improved grassland. Areas of bare ground and ephemeral vegetation are present, particularly to the east where land has been used to house a construction compound for the IAMP ONE site.

12.5.7 Species-poor hedgerows, both intact and defunct, are present along with an area of dense scrub adjacent to West Moor Farm and a single ash tree is situated within a field boundary to the north. An area of ephemeral standing water was also present within the field to the east of the farm, when the Site was surveyed in January 2020.

12.5.8 Full details of habitats are provided within Appendix 12.2. Habitats are concluded to be of local value as per the criteria set out above.

12.5.9 Occasional hedgerow trees are present within both the west-east and north-south hedgerows.

Bats and Barn Owl

12.5.10 The surveys undertaken for the IAMP ONE 2018 ES identified the presence of two common pipistrelle day roosts within the buildings (Buildings 2 and 5[2]) at West Moor Farm. In addition, these surveys identified the presence of a potential barn owl nest/roost within the buildings.

12.5.11 A single updating daytime inspection and dusk emergence survey were carried out in 2019 by E3 Ecology (Appendix 12.1); these did not record bats roosting at the time of the survey with only low numbers of pipistrelle bats recorded at any one time, foraging in the area of the Site. It was concluded that the buildings are used occasionally by low numbers of common pipistrelle at times during the year.

12.5.12 There were no sightings of barn owl at the time of the 2019 bat emergence survey. A single owl pellet was recorded in Building 5 and a number of old owl pellets in Building 8. It is concluded that the buildings may be used on occasion by roosting barn owl but that there is no evidence of nesting activity.

12.5.13 The common pipistrelle roost sites within West Moor Farm are considered to be receptors of local value while a barn owl roost site, if present, would also be a receptor of local value.

Wintering birds

12.5.14 A wintering birds survey completed during the period September 2018 to March 2019 by Durham Wildlife Services (see Appendix 12.3) covered the full IAMP site. Table 12.3 below details the red and amber list species recorded within the current application area. Detailed results for the full site including distribution maps are provided within Appendix 12.3.

[2] Building references follow those used in the IAMP ONE 2018 ES, Chapter K Figure 4.1.3iii West Moor Farm Location Plan

Table 12.3 Wintering Bird Survey Results (Application Area)								
Species	**BTO Code**	**Survey**						
		Sept 2018	**Oct 2018**	**Nov 2018**	**Dec 2018**	**Jan 2019**	**Feb 2019**	**March 2019**
Bullfinch	BF							1
Dunnock	D.				1			2
Grey partridge	P.	10				11		2
Greylag Goose	GJ					2		
Herring Gull	HG							2
House Sparrow	HS					6		
Kestrel	K.		1	1				
Lapwing	L.							4
Linnet	Li	4		35				10
Meadow Pipit	MP	1	1					
Redwing	RE							1
Skylark	S.	10						2
Song Thrush	ST		1					
Tree Sparrow	TS	13						3
Yellowhammer	Y.							3

12.5.15 Wintering bird survey recorded a total of 10 BoCC Red List species within the current application area (grey partridge, herring gull, house sparrow, lapwing, linnet, redwing, skylark, song thrush, tree sparrow and yellowhammer) and five BoCC Amber List species (bullfinch, dunnock, greylag goose, kestrel and meadow pipit). Of these species, redwing is also listed under Schedule 1 of the Wildlife and Countryside Act (1981).

12.5.16 The wider IAMP survey area was concluded to be of County value (see Appendix 12.3 for full details); however, the assemblage within the current application area, a subset of the wider assemblage, is considered to be a receptor of no more than local value as per the criteria set out within paragraph **Error! Reference source not found.**.

12.5.17 It is noted within the wintering bird report (Appendix 12.3) that where development has begun at IAMP ONE Phase One, a noticeable decline in ground dwelling/foraging species has occurred as the development has progressed. Species such a grey partridge and foraging finch flocks were noted to have been displaced, however skylark and lapwing were noted displaying above the works and appeared to be tolerating aspects of the development to a certain degree.

12.6 Assessment of effects

Demolition and construction phase

Habitat loss / modification

12.6.1 It is assumed, as a worst-case scenario, that the proposals will result in the loss of all existing habitat within the Site. This will comprise approximately:

- 3.6ha arable land;
- 0.6ha improved grassland;
- 0.06ha of dense scrub;
- 12.4ha of poor semi-improved grassland;
- 5.6ha of ephemeral vegetation;
- 420m of intact species-poor hedgerow; and
- 860m of defunct species-poor hedgerow.

The remainder of the area being mainly bare ground from construction disturbance and access tracks.

12.6.2 In addition, proposals will result in the loss of a single ash tree, an area of ephemeral standing water and areas of bare ground, hard standing and built development (c. 0.65ha) at West Moor Farm.

12.6.3 All the habitat types detailed above are considered to be receptors of local value, common within the wider landscape and/or readily replicated and therefore of low sensitivity. Losses of the scale anticipated are considered to be of minor magnitude, equating to minor-negligible adverse effects (not significant).

Demolition of West Moor Farm

12.6.4 Demolition of the buildings at West Moor Farm has the potential to cause the following:

- the loss of two intermittently used common pipistrelle day roosts of local value;
- the risk of harming / disturbing any bats that may be using the buildings at the time of demolition; and
- the loss of a possible barn owl roost site of local value and potential disturbance of a roosting barn owl, if present at the time of demolition.

12.6.5 Common pipistrelle day roosts used by individual bats are considered to be receptors of local value and low sensitivity. Loss of these roost sites and the potential for harming/disturbing individual bats during demolition is considered to be an impact of minor magnitude in relation to the local common pipistrelle population, equating to a minor-negligible adverse effect (not significant).

12.6.6 The loss of a possible barn owl roost site and the potential for disturbing a roosting barn owl during demolition works is anticipated to be a minor-negligible adverse effect (not significant) in relation to the local barn owl population. A barn owl roost is considered to be a receptor of local value and low sensitivity. Loss of the roost site and potential disturbance of an individual roosting bird is considered to be an impact of minor magnitude in relation to the local population and overall the effect is not significant.

Wintering birds

12.6.7 The existing wintering bird assemblage utilising the application area is likely to be largely displaced due to a combination of habitat loss and disturbance. The assemblage is considered to be of local value and therefore low sensitivity. In relation to local wintering populations, the majority of which will range across a relatively wide area, this displacement is anticipated to be an impact of minor magnitude. This equates to a minor-negligible adverse effect (not significant).

Operational phase

12.6.8 Without appropriate design, the operational phase may result in an increase in noise and light pollution into adjacent areas of retained/enhanced habitats, displacing bats and reducing the value of these habitats to a range of wildlife, particularly bats and farmland birds.

12.6.9 Ongoing operation of the site may also result in an increase in general disturbance levels, within and adjacent to the site and an increase in littering or informal recreational activity in adjacent areas of retained/enhanced habitat.

12.6.10 Common pipistrelle bats and farmland birds are considered to be receptors of local value and low sensitivity. Operational disturbance is considered to be an impact of minor magnitude in relation to the local populations of these species, equating to a minor-negligible adverse effect (not significant).

12.7 Mitigation and Compensation Measures

Generally

12.7.1 A Biodiversity Construction Environment Plan (BCEMP) is in place in relation to the IAMP ONE Phase One site and it is anticipated that this will also apply to the Site. This document includes Method Statements in relation to a range of elements including site clearance, pre-construction badger (or other species) surveys, noise and light effects, protected species and invasive species. An Ecological Clerk of Works (ECoW) is in place to oversee the implementation of the BCEMP.

Habitat

12.7.2 In order to address losses of arable habitat as a result of IAMP ONE and to address effects on nesting, passage and over wintering birds, a mitigation strategy has been put in place in relation to an area of land to the north and west of the Site (Ecological and Landscape Mitigation Area (ELMA)) and the IAMP ONE site itself. This strategy was designed to offset effects of the whole of the IAMP ONE area on these key receptors through enhancement of retained habitats, the creation of areas of landscaping and aquatic habitats for biodiversity gain within the IAMP ONE Site, and the delivery of exemplar stewardship of arable land within the ELMA area.

12.7.3 The development of the ELMA area (110ha, of which 43.6ha relates to IAMP ONE, including the full extent of the Site) therefore mitigates and compensates for the loss of habitat and impacts of the IAMP development on the area's habitats, species and landscape, to the satisfaction of the Local Planning Authorities.

12.7.4 The area within the Site which was not included in the 2018 IAMP ONE outline planning application comprises a triangle of approximately 6.85ha of land, including 3.6ha of arable, the remainder comprising improved or poor semi-improved grassland, dense scrub (~0.06ha) and built development. Approximately 420m of intact species-poor hedgerow and 215m of defunct species-poor hedgerow will also be lost from within this area.

12.7.5 Appendix 12.4 sets out the analysis of the biodiversity metrics within the Site as existing and the extent of biodiversity net gain that could be provided as part of the proposed development of the Site, in order to accord with the requirements of the AAP and Sunderland City Council's Core Strategy and Development Plan policies.

12.7.6 In order to compensate for this additional habitat loss, landscape proposals for the Site will include the following key elements:

- the creation of 1.81ha of additional diverse native scrub and tree planting within the Site, including as linear belts of planting, along the north-western (15m width) and southern (10m width) boundaries of the Site; and
- the planting of 400m of species-rich native hedgerow, on a hedge bank, along the southern (A1290) boundary of the Site.

Parameter plan 3 Green Infrastructure indicates the locations and extent of these areas (Appendix 3.1).

12.7.7 Further habitat enhancement will be undertaken as part of the detailed design of the Site, as reserved matters applications come forwards. Where practicable, new areas of diverse grassland, wetland and woodland planting will be located in areas which extend the influence of the adjacent ELMA.

12.7.8 A Habitat Management Plan (HMP) is in place in relation to the IAMP ONE site and ELMA, and it is anticipated that this will be revised to include proposals within the Site.

12.7.9 In order to minimise disturbance to the south-western corner of the Site, which is proposed as an area of landscaping comprising native tree and scrub, and to the adjacent ELMA area, to the north-west, the design of the adjacent plot(s) should as far as possible seek to ensure that:

- there is no or limited lighting directed towards this south-western corner of the Site or towards the ELMA area to the north; and
- the plot layouts ensure that areas of service yards, parking etc with the potential to give rise to increased levels of disturbance, are positioned such that these are shielded from the south-west corner and the ELMA area by their associated building(s).

12.7.10 This will assist in minimising levels of disturbance from the proposed development on these more sensitive areas.

Demolition of West Moor Farm

12.7.11 The following mitigation measures will be implemented in relation to the demolition of the buildings at West Moor Farm.

Generally

12.7.12 Demolition will not be undertaken during the bird nesting period (March to August inclusive) unless a checking survey by a suitably qualified and experienced ornithologist has confirmed that active nests are absent.

Barn owl

12.7.13 The site is not currently considered to support nesting barn owl; however, to address the residual risk of active nests being present, prior to demolition, a checking survey will be undertaken for nesting barn owl.

12.7.14 As compensation for the loss of the barns, two barn owl boxes will be provided, located within suitable trees or on poles, to the north-west of the site, adjacent to or within the ELMA area, where open farmland including set-aside will provide suitable foraging habitat. Boxes will be positioned on site under the supervision of the project ecologist to ensure the locations of these are appropriate and sufficiently distant from roads.

Bats

Timing of works

12.7.15 Demolition of buildings 2 and 5 (see Appendix 12.1) will not commence until a Natural England development licence has been obtained. All other structures will be demolished to a precautionary method statement.

12.7.16 Bat boxes (as detailed below) will be provided within the land ownership prior to works commencing to provide roosting opportunities during the works.

12.7.17 Prior to works commencing a site induction meeting will be held, attended by the project ecologist and lead contractors.

12.7.18 Works will not commence until a detailed inspection of the structures where roosts have been recorded (buildings 2 and 5) has taken place, with the provision of scaffolding/cherry picker access to facilitate this inspection.

Working methods and best practice

12.7.19 A copy of the relevant Natural England licence method statement will be provided to contractors prior to the induction process at the start of works, in relation to buildings 2 and 5. The project ecologist will review all key points with contractors during the induction and provide all necessary training.

12.7.20 A detailed precautionary method statement for the other buildings will be provided to contractors as part of the induction process at the start of the works.

12.7.21 Old slates, coping stones, ridge tiles and barge boards will be removed carefully by hand, being aware that bats may be present beneath slates or ridge tiles, within

mortise joints, cavity walls, between loose stones, between lintels and in gaps around window frames.

12.7.22 If bats are found during works when the ecologist is not on site, works will stop in that area and the ecological consultant will be contacted immediately. If it is necessary to move the bats for their safety, this will be undertaken by a licensed bat handler.

Compensation roosts

12.7.23 In advance of the start of works, two bat boxes will be erected in trees within the adjacent ELMA Area which borders the site as direct mitigation for roost loss, providing alternative roost sites. In addition, it is recommended that four further boxes are erected as enhancement.

12.7.24 Boxes will be Schwegler 2F (General Purpose) or similar equivalent with a 10 year design life, and will be erected as high as possible, ideally at a minimum height of 4m above ground level.

12.8 Residual effects

12.8.1 In line with the definitions set out in ES chapter 2, no significant residual effects on ecology and biodiversity are anticipated.

12.8.2 There will be a residual loss of habitats of open farmland and their associated bat and bird populations. Although habitat creation works within the Site (including as set out in para. 12.7.6 and 12.7.9 above) and ELMA area will cater for a range of species, particularly those associated with hedgerow and scrub, those species associated with open arable land such as grey partridge, skylark and lapwing are unlikely to return once development is completed.

12.8.3 The design of the ELMA was targeted to offset losses of arable land and effects on the associated bird assemblage.

12.8.4 In the context of the wider IAMP ONE development and the associated ELMA, the loss of arable land associated with the current application is considered to be a minor adverse effect, one that is likely to be mitigated for by the ELMA in the medium to long-term given good quality habitat creation and management. Monitoring is proposed that can identify net changes and any residual effects could be addressed through further habitat enhancement within the ELMA, if required. This may include options such as:

- reducing the average field size to around 2ha, allowing the creation of new species-rich hedgerows with deep ditches alongside designed to retain water;
- using game cover crops to support wintering birds and species such as grey partridge;
- creation of new field ponds at hedge junctions;
- allowing hedgerows to grow beyond the 2m height and 1.5m width currently specified;
- inversion ploughing and re-seeding of the fertile grass field (Field 1 in the Mitigation Plan for IAMP ONE, DWS, November 2018); and
- creation of skylark / lapwing plots within arable fields through topsoil stripping in areas where winter waterlogging is likely, with the arisings distributed over the adjacent arable land.

12.8.5 This could be reviewed as part of the revisions to the HMP identified at para. 12.7.8, or conditioned as part of any consent for this outline application.

12.9 Cumulative effects

12.9.1 It is considered that the primary driver of any significant cumulative effects will be the wider IAMP development. However, it was concluded within the 2018 Environmental Statement produced in relation to IAMP ONE that, with the implementation of the BCEMP, HMP and ELMA, although negative residual impacts would be experienced in the short-term, these would become neutral or positive in the medium to long-term (IAMP ONE 2018 ES, chapter K, section K.7.0, final para.).

12.9.2 The Habitat Management Plan for IAMP ONE proposes very frequent surveys for bats, birds and invertebrates. These species groups can act as indicators for the biodiversity being achieved within IAMP and the ELMA. To help ensure that cumulative effects are assessed and addressed, and biodiversity net gain achieved, it is recommended that standard survey techniques, such as the BTO territory mapping method for breeding birds, and fixed transect routes for bat and invertebrate surveys are agreed. Targets can then be set based on the population levels needed to demonstrate no net loss from the pre-development baseline, and measures identified to address any shortfall (including, if required, revisions to the management of the area).

12.9.3 Given this, and the anticipated limited residual effects of the current application detailed above, no significant cumulative effects are anticipated from the combination

of effects of the Site with the wider IAMP development, or with other planned developments within the local area.

12.9.4 In respect of the planning applications set out in ES chapter 2, these developments will have been subject to their own assessments and development of mitigation (as appropriate) and therefore the combination of the effects of the Site with these is unlikely to result in any significant adverse cumulative effects on the ecology and biodiversity of the local area.

12.10 Limitations of study

12.10.1 The ecological appraisal completed in 2020 was undertaken at a sub-optimal time of year for the identification of some flowering plants (January); however, previous survey work completed at the site over a number of years has been reviewed and this is not considered to have been a significant limitation.

12.10.2 Some areas of the site were not accessible at the time of the 2020 ecological appraisal due to ongoing works to install a foul rising main; however, these areas were bare ground at the time of survey and are not considered to be of ecological value.

12.10.3 During the bat survey completed in 2019 no access was possible to the loft void of the cottage (Building 3) and some sections of Building 4 and 5 were also locked; however, it is considered that a robust assessment was possible given previous studies (see Appendix 12.1).

12.10.4 Due to access and permission issues associated with the wintering bird surveys some areas of the site were only surveyed using distant vantage point techniques and as a result some species may have been under-recorded on occasion (see Appendix 12.3, para. 5.1.1).

12.10.5 The 2018 Dendra Breeding bird survey report does not include night-time survey for owls and does not provide information on the locations or numbers of breeding pairs likely to be present. It assessed value through the number of species present, rather than considering the number of breeding pairs present and the rarity of individual species such as corn bunting or curlew in the district or county. As a result, the effects of IAMP ONE or this application on breeding birds cannot be assessed in detail. This limitation has been addressed through a precautionary approach to compensation requirements.

12.11 Summary and conclusions

12.11.1 The IAMP as a whole includes 110ha of land allocated as Ecological and Landscape Mitigation Area (ELMA). This land will be used to implement some of the mitigation and/or compensation for impacts of the IAMP development on the habitats and species of the area. Of the 110 hectares of ELMA, 43.6 hectares is associated with IAMP ONE and 66.4 hectares relates to IAMP TWO. The ecological mitigation for IAMP ONE has already been agreed with the Council through the approval of the IAMP ONE Habitat Management Plan (DWS Ecology, November 2018) and is being established on-site. As such, the mitigation for part of the Site that overlaps with the 2018 IAMP ONE permission has already been agreed and is being established.

12.11.2 This chapter of the ES provides an assessment of the effects on the ecology and biodiversity within the triangular area of land (the area without planning consent) and relates to the loss of possible barn owl and bat habitat associated with the demolition of the West Moor Farm buildings, as well as the loss of a small area of arable land and associated hedgerows from within the triangle of land in the south-western part of the Site. Assessment of the remainder of the Site has been carried out as part of the work done to inform the 2018 IAMP ONE ES, and as ongoing survey work.

12.11.3 The site does not lie within, or in close proximity to any designated areas of ecological interest.

12.11.4 Analysis of the ecological interest of the Site has identified this to be of no greater than local level.

12.11.5 No significant adverse effects on the ecology and biodiversity of the local area are predicted, including cumulative effects. Mitigation and compensation measures are proposed to ensure that the development of the Site can make a long-term, positive contribution to the local ecology and biodiversity interest of the area. Measures to ensure that there is biodiversity net gain within the Site, in accordance with Sunderland City Council's Core Strategy and Development Plan Policy NE2, are proposed.

12.11.6 These mitigation measures include the provision of barn owl and bat boxes as compensation for loss of the barns within West Moor Farm. Demolition of the buildings will only commence once a Natural England licence method statement is in place for key buildings (along with precautionary method statements for other buildings) and checking surveys of all the buildings have been completed.

12.11.7 Further habitat enhancement may be required within the ELMA area; this could include:

- reducing the average field size to around 2ha, allowing the creation of new species-rich hedgerows with deep ditches alongside designed to retain water;
- using game cover crops to support wintering birds and species such as grey partridge;
- creation of new field ponds at hedge junctions;
- allowing hedgerows to grow beyond the 2m height and 1.5m width currently specified;
- inversion ploughing and re-seeding of the fertile grass field (Field 1 within the Mitigation Plan for IAMP ONE, DWS, November 2018); and
- creation of skylark / lapwing plots within arable fields through topsoil stripping in areas where winter waterlogging is likely, with the arisings distributed over the adjacent arable land.

12.11.8 No significant adverse cumulative effects have been identified in relation to ecology and biodiversity.

13 ACCESS AND TRANSPORT

13.1 Introduction

13.1.1 This assessment considers the potential highway, access and transportation impacts of the Site and has been prepared by SYSTRA.

13.1.2 The inclusion of the Site within the IAMP ONE area will provide greater development flexibility. It is important to note that overall, the area of developed units on IAMP ONE (including Phase One and Phase Two) is intended to not exceed the consented amount as per the IAMP ONE Phase One application.

13.2 Consultation and scope of the assessment

13.2.1 The 2018 ES prepared for IAMP ONE concluded that there were no significant adverse effects predicted for the construction and decommissioning phases, but a major adverse effect was identified during the operational phase, in relation to 'Fear and Intimidation' along the A1290 due to the increase in HGV movements. Moderate adverse effects had also been identified for this route in relation to 'Severance, 'Pedestrian and Cyclist Amenity', and 'Pedestrian and Cyclist Delay'. Mitigation is proposed to offset these impacts and residual effects have been assessed as not significant with these measures in place.

13.2.2 The Site will be subject to the same mitigation and operational restrictions that are conditioned for IAMP ONE relating to traffic generation and as such, it is considered superfluous to reproduce the detailed assessments that supported the IAMP ONE planning application, either during construction or at the operational stage. Adverse effects are unlikely to occur.

13.2.3 This chapter includes a consideration of the baseline highway conditions, a review of the IAMP ONE Phase Two development and a summary of the previously reported, and still applicable, impacts on key receptors. A number of mitigation measures are identified to offset any significant impacts.

Supporting documents

13.2.4 This chapter is underpinned by the Transport Statement (TS) included in Appendix 13.1 and which contains the access strategy, trip generation, distribution of traffic and highway operational assessments.

Study area

13.2.5 The study area replicates the extent of the highway network previously considered for IAMP ONE, which was determined based on the most probable routes for development traffic.

The study area is shown in Figure 13.1, which also includes the link[1] labels which are referenced within this chapter.

Figure 13.1: Study Area (including link labels)

[1] A section of road between two junctions

13.3 Methodology

Introduction

13.3.1 The impact of the proposed development has been assessed with reference to The Institute of Environmental Management and Assessment (IEMA) guidelines ("Guidelines for the Environmental Assessment of Road Traffic" [GEART]), which sets out a methodology for assessing potentially significant environmental effects due to changes in traffic flows.

13.3.2 The significance of each effect is considered against the GEART criteria, where possible. In the absence of established significance criteria for traffic and transport effects, professional judgement has been used to assess whether the effects on access and transport are significant. The degree of significance falls into two categories – not significant and significant.

Traffic Flows

13.3.3 Traffic flow data from the IAMP ONE TS and 2018 ES have again been used to inform this assessment. The baseline traffic data was obtained in 2018 and whilst traffic flow conditions on the network may have changed since surveys were undertaken (i.e. Testo's junction works are ongoing and Nissan shift times have changed), the forecast traffic generation of the proposed development remains unchanged from those considered, and accepted, for the consented IAMP ONE.

Identifying Sensitive Receptors

13.3.4 Using the IAMP ONE ES assessments, **Table 13.1: Link sensitive receptors descriptionTable 13.1** shows the parameters used for determining the link sensitivity rating. **Table 13.2** shows the sensitivity rating and respective justification for each link.

Table 13.1: Link sensitive receptors description

Link sensitivity Rating	Description
Low	Few nearby sensitive receptors/or highways can accommodate changes in the volume of traffic.
Medium	Small number of sensitive receptors (e.g. residential communities, nearby pedestrians etc.) and limited separation from traffic provided by the highway environment.
High	High number of sensitive receptors (e.g. hospitals, schools, large pedestrian footfall etc.) and limited separation from traffic provided by the highway environment.

Table 13.2: Link sensitivity			
Link	**Description**	**Rating**	**Link Sensitivity Rationale**
1	A184 (east of Testos roundabout)	Medium	A modern main road with no frontage development, to accommodate a high volume of traffic. Footways but with limited pedestrian footfall.
2	A184 (west of Testos roundabout)	Medium	A modern main road with limited frontage development and a limited pedestrian footfall.
3	A19 (Testos roundabout to Downhill Lane)	Low	A modern main road with no frontage development designed to accommodate a high volume of traffic.
4	Downhill Lane	Low	A modern main road with no frontage development designed to accommodate a high volume of traffic.
5	Washington Road	High	A modern main road. Parts of the link have development frontage and will experience pedestrian footfall. A primary care centre is within 200 metres.
6	A19 (south of Downhill Lane to south of A1231/A19 roundabout)	Low	A modern main road with no frontage development designed to accommodate a high volume of traffic.
7	A1231 (east of Wessington Way/ A19 roundabout)	Low	A modern main road with no frontage development designed to accommodate a high volume of traffic.
8	A1231 (west of Wessington Way/ 19 roundabout to Nissan Way/ Pattinson Road/A1231 roundabout)	Low	A modern main road with no frontage development designed to accommodate a high volume of traffic.
9	Nissan Way	Medium	Modern road with access to Nissan and other large employers. Subject to a high number of pedestrians and vehicles.
10	A1231 (west of Nissan Way/ Pattinson Road/A1231 roundabout to Barmston Way/ A1231 junction)	Low	A modern main road with no frontage development designed to accommodate a high volume of traffic.
11	A1231 (west of A195/A1231 roundabout)	High	A modern main road with no frontage development designed to accommodate a high volume of traffic. However, Washington School is nearby.
12	A195 (north of A195/A1231 roundabout to A1290/A195 roundabout)	Low	A modern main road with no frontage development designed to accommodate a high volume of traffic.
13	A195 (north of A1290/A195 roundabout)	Low	A modern main road with no frontage development designed to accommodate a high volume of traffic.

Table 13.2: Link sensitivity			
Link	**Description**	**Rating**	**Link Sensitivity Rationale**
14	A1290 Glover Road to Sulgrave Road	High	A main road that is fronted by some residential properties, a school and a fire station.
15	Cherry Blossom Way	High	Main access to key employment sites and is subject to a high number of pedestrians and vehicles.
16	A1290 (Sulgrave Road to Cherry Blossom Way)	High	A main road with the Elm Tree Garden Nursery and Tearoom located at its western end.
17	A1290 (Cherry Blossom Way to Nissan entrance)	High	Main access to Nissan and is subject to a high number of pedestrians and vehicles. The residential property of West Moor Farm is also located on this link
18	A1290 (east of Nissan Entrance to Downhill)	Low	A modern main road with no frontage development designed to accommodate a high volume of traffic.

Screening

13.3.5 GEART suggests that, to determine the scale and extent of the assessment and to calculate the level of effect which any given development will have on the surrounding road network, the following two 'rules' should be followed:

Rule 1) Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%); and

Rule 2) Include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

13.3.6 For this assessment, Rule 1 was applied to all low and medium sensitivity links and Rule 2 to high sensitivity links. Changes in traffic flows below these thresholds result in no significant environmental effects and therefore have not been assessed further.

13.3.7 The screening results are shown in Table 13.3.

Table 13.3: Screening Results	
Phase	**Screening Result**
Construction	Rules 1 and 2 were applied and this identified that Links 17 and 18 are above the screening thresholds. These links were therefore considered further as part of the assessment of impact during construction.
Operation	Rules 1 and 2 were applied and this identified that Links 14, 15, 16, 17 and 18 are above the screening thresholds. These links were therefore considered further as part of the assessment of impact during operation.

Assessment of Environmental Impacts

13.3.8 GEART forms the basis for the assessment of environmental impacts used in this assessment. These impacts are:

- severance;
- driver stress and delay;
- pedestrian amenity and delay;
- cyclist amenity and delay;
- fear and intimidation; and
- highway safety.

13.3.9 Each environmental impact has a series of thresholds that indicate the magnitude of the effect of a development, based on IEMA guidelines (see **Table 13.4**). These thresholds indicate the magnitude of effect; however, observations and professional judgement will also influence the final assessment.

Table 13.4: Traffic and Transport Assessment Framework

Environmental Impact	Magnitude of Effect			
	Very low	**Low**	**Medium**	**High**
Severance	Change in traffic volume of less than 30%	Change in traffic flows of 30-60%	Change in traffic flows of 60-90%	Change in traffic flows of over 90%
Driver stress and delay	Capacity, vehicle delay and queue lengths forecast from the junction modelling software will be used to determine driver stress and delay.			
Pedestrian and cyclist amenity	Changes in traffic flow (or HGV component) less than 100%	Greater than 100% increase in traffic (or HGV component) and a review of vehicle speed and pedestrian or cyclist demand.		
Pedestrian and cyclist delay	A review of existing crossing facilities and demand.			
Fear and intimidation	Average traffic flows over 18 hours of less than 600 vehicle/hour or 1,000 HGVs over 18 hours.		Average traffic flows over 18 hours of between 600 and 1,200 vehicle/hour or 1,000 – 2,000 HGVs over 18 hours.	Average traffic flows over 18 hours of more than 1,200 vehicle/hour or more than 2,000 HGVs over 18 hours.
Highway safety	Analysis of personal injury collision records to identify clusters or trends			

Impact Significance

13.3.10 Determining whether an impact is 'significant' is done by comparing the degree to which the receptor would be affected (i.e. the magnitude of effect) and the sensitivity of the receptor. The impact significance is assessed as major, moderate, minor or

negligible. The impact significance assessment matrix is shown in Table 13.5 and described in Table 13.6.

13.3.11 Major and moderate impacts are deemed to be significant. Minor effects may cumulatively create significant effect and will therefore also be considered further.

Table 13.5: Impact Significance Assessment Matrix

		Magnitude of Effect			
		High	**Medium**	**Low**	**Very low**
RECEPTOR SENSITIVITY	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible

Table 13.6: Impact Significance Category Descriptions

Category	Description
Major	These beneficial or adverse effects are very important considerations and are likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a resource or receptor.
Minor	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project.
Negligible	No effects, or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

(DMRB, Volume 11 Environmental Assessment)

Assumptions and Limitations

13.3.12 This assessment is based on assumptions regarding future capacity and network performance with and without the proposed IAMP ONE Phase Two development. As there will be no changes to the forecast traffic generation considered for IAMP ONE, assessments are not replicated – details pertaining to traffic flows, trip generation and distribution for example, are set out in the IAMP ONE ES and TA.

13.4 Legislation and policy context

Introduction

13.4.1 This section sets out relevant planning policies and guidelines, providing an overall transport-related spatial and planning context for the IAMP ONE Phase Two development proposal.

National Planning Policy Framework

13.4.2 The National Planning Policy Framework (NPPF) provides a framework for local communities and local authorities to develop relevant local development plans and strategies.

13.4.3 The NPPF has two key themes:

- Providing a greater level of integration and simplification of the planning policies governing new development nationally; and
- Contribute to the achievement of sustainable development from an economic, social and environmental perspective.

13.4.4 One of the key changes relating to the NPPF is the presumption in favour of sustainable development, which should be reflected in local development plans and frameworks to ensure that sustainable development and the needs of an area are identified and subsequently approved without delay.

13.4.5 Transport-specific policies play a key role in supporting and achieving the core planning principles and are intrinsically linked to the objective of sustainable development. The NPPF specifically states that development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.

Planning Practice Guidance (2014)

13.4.6 The Planning Practice Guidance (PPG) provides advice on when Transport Assessments and Transport Statements are required.

13.4.7 The PPG outlines that Travel Plans, Transport Assessments and Transport Statements support national planning policy, which sets out that planning should actively manage patterns of growth to make the fullest possible use of public transport, walking and cycling, and focus significant development in locations which are sustainable, or can be made sustainable, and can positively contribute to:

- Encouraging sustainable travel;
- Lessening traffic generation and its detrimental impacts;
- Reducing carbon emissions and climate impacts;
- Creating accessible, connected, inclusive communities;
- Improving health outcomes and quality of life;
- Improving road safety; and

- Reducing the need for new development to increase existing road capacity or provide new roads.

Transport White Paper 'Creating Growth, Cutting Carbon - Making Sustainable Local Transport Happen' (January 2011)

13.4.8 The Government's vision for a sustainable local transport system is set out in this White Paper, which acknowledges that transport provision is essential for economic growth. The Paper also recognises, however, that the current levels of carbon emissions from transport cannot be sustained if the nation is to meet its national commitments on climate change, as well as creating a safer and cleaner environment in which to live. The Government highlights sustainable transport solutions as a means by which the economy can grow, which will also see a positive impact on the local environment.

13.4.9 Whilst the Paper outlines the funding options which will be available for sustainable transport schemes, it also recognises that investment alone will not be enough and that help needs to be given to people to ensure that the transport choices they make are good for society. The Paper recognises that it is at the local level where most can be done to encourage sustainable transport modes and implement sustainable transport schemes. Solutions should be developed for the places they serve, tailored for the specific needs and behaviour patterns of individual communities.

13.4.10 Within the Paper, sustainable transport considers more than just public transport, walking and cycling schemes, and acknowledges that it is not feasible for some trips to be undertaken by these modes. There is therefore a realisation that the car will continue to be an important mode of transport and a focus should be given to making car travel greener through electric and other low emission vehicles.

North East Combined Authority Transport Manifesto (2016)

13.4.11 The North East Combined Authority (NECA) Transport Manifesto – "Our Journey" – feeds into the emerging Local Transport Plan for the NECA and sets out how the NECA intends to deliver on its ambition *"to provide affordable, attractive, reliable, safe, healthy transport choices for businesses, residents and visitors while enhancing the environment".*

13.4.12 The NECA vision in the North East is for transport to be:

1) **Accessible**: It should run as near as possible to where people live and want to travel to, and where businesses are (or want to be) located. It should be usable by everyone.
2) **Affordable:** As far as possible, transport should be provided at a reasonable cost relative to the journey being undertaken.
3) **Reliable:** The transport network should be one that we can rely on to work, with buses and trains running on time and congestion at a minimum.
4) **Easy to use:** It should be easy to plan safe journeys, find out the best way to travel, pay for tickets and get all the essential information for your journey.
5) **Safe:** The transport network should be, and be seen to be, safe, with regards to both road safety and crime, and fear of crime on public transport. Vulnerable users should be given greater protection than they currently are.
6) **Sustainable:** The attractiveness of sustainable modes of transport should be improved. Transport should not have an adverse impact on the environment.
7) **Integrated:** The transport network should be connected so that people can switch easily between modes, and timings and methods of payment complement each other.

Local Transport Plan (LTP3) for Tyne and Wear (2011-2021)

13.4.13 The third Local Transport Plan (LTP3) for Tyne and Wear comprises a ten-year strategy (2011-2021) covering all forms of transport in Tyne and Wear. The LTP3 is underpinned by three-year delivery plans setting out how the strategy will be implemented at a local level.

13.4.14 The Plan has been produced by the Tyne and Wear Integrated Transport Authority on behalf of the six LTP Partners – the five local authorities in Tyne and Wear (Gateshead, Newcastle, North Tyneside, South Tyneside and Sunderland) plus Nexus, the local Passenger Transport Executive.

13.4.15 IAMP ONE Phase Two seeks to respond to the five goals of the transport strategy, which are:

- To support the economic development, regeneration and competitiveness of Tyne and Wear, improving the efficiency, reliability and integration of transport networks across all modes.

- To reduce carbon emissions produced by local transport movements, and to strengthen our networks against the effects of climate change and extreme weather events.
- To contribute to healthier and safer communities in Tyne and Wear, with higher levels of physical activity and personal security.
- To create a fairer Tyne and Wear, providing everyone with the opportunity to achieve their full potential and access a wide range of employment, training, facilities and services.
- To protect, preserve and enhance our natural and built environments, improving quality of life and creating high quality public places.

Sunderland City Council Core Strategy and Development Plan (2015-2033)

13.4.16 The Core Strategy and Development Plan was adopted in January 2020 and sets out the long-term plan for development across the city to 2033. It will ensure that the right type of development is focused in the right places to meet the needs for local people and businesses.

13.4.17 The Core Strategy and Development Plan includes development policies and site allocations, land use designations and development management policies

13.4.18 The Sunderland City Council Core Strategy and Development Plan states at para. 2.55 that:

"Advanced manufacturing and particularly the automotive sector are a key part of the local economy, centred around the Nissan plant, which produces more than 500,000 vehicles a year and supports a thriving supply chain extending along the A19 and A1 corridors. The sector employs 30,000 people regionally. To support the continued growth of this sector, the IAMP will be developed on land to the north of the existing Nissan plant. It is anticipated that the IAMP would create approximately 7,850 new jobs and would be a significant driver for the regional economy and the automotive sector within the UK."

13.4.19 **Policy SP10 Connectivity and transport network**: this policy notes that the council will work with its partners and use developer contributions in order to deliver a range of new highway schemes and initiatives. At point 1 iv, this includes "*improvements to the mainline and key junctions on the A19, including providing access to IAMP*."

13.4.20 **Policy ST3 Development and transport:** this policy requires that development should:

1. provide safe and convenient access for all road users, in a way which would not

   i. compromise the free flow of traffic on the public highway, pedestrians or any other transport mode, including public transport and cycling; or

   ii. exacerbate traffic congestion on the existing highway network or increase the risk of accidents or endanger the safety of road users including pedestrians, cyclists and other vulnerable road users;

2. incorporate pedestrian and cycle routes within and through the site, linking to the wider sustainable transport network.
3. submit an appropriate Transport Assessment / Transport Statement and a Travel Plan. This must demonstrate that appropriate mitigation measures can be delivered to ensure that there is no detrimental impact to the existing highway;
4. include a level of vehicle parking and cycle storage for residential and non-residential development, in accordance with the council's parking standards;
5. provide an appropriate level of electric vehicle parking and charging infrastructure for commercial and non-residential development to suit site specific requirements, and make provision for the installation of home charging apparatus on major residential schemes; and
6. safeguard the existing network of Definitive Public Rights of Way. If this cannot be accommodated, then a diversion and/or alternative route shall be provided.

International Advanced Manufacturing Park Area Action Plan

13.4.21 The IAMP Area Action Plan (AAP) is the adopted policy document to guide the comprehensive development of the DCO Site. The AAP was prepared jointly by Sunderland City Council and South Tyneside Council, in support of the Sunderland City Deal (in partnership with South Tyneside), and was adopted on 30 November 2017. The IAMP AAP is a plan for the next 15 years (covering the period 2017 to 2032).

13.4.22 Within the IAMP AAP, the following policies are applicable to Infrastructure, Transport and Access:

7. Policy S1(4)(iv): Spatial Strategy for Comprehensive Development - requires Masterplans, Design Codes and Phasing Plans to be submitted, demonstrating how development will contribute fully, in a proportionate and timely manner, towards providing the infrastructure.

8. Policy S4(A)(vii): The Hub and Ancillary Uses – a multi-modal transport interchange accommodating public transport, cycling and pedestrian access.
9. Policy D1(A)(i)(ii): Public Realm – a public realm strategy is required to mark key gateways into the site and a comprehensive, wayfinding strategy for cyclists and pedestrians.
10. Policy T1: Highway Infrastructure – a public realm strategy is required to accompany the development proposals along with a supported Transport Assessment to assess highway improvements.
11. Policy T2: Walking, Cycling and Horse Riding – the development must promote walking, cycling and horse riding by design and connecting to the surrounding network.
12. Policy T3: Public Transport – the development must promote sustainable transport by enhancing the existing provisions and consider new improvements as appropriate.
13. Policy T4: Parking – the development must ensure that appropriate provision for car parking is provided in accordance with the Councils' standards.
14. Policy Del2: Securing Mitigation – outlines that mitigation required will be secured through articles and requirements within a DCO, planning conditions or planning obligations. Developer contributions will be sought to mitigate the impact of IAMP, where necessary.

Road Investment Strategy: 2015 to 2020

13.4.23 These documents set out a long-term approach to improve England's motorways and major roads. The first 'Road Investment Strategy' (RIS 1) outlines a long-term programme for motorway and major roads with the funding needed to plan ahead.

13.4.24 The RIS 1 comprises:

- a long-term vision for England's motorways and major roads, outlining how we will create smooth, smart and sustainable roads;
- a multi-year investment plan that will be used to improve the network and create better roads for users; and
- high-level objectives for the first roads period 2015 to 2020.

13.4.25 Included within the Road Investment Strategy are improvement measures at the A19 Testo's junction and A19 Downhill Lane junction. These schemes are considered nationally significant infrastructure projects (NSIP).

13.5 Baseline conditions

Introduction

13.5.1 Characteristics of the existing environment were informed by the IAMP ONE ES and TS, which used the following sources:

- traffic count data;
- desktop studies and site visits; and
- personal injury collision (PIA) data, from Tyne and Wear Traffic and Accident Data Unit (TADU).

Surrounding Highway Network

13.5.2 Only links which met the screening threshold are reviewed further as part of this assessment, these are:

- Links 17 and 18 (Construction and decommissioning phase assessments); and
- Links 14, 15, 16, 17 and 18 (Operation phase assessment).

13.5.3 The location of these links is shown in ch are referenced within this chapter.

13.5.4 **Figure 13.1** (above) and described as follows.

<u>Link 14: A1290 Glover Road to Sulgrave Road</u>

13.5.5 Glover Road runs in an east-west direction and includes four conventional roundabouts and two priority junctions. It is a single carriageway road which sometimes flares to two lanes on the approach to roundabouts. Most of the road is subject to a 30mph speed limit, except a short section near Vermont roundabout when a derestricted speed limit applies. A shared use footway is available to the northern edge. The footway is set back considerably from the road and has signposts that indicate use by both pedestrians and cyclists. Street lighting is present along Glover Road.

<u>Link 15: Cherry Blossom Way</u>

13.5.6 Cherry Blossom Way connects Nissan Way to commercial units and car parking adjacent to Nissan. It is a single carriageway road subject to 40mph speed limits. Parking is prohibited with trief kerbs and double yellow lines used to enforce this

prohibition. Access to units or car parks along Cherry Blossom Way is via priority junctions. A conventional roundabout is also situated on Cherry Blossom Way. Footways and street lighting are present on both sides of the road. One footway has signage that indicates shared use for cyclists and pedestrians. Cherry Blossom Way forms part of a bus route and bus stops are present on both sides of the road.

Link 16: A1290 to Cherry Blossom Way

13.5.7 The A1290 runs in an east-west direction. This link has several junctions that lead to nearby commercial properties. The road is single carriageway and is subject to a national speed limit. A shared use footway is available to the northern edge of the carriageway with street lighting present.

Link 17: A1290 Cherry Blossom Way to Nissan entrance

13.5.8 Link 17 is a continuation of Link 16. A T-junction provides access to Nissan entrance from the A1290. The junction is signalised for right turns from the Nissan plant and for eastbound traffic on the A1290. Vehicles turning into the Nissan plant from the off-side lane of the A1290 east are required to give way, as are vehicles travelling west from the Nissan plant. The Nissan plant access has two lanes for journeys into the Nissan plant and three lanes for vehicles leaving. A footway is present on the western side of the road, which has street lighting.

Link 18: A1290 east of Nissan site entrance to A19 Downhill Lane junction

13.5.9 Link 18 is a continuation of Link 17. The road is single carriageway and is subject to a derestricted speed limit. No footways are present.

Sustainable Transport

Walking and Cycling

13.5.10 There is generally a good network of footways near the proposed IAMP ONE Phase Two Site, which offer a choice of suitable routes to nearby bus stops, car parking or alternative destinations. External pedestrian routes in the vicinity of the Site are well lit and generally in good condition.

13.5.11 Cycling has the potential to cater for many trips and is considered a viable mode of travel for journeys less than five kilometres. The potential for cycling trips is significant as a 30-minute journey from the Site covers north-west Sunderland, Washington, Wardley, Hedworth and Boldon.

13.5.12 Near the Nissan Access junction on the A1290, there is a controlled pedestrian crossing facility, which includes a central refuge island, dropped kerbs and tactile paving. There is also a pedestrian guardrail on the A1290 near the bus stops.

13.5.13 Pedestrians can travel along Washington Road to access a footbridge over the A19(T). This route links to the residential area of Town End Farm.

13.5.14 New pedestrian links and footways are to be provided within the consented IAMP ONE development. These include the creation of a Non-Motorised User (NMU) route along the section of Follingsby Lane within the Site, which will be introduced by virtue of a prohibition of motor vehicles along this route, allowing walkers, cyclists and horse riders to pass through without conflict with motor vehicles.

Equestrian

13.5.15 Formal equestrian routes in the vicinity of the Site are limited; however, it is acknowledged that horses are kept on land at North Moor Farm.

13.5.16 The majority of bridleways, byways and restricted byways in the Tyne and Wear area are linear, limiting the opportunity for horse riding as a leisure pursuit. However, it should be noted that looking at rights of way in isolation understates the equestrian access resource. It may be possible to link up public rights of way using minor roads and other access resources.

Bus

13.5.17 The bus is considered a viable mode of travel over short and medium distances, although some routes and services with limited stops can make longer distances viable. Bus travel plays an important part of the access to the Site.

13.5.18 Bus services are located on the A1290, within 300m of the proposed Site entrances. Both bus stop pairs have regular services operating in both directions, providing access to Chester-Le-Street, South Shields, Sunderland, Durham, Gateshead and Newcastle.

13.5.19 The potential for public transport trips is significant as a 30-minute journey from the Site covers north Sunderland, Washington, parts of Pelaw, parts of Hebburn, South Shields, Southwick and Castletown.

Highways Safety

13.5.20 A prior review of the TADU PIA data for this study area was undertaken for the IAMP ONE site. Overall, there were 126 collisions between August 2013 and August 2018.

Most collisions (103) were slight, with 22 classified as serious and one collision resulted in a fatality.

13.5.21 The collision data was explored further to determine if any correlations imply that there is a highway safety concern which could be worsened by the proposed development. Following this review, it was considered that all collisions were due to factors involving driver error.

13.6 Assessment of impacts during construction

Construction Traffic

13.6.1 IAMP ONE Phase One is currently being constructed on site, with three buildings substantially complete and highway and drainage infrastructure due to be completed by May 2020. Therefore, only construction activities associated with the development of the remaining plots are expected, including earthworks and building structures.

Mitigation

13.6.2 The following mitigation measures are considered in relation to impacts during construction:

- Construction Traffic Management Plan which includes measures relating to:
  - The management and scheduling of deliveries;
  - Timetable of construction implementation;
  - Restrictions regarding working hours; and
  - The routes for freight access to the site.

Assessment of environmental impacts (construction)

13.6.3 Given the IAMP ONE 2018 ES assumed robust assessments when considering the potential overlap of construction activities and all impact ratings were reported as minor adverse or negligible, it can be summarised that no significant adverse effects are predicted during the construction of IAMP ONE Phase Two.

13.7 Assessment of impacts during operation

Mitigation

13.7.1 The following mitigation measures should be considered in relation to the traffic forecasts and impacts set out in this chapter:

- Framework Travel Plan to reduce the number of employees commuting by single occupancy car. This includes measures relating to:

  - encouraging walking, cycling and public transport;
  - encouraging greener car travel (car sharing/ultra-low emissions vehicles/car clubs);
  - encouraging smart business travel; and
  - minimising the need for travel by sourcing locally.
- Framework Service and Delivery Strategy to ensure freight movements are carefully managed. This includes measures relating to:
  - encouraging sustainable freight;
  - sourcing products and service locally (where possible); and
  - restricting delivery times during shift change over periods.
- Localised widening of the western side of the A1290, along the section north of the proposed new northern IAMP ONE site access junction. These widening works will facilitate the extension of the two southbound lanes and create additional capacity on the A1290 for southbound movement.
- Offset of Operational Shift Patterns. For a temporary period, until improvement works to the A19 at Testo's and Downhill Lane are completed, the end users of IAMP ONE Phase One and Phase Two will be required to operate a shift pattern that is offset by one hour from those used at Nissan in the morning and afternoon periods. The Highways Operational Management Plan (HOMP) provides more detail on this, but for the purposes of this assessment, the following IAMP ONE Phase Two shift patterns have been assumed:
  - Day Shift: 06:00 - 14:35hrs.
  - Back Shift: 14:30 - 22:05hrs.
  - Night Shift: 22:00 - 06:05hrs.

Assessment of environmental impacts (operation)

13.7.2 As outlined previously, the inclusion of the Phase Two development will not generate any increase in traffic; the total area of developed units on IAMP ONE (including Phase One and Phase Two) will not exceed the consented amount as permitted for the IAMP ONE (Phase One) application.

13.7.3 This section summarises the operational assessments and results, as reported in the IAMP ONE ES (2018). Only the links identified in the screening results Table 13.3 are reported.

Severance

13.7.4 The worst-case peak magnitude of effect in relation to the assessment of environmental impact for severance for Links 14, 15, 16, 17 and 18 is as follows:

- Link 14: Low as change in traffic volume is between 30% and 60%, resulting in a moderate adverse impact that may be significant.
- Link 15: Very low as change in traffic volume is less than 30%, resulting in a minor adverse impact (not significant).
- Link 16: Medium as change in traffic volume is between 60% and 90%, resulting in a **major adverse impact (significant)**.
- Link 17: High as change in traffic volume is greater than 90%, resulting in a **major adverse impact (significant)**.
- Link 18: Low as change in traffic volume is between 30% and 60%, resulting in a negligible adverse impact (not significant).

13.7.5 As Links 16 and 17 are not important links for residents for accessing facilities and services within the community, they were re-categorised as low magnitude of effect, leading to a moderate adverse impact and may therefore be significant.

Driver Stress and Delay

13.7.6 Junction capacity assessments for the peak periods were undertaken as part of the IAMP ONE 2018 planning application.

13.7.7 The results for all junctions was that the magnitude of effect is assessed as very low on a high value receptor, resulting in a minor adverse impact (not significant).

Pedestrian and Cyclist Amenity

13.7.8 Links 14, 15, 16 and 18 experience traffic flows below GEART thresholds (100% increases in traffic or HGVs) for all periods. Therefore, the magnitude of effect assessed is very low on a high value receptor, resulting in a minor adverse impact (not significant).

13.7.9 Link 17 would experience increases in traffic flows above the GEART threshold of 100% increase in traffic (or HGVs) for 05:30-06:30hrs and 13:30-14:30hrs. This link was given a high sensitivity due to the proximity of the Nissan site access. Along this link is a traffic free route for use by cyclists and pedestrians; however, given the high percentage of additional HGVs (particularly during 13:30-14:30hrs), a low magnitude

of effect on a high value receptor results in a moderate adverse impact and may therefore be significant.

Pedestrian and Cyclist Delay

13.7.10 Link 14 includes four conventional roundabouts and two priority junctions. A shared use footway is available to the northern edge of this link. The footway is set back considerably from the road and is a shared use facility by both pedestrians and cyclists. Street lighting is present along Glover Road. Crossing would only occur at connecting roads. Crossing refuge islands are available at roundabouts on Glover Road. It is expected that the delay for pedestrians and cyclists at this link will be very low on a high value receptor; resulting in a minor adverse impact (not significant).

13.7.11 Link 15 connects Cherry Blossom Way to Nissan Way to commercial units and car parking adjacent to Nissan. It is a single carriageway road subject to 40mph speed limits. Access to units or car parks along Cherry Blossom Way is via priority junctions. A roundabout is also situated on Cherry Blossom Way. Footways and street lighting are present on both sides of the road. Given the availability of footways available and an unlikely need for pedestrians to cross this road (unless at the A1290 junction), it is expected that the delay for pedestrians and cyclists on this link will be very low on a high value receptor, resulting in a minor adverse impact (not significant).

13.7.12 Link 16 has a shared use footway to the northern edge of the carriageway and street lighting is present. There is no crossing facility from Cherry Blossom Way to the footway on the northern edge of A1290. Due to the lack of crossing facility, it is expected that the delay for pedestrians and cyclists on this link will be low on a high value receptor, resulting in a moderate adverse impact and may therefore be significant.

13.7.13 Link 17 is a continuation of Link 16. A signalised junction provides access to the Nissan from the A1290 and a footway is present on the southern side of the road, which has street lighting. A new proposed site access for the IAMP ONE Site will connect to this link. It is expected that the delay for pedestrians and cyclists at this link will be very low, given the availability of signalised crossing points. A very low magnitude effect on a high value receptor results in a minor adverse impact (not significant).

13.7.14 Link 18 is a continuation of Link 17. Again, the road is a single carriageway and is subject to the national speed limit. No footways are present. It is expected that the delay for pedestrians and cyclists on this link will be very low, given that there are

currently no footways present. A very low magnitude effect on a high value receptor results in a minor adverse impact (not significant).

Fear and intimidation

13.7.15 The effects of fear and intimidation on Links 14 and 16 is very low on high sensitivity receptors. This results in a minor adverse impact (not significant).

13.7.16 Links 15 and 18 have a medium magnitude of impact - for Link 15 this results in a major adverse impact (based on a high value sensitivity link) and Link 18 results in a minor adverse impact (not significant).

13.7.17 Link 17 has a high magnitude of effect for fear and intimidation on a high sensitivity receptor - this results in a **major (significant) adverse impact**. It should however be noted that a key factor in the determination of fear and intimidation is the proximity to people or the lack of protection caused by such factors as narrow pavement widths. Given the location of this link, it is unlikely that notable pedestrian movement will be present and as such, the reported 'major adverse impact' is considered an unfair representation of the conditions on this link.

Highway Safety

13.7.18 A summary of the impact on highway safety is as follows:

- Cluster 1: A19/Downhill Lane (Link 3). This link is screened out of the assessment; therefore, the impact is assessed as very low on a high value receptor, resulting in a minor adverse impact (not significant).
- Cluster 2: A19/Ferryboat Lane (Link 5). This link is screened out of the assessment; therefore, the impact is assessed as very low on a high value receptor, resulting in a minor adverse impact (not significant).
  Cluster 3: A1231/Nissan Way (Links 8, 9 and 10). These links are screened out of the assessment; therefore, the impact is assessed as very low on a high value receptor, resulting in a minor adverse impact (not significant).
- Cluster 4: A1231/A195 (Links 10, 11 and 12). These links are screened out of the assessment; therefore, the impact is assessed as very low on a high value receptor, resulting in a minor adverse impact (not significant).

Operational Impact Summary

13.7.19 A major adverse effect was identified in the 2018 ES during the operational phase in relation to 'Fear and Intimidation' along the A1290 due to the increase in HGV

movements. Moderate adverse effects were also identified for this route in relation to 'Severance', 'Pedestrian and Cyclist Amenity', and 'Pedestrian and Cyclist Delay'. Mitigation is proposed to offset these impacts and the residual effects have been assessed as not significant with these measures in place.

13.8 Cumulative effects

13.8.1 Several environmental topics base all or part of their impact assessment on information about the quantity of traffic on the road network in the wider area surrounding the Site, its distribution, speed and movement.

13.8.2 This information was derived from a traffic model that has built into it, in accordance with standard guidelines, assumptions about traffic growth over time so the future operational traffic forecasts take into account proposed developments and infrastructure projects in the surrounding area. This means that cumulative effects in relation to traffic are already built into these assessments and do not need to be considered further in this chapter.

13.9 Summary

13.9.1 This chapter has considered the potential access and transport impacts of the proposed IAMP ONE Phase Two development within the identified study area as shown on Figure 13.1 (above), during the construction and operation phases.

13.9.2 Mitigation measures have been identified for IAMP ONE Phase Two. Importantly, the IAMP ONE Phase Two development will not generate any additional traffic, due to the constraint on floor space being limited to that consented previously for IAMP ONE (Phase One).

13.9.3 The mitigation measures for IAMP ONE Phase One will be equally applicable for Phase Two (i.e. provision of facilities for cyclists, pedestrians and bus travel, other sustainable transport measures, compliance with the HOMP and the development of a Construction Traffic Management Plan, for example). With these measures in place, it is anticipated that any residual effects on access and transport will not be significant.

13.9.4 The negative effects associated with the construction phase are temporary and, during its operational phase, the mitigation measures will reduce the impact on the transport environment.

13.9.5 Overall, the mitigation measures outlined above have the potential to enable IAMP ONE Phase Two to be built in a positive way. In addition, the Travel Plan, managed by

the Travel Plan Coordinator, will increase community participation in further meeting the travel demands of the development, once operational. Indeed, the Travel Plan is one of the primary mitigation measures.

13.9.6 A summary of the potential impacts for the traffic effects is presented in Table 13.7.

Table 13.7: Summary of Predicted Impacts on Access and Transport

Impact Description	Key Mitigation Measures	Maximum Residual Impact
Construction		
Severance	Construction Traffic Management Plan	Minor adverse
Driver stress and delay	Construction Traffic Management Plan	Minor adverse
Pedestrian and cyclist amenity	Construction Traffic Management Plan	Minor adverse
Pedestrian and cyclist delay	Construction Traffic Management Plan	Minor adverse
Fear and intimidation	Construction Traffic Management Plan	Minor adverse
Highway Safety	Construction Traffic Management Plan	Minor adverse
Operation		
Severance	New pedestrian and cyclist crossing provisions and enhanced infrastructure. Framework Service and Delivery Strategy.	Moderate adverse
Driver stress and delay	Management of operational shift patterns Travel Plan implementation. Highway widening works on A1290. Framework Service and Delivery Strategy.	Minor adverse
Pedestrian and cyclist amenity	New/improved footways and links.	Moderate adverse
Pedestrian and cyclist delay	New pedestrian and cyclist crossing provisions and enhanced infrastructure. New/improved footways and links. Framework Service and Delivery Strategy.	Moderate adverse
Fear and intimidation	Enhanced environmental streetscape. Management of operational shift patterns. Travel Plan implementation. Framework Service and Delivery Strategy.	Major adverse
Highway Safety	Management of operational shift patterns. Highway improvement measures Travel Plan implementation. Framework Service and Delivery Strategy.	Minor adverse

13.10 Abbreviations and Definitions

AADT	Average Annual Daily Total
AAP	Area Action Plan
ATC	Automatic Traffic Count
CTMP	Construction Traffic Management Plan
DMRB	Design Manual for Roads and Bridges
DoS	Degree of Saturation
ES	Environmental Statement
FTP	Framework Travel Plan
GEART	Guidelines for the Environmental Assessment of Road Traffic
HGV	Heavy Goods Vehicle
IAMP	International Advanced Manufacturing Park
IEMA	Institute of Environmental Management and Assessment
LGV	Light Goods Vehicle
MMQ	Mean Maximum Queue
NECA	North East Combined Authority
NPPF	National Planning Policy Framework
NSIP	Nationally Significant Infrastructure Project
NTM	National Transport Model
PCU	Passenger Car Units
PIA	Personal Injury Accident
PPG	Planning Practice Guidance
RFC	Ratio of Flow to Capacity
RIS	Regional Investment Strategy
SCC	Sunderland City Council
SRN	Strategic Road Network
STC	South Tyneside Council
TA	Transport Assessment
TADU	Traffic and Accident Data Unit

13.11 References

Department for Communities and Local Government. (2017). *National Planning Policy Framework.* London: Crown Copyright.

Department for Communities and Local Government. (2017). *Planning Practive Guidance*. Retrieved from Gov.uk: https://www.gov.uk/government/collections/planning-practice-guidance

Department for Transport. (2011). *Creating Growth, Cutting Carbon Making Sustainable Local Transport Happen.* London: Crown copyright.

Highways England. (2012). Volume 11. *Design Manual for Road and Bridges (DMRB).*

Institute of Environmental Assessment. (1993). *Guidelines for the Environmental Assessment of Road Traffic.* Institute of Environmnetal Assessment.

North East Combined Authority. (2016). *Our Journey - A 20 year Transport Manifesto for the North East Combined Authority.* NECA.

South Tyneside Council. (2017). *International Advanced Manufacturing Park Area Action Plan 2017-2032.* South Tyneside Council, Sunderland City Council.

Sunderland City Council. (2017). *Core Strategy and Development Plan 2015 - 2033 (DRAFT).* Sunderland: SCC.

14 VULNERABILITY TO MAJOR ACCIDENTS AND DISASTERS

14.1 Background

16.1.1 The changes to the Environmental Impact Assessment Regulations introduced in 2017, established a requirement for EIA to include consideration of the potential significant effects that might arise as a result of the vulnerability of a proposed development to major accidents or disasters.

16.1.2 The EU Directive (2014/52/EU, point (7) of the introductory text) notes that the risks of accidents and disasters "*have become more important in policy making. They should therefore also constitute important elements in assessment and decision-making processes*."

16.1.3 This chapter therefore considers the scope for the proposed development to be at risk from major accidents and disasters, and whether the consequences of any such events would be significant.

14.1.1 Preceding chapters of this EIA Report have assessed construction and operational effects of the proposed development on the environment and people of the area (including, at chapters 7 and 6 (respectively), effects of construction noise, operational noise and construction air quality (dust)) and mitigation measures are proposed to reduce any identified effects. This information is not repeated here in any detail.

14.2 Sources of information

14.2.1 Sources of information to enable this assessment have comprised:

- Chapter N – Risks and Accidents – of the 2018 IAMP ONE ES; and
- authorship of chapters addressing vulnerability to major accidents and disasters, in other Environmental Statements / EIA Reports.

14.3 Consultation and scope of assessment

14.3.1 As part of the informal consultation with Sunderland City Council in 2019, consideration was given to the potential risk of accidents during construction and also that there could be a low risk of the presence of unexploded ordnance within the site (based on the findings of the IAMP ONE EIA).

14.3.2 It is anticipated that similar conclusions can be drawn in relation to this Site, and its vulnerability to major accidents and disasters, as have been identified for the IAMP ONE and IAMP TWO sites. As such, significant adverse effects in relation to this aspect

were considered unlikely to arise and it was proposed that this aspect not be considered in detail as part of the EIA, but that a short chapter would be prepared providing cross-references to the findings of the IAMP ONE and IAMP TWO EIAs for this topic.

14.3.3 Sunderland City Council, at a meeting on 15th November 2019, indicated that the above would be acceptable.

14.3.4 Two indicative masterplans have been prepared for the outline planning application; this assessment considers the layout included for the multiple unit development, as the worst-case option in this regard (on the basis that increased numbers of units within the site increases the potential risk of major accidents and disasters). Figure 3.1A refers.

14.4 Methodology

14.4.1 There is no set methodology for the assessment of the vulnerability of a proposed development to major accidents and disasters. A risk-based assessment can be used.

14.4.2 This assessment has considered the scope for the proposed development to be vulnerable to any existing, albeit low-likelihood, environmental hazards that would introduce (or increase) the risk of adverse effects on sensitive receptors (people and the environment).

14.4.3 Construction and operational effects are considered separately as the types of risks are different in each case.

14.5 Baseline environment

14.5.1 The baseline environment of the project area comprises the existing industrial development within the Nissan site and adjacent areas to the south of the A1290; the ongoing development of the IAMP ONE site; the development of the ELMA land within the Green Belt to the north-west of the Site; together with the small area of housing, public house and museum, to the east. Within the wider area are the residential and industrial areas on the eastern edges of Washington New Town and on the western edge of north Sunderland, and areas of agricultural land, to the north.

14.6 Impact assessment

During construction of the development units

14.6.1 As noted in the 2018 IAMP ONE ES, chapter N, at section N3.0, any vulnerability of construction phase activities to potential hazards that might result in major accidents

or disasters can expect to be controlled through the use of a Construction Environmental Management Plan (CEMP).

14.6.2 As noted above (para. 14.3.1), there is a low potential for the presence of unexploded ordnance (UXO) within the development plots. This needs to be considered as part of the CEMP for the Site.

14.6.3 In the absence of proposed mitigation, it is considered that the likelihood of any risk to construction from the presence of UXO is not significant.

During the operational phase of the development

14.6.4 The operational phase of the development will comprise the operation of the automotive and advanced manufacturing plant within the Site (and across the remainder of the IAMP development area).

14.6.5 The potential environmental or man-made hazards that might present a risk to the proposed development could include:

Natural hazards

- geophysical hazard, e.g. mine collapse;
- flooding;
- extremes of weather (high wind / heavy rain) damaging infrastructure and buildings;
- fires from lightning strikes damaging infrastructure and buildings;

Industrial hazards

- structural or mechanical failure from vehicle / plant collision or other human error;
- failure of storage tanks / bunds;
- leaks or spillage of fuel (e.g. diesel) from vehicles;
- fire resulting in damage to infrastructure and buildings, plus any secondary effects on air quality and human health from emissions to air; and
- catastrophic failure of plant or machinery resulting in damage to infrastructure or buildings.

14.6.6 Table N4 in the 2018 ES, chapter N sets out the assessment of the potential for adverse effects on the environment from the above hazards, and the aspects of the environment at risk from these occurring.

14.6.7 The chapter concluded that, where mitigation for and management of accidents and disasters falls outside the scope of primary controls (such as the use of CEMPs, Site Waste Management Plans, Surface Water Management Strategy), additional measures will be put in place at the detailed design stage, once the end use of a building is known. These measures should comprise:

- development of an Operational Management Plan, setting out the maintenance and monitoring regimes to be used at individual development units, in order to reduce the risk of hazards occurring; and
- the use of Emergency Response and Preparedness Plans, setting out the way each business will prepare for and respond to the hazards identified above (and any others), to minimise risks to the wider environment. Chapter N, section N6.0 identified that this could be secured as a planning condition.

14.6.8 A brief update on the likely effects from potential natural and industrial hazards, in relation to the IAMP ONE Phase Two site, is set out below.

Geophysical hazards

14.6.9 Chapter J of the 2018 IAMP ONE ES has ruled out the scope for mine-related accidents; section J4.4 notes that the IAMP area is at some distance from coal seams, shallow mine workings, surface mining, or mine entries are all at least 2km distance, though the Site is underlain by deep underground workings. Section J5.3 of this ES determined that the risk of sink holes resulting from underground mine collapse is very low. This aspect can therefore be ruled out of consideration as part of this assessment, therefore. Site investigation as part of any ongoing works, in addition to any SI carried out for a specific development plot would also be able to be used to inform the risk to development.

Flooding

14.6.10 A Flood Risk Assessment has been undertaken for the proposed development (see Appendix 10.1); this has concluded that with mitigation in place, the risk of flooding (whether fluvial, surface water, groundwater, or from sewers) ranges from low to very low. As such, the likelihood of flooding resulting in a major event at the Site can be considered to be very low.

Extremes of weather

14.6.11 Extremes of weather have the potential to result in environmental damage, including the potential for damage to containment or storage structures (for instance, from falling objects) resulting in the release of potential contaminants.

14.6.12 However, it is anticipated that buildings, site layouts and installations such as containment tanks and the like would be designed to withstand extreme weather events and to limit the risk of damage from external agencies. As such, the likelihood of such an event is very low.

Lightning strikes

14.6.13 Lightning strike has the potential to give rise to fire, or other damage to structures and infrastructure, including electrical systems. The likelihood of lightning strikes increases with increased temperatures. However, buildings and infrastructure can be protected so as to reduce the risk of damage (using BS EN 62305) in order to ensure electrical currents from lightning strikes are safely carried to earth.

14.6.14 Providing that such protection is installed at the buildings on site, the likelihood of damage from lightning strikes can be considered to be very low.

Structural or mechanical failures

14.6.15 It is unlikely to be feasible to entirely rule out the possibility of human errors and unforeseeable failures in mechanical systems occurring; however, the scope for these can be considerably limited through the use of work plans, method statements, risk assessments, regular maintenance and checking, and other good practices. As such, while the consequences of any such events could be considerable in terms of potential damage to the environment, the likelihood of these events, providing that these systems are in place, will be very low.

Failure of storage tanks / bunds

14.6.16 Any failure of storage tanks and bunds risks the release of contaminants into the environment. However, as above, provided that regular checks on these are carried out, the risk of such failures occurring can be reduced to very low to negligible.

Leaks / spillage of fuel

14.6.17 This could also result in the release of potential contaminants to the environment, either during refuelling or from poorly maintained vehicles. As with other aspects with the potential to harm the environment, use of method statements, risk assessments

and the provision of containment measures to control accidental spillages (whether during construction or operation) will limit the risk of such events occurring, to very low.

Fire – damaging buildings and resulting in emissions to air

14.6.18 Fire within industrial buildings may result from a range of factors, including human error, incorrect use of equipment or from machinery overheating. As with other aspects, providing that measures are in place to limit the risk of this (including regular maintenance, provision of fire extinguishers, and the like) then the likelihood of harm to the environment will be low.

Catastrophic failure of plant or machinery damaging structures and infrastructure

14.6.19 Catastrophic failures of any equipment should be preventable given good maintenance and checking regimes, and the use of risk assessments to understand how potential combinations of factors (such as plant failure combined with operator error or injury) could give rise to such events. Health checks of personnel, in addition to equipment checks, will ensure such combinations are unlikely to occur.

14.6.20 From the above, it can be seen that all likely hazards (natural and industrial) with the potential to result in harm to the environment can have their risk levels reduced to minimal with the implementation of plans and procedures addressing these. These would encompass regular maintenance of plant and equipment, development of and adherence to method statements, installation of protection systems (e.g. against fire, lightning strikes and so on) and the like.

14.6.21 The vulnerability of the proposed development, both during the construction stage and when operational, to major accidents and disasters, can therefore be considered to be very low.

14.7 Mitigation Measures

14.7.1 Mitigation measures to address potential adverse effects have been identified within the relevant chapters of this ES and are embedded into the design of the proposed development. This includes the development of a Construction Environmental Management Plan, Site Waste Management Plan, Surface Water Management Strategy and other such documents.

14.7.2 Once the buildings developed on the site are occupied, their ongoing operation would include measures to reduce and remove the risks of hazards to the environment,

including operational management plans and emergency response and preparedness plans.

14.7.3 As such, it is considered that these and the aspects noted above would be effective in addressing the potential risk from and vulnerability to major accidents and disasters and no further mitigation is required.

14.8 Residual Effects

14.8.1 With the mitigation measures as proposed above in place, no significant effects are anticipated.

14.9 Cumulative Effects

14.9.1 The assessment of the vulnerability of the project to major accidents and disasters has of itself considered the interaction between the different aspects of the environment and the proposed development. This concluded that the vulnerability of the project to this is low. Accordingly, no further assessment of intra-project effects is required.

14.9.2 In considering the potential for the project, in combination with the development of the wider IAMP site (IAMP ONE and IAMP TWO), to give rise to an increased risk of major accidents and disasters, it is assumed that the findings of the 2018 ES (Chapter N) for the IAMP ONE area will be applicable to the IAMP TWO area. As noted above, the potential for UXO within the development area is considered to be low and would be considered within the CEMP developed for the construction works on site. The IAMP ONE 2018 ES (Table N4) identified the potential for up to moderate effects on the vulnerability of the development to both natural and industrial hazards. However, these hazards would be addressed through the preparation of operational management plans, and emergency preparedness and response plans. As such, any residual effects would not be significant. The combination of the Site with the wider IAMP ONE and IAMP TWO development areas, given the proposed mitigation, is not considered to result in any significant adverse cumulative effects with regard to the vulnerability of the development to major accidents and disasters.

14.9.3 In relation to the potential cumulative risks of the proposed development with other consented or in-planning projects, these would typically be at sufficient distance from the proposed development that any such cumulative risks are not considered likely to increase the scope for major accidents or disasters, either from or to the proposed development. Therefore, no inter-project cumulative effects have been assessed.

14.10 Limitations to the assessment

14.10.1 No limitations to the assessment have been identified.

14.11 Conclusions

14.11.1 From the above assessment, it can be concluded that, with the appropriate measures to control aspects such as dust dispersion, and flood risk, the vulnerability of the proposed development to major accidents and disasters, including cumulatively with other developments, can be considered to be very low and not significant.

15 CUMULATIVE EFFECTS

15.1 Introduction

15.1.1 This chapter of the ES considers the potential for the proposed development of the IAMP ONE Phase Two site to give rise to significant cumulative effects on the environment and people of the local area.

15.1.2 As set out in ES chapter 2, at section 2.3, the cumulative impact assessment addresses the scope for potential cumulative effects on the environment and people of the area, from 'in combination' effects of the project alone (i.e. a combination of the effects as assessed within the individual chapters of this ES), and, separately from the consideration of the effects of this project when considered alongside other development proposals within the local area (as set out in ES chapter 2 at para. 2.3.4).

15.1.3 These potential cumulative impacts are addressed in the subsequent sections of this chapter. A cut-off date of 31 December 2019 has been applied to the consideration of other developments proposed within the areas adjacent to the site. These are listed at para. 15.3.5, below.

Methodology for cumulative impact assessment

15.1.4 The methodology for undertaking cumulative impact assessment follows the principles established for the environmental assessment of specific topics, as set out in the preceding chapters of this EIA Report.

15.1.5 Significant cumulative effects, in combination with other projects or plans, can arise from the combined result of individual impacts that may not necessarily be considered significant in isolation. Consideration of the potential for significant cumulative effects is particularly important where receptor populations are subject to existing pressures that mean they are close to a critical threshold of viability. Exposure to the combined effects from several proposed developments, which individually may not cause that threshold to be reached, could result in that population no longer being viable and suffer irreversible decline.

15.1.6 Cumulative effects can be broadly categorised as being either antagonistic, additive or synergistic:

- antagonistic effects are when the effect of one impact offsets the effect of another (e.g. collision mortality removes birds from a population; assuming no immigration, these birds cannot then be killed by another development);
- additive effects can result from multiple activities or projects, each with potentially insignificant effects but when combined together result in a significant effect due to their proximity in time and space; and
- synergistic effects arise where the combined impacts of multiple projects or actions result in an effect that is greater than the sum of the individual impacts.

15.1.7 Although antagonistic or synergistic effects on receptor populations or areas (e.g. of birds, fauna or habitats) have the potential to occur and are likely to reflect some real world situations, they are often difficult to reliably quantify.

15.1.8 The assessment uses as its base, the identified residual effects, post-mitigation, as these would be the effects with greatest potential for cumulative impacts.

15.1.9 The sensitivity of receptors is taken to be either high or moderate where this involves people residing in or using an area; or where this involves the natural environment as a combination of aspects which, when taken together, can be considered to be of at least moderate sensitivity.

15.1.10 The magnitude of effect will vary depending on the operations being considered as part of this assessment. The duration of operation(s) is also of relevance to the consideration of the magnitude of the effect.

15.1.11 As with other assessments included in this ES, significance is assessed as a combination of sensitivity (which can be a combination of value and susceptibility) and magnitude. Any cumulative effect judged to be major or moderate has been identified as significant; effects judged to be minor or negligible are not considered to be significant. In general, it is anticipated that effects of medium magnitude on receptors of moderate or high sensitivity would result in moderate effects; effects of high magnitude on receptors of moderate sensitivity would result in moderate effects and effects of high magnitude on receptors of high sensitivity would result in major effects.

15.1.12 Sections 15.4 to 15.12, below, summarise the findings of the cumulative assessment carried out within each of the technical chapters of this ES. This information is then used to consider (in terms of effects on people and property, and effects on the

natural and cultural heritage) whether the project would result in 'in combination' cumulative effects, and to identify the significance of these.

Data assessment and limitations

15.1.13 Any limitations within this chapter of the ES reflect the limitations as identified in the relevant preceding chapters (6 – 14).

15.2 The project

15.2.1 The project is described in detail in chapters 1 and 3 of this ES and indicative masterplans for the potential development of the Site are illustrated on Figures 3.1A and 3.1B. Figures illustrating the baseline environment have been prepared as part of the individual technical chapters of this ES, as appropriate.

15.2.2 A series of parameter plans have also been developed to indicate the limitations of the development in terms of developable area, building height, access and landscaping (see Appendix 3.1).

15.3 Regulatory context

15.3.1 Assessment of cumulative impacts is a requirement of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

Scoping

15.3.2 The informal consultation carried out with Sunderland City Council in 2019 included consideration of cumulative impacts and identified that these would be considered in the assessment, in the manner described above.

15.3.3 Sunderland City Council raised no objections to this.

15.3.4 It is relevant to note that developments that are already built will form part of the baseline assessment and are not, therefore, included in an assessment of cumulative effects.

Schemes to be included in the cumulative assessment

15.3.5 The following schemes are included in the inter-project cumulative assessment for this ES:

- the combination of the Site with IAMP ONE and IAMP TWO development areas;
- the combination of the Site with IAMP ONE, IAMP TWO and (separately) the following approved but not constructed / in planning schemes:

- provision of the approved solar panels on the existing Unipres building on Washington Road;
- construction of a renewable energy centre to the west of Infiniti Drive, Washington;
- extension to the existing farm shop, tea room etc at Elm Tree Nursery, Washington Road; and
- consented, and variation application under consideration, proposed development of a three storey, 33 bed hotel and parking on land adjacent to the Three Horse Shoes, Washington Road.

- the combination of the Site with IAMP ONE and IAMP TWO development areas and all of the above (consented and awaiting determination) developments.

15.3.6 It is important to note that some or all of the above applications may not be relevant to the technical aspects detailed below; this could be due to distance or to the nature of the proposal (e.g. installation of solar panels / water resources).

15.4 Cumulative impact assessment – air quality

15.4.1 The cumulative assessment of effects on air quality from the proposed development and any combination of effects associated with IAMP ONE and IAMP TWO concluded that, as these would be worked in accordance with an approved Construction Environmental Management Plan (CEMP), which will set out an extensive list of mitigation to ensure that dispersion of dust and fine particulate matter on site is controlled, the likelihood of significant effects is low.

15.4.2 The various approved but not constructed, and in planning developments (para. 15.3.5) are sufficiently distant for there to be no likelihood of cumulative effects on air quality.

15.4.3 In relation to cumulative effects associated with traffic generation and air quality, based on the low pollutant concentrations predicted, the chapter concluded that cumulative effects would remain as negligible and not significant.

15.5 Cumulative impact assessment - noise

15.5.1 No significant cumulative effects are anticipated in respect of noise, either during construction or at the operational stage, from the proposed development in combination with IAMP ONE, for the identified sensitive receptor (North Moor

Farm). The IAMP TWO development area is further away and would not give rise to cumulative impacts.

15.5.2 Similarly, none of the other consented but not constructed or in planning applications as set out in para. 15.3.5 are sufficiently close to North Moor Farm as to give rise to the potential for cumulative effects on noise.

15.6 Cumulative impact assessment – landscape character and visual amenity

Landscape character and the landscape resource

15.6.1 Effects are assessed for the operational stage, only, as the temporary effects of construction are not anticipated as giving rise to significant effects on the landscape character and landscape resource of the local area.

15.6.2 Cumulative effects on the landscape resource, from the presence of the operational Site in combination with the development of the IAMP ONE Phase One and IAMP TWO areas, would relate to the increased loss of hedgerows and trees from within the development area. This can be expected to be a significant effect for the larger IAMP ONE Phase One and IAMP TWO sites. The combination of the proposed development with the wider IAMP development is not considered to result in any significant cumulative effect on the landscape resource.

15.6.3 No significant cumulative effects are predicted on the landscape resource, from the combination of the Site with the various planning applications set out in para. 15.3.5.

15.6.4 Equally, no significant effects on landscape character are anticipated from the proposed development in combination with the wider IAMP ONE Phase One and IAMP TWO sites. Notwithstanding the prediction of a significant effect on the *Urban Fringe, Boldon Fell* LCA as a result of IAMP TWO, the greater distance of the Site from this LCA suggests that cumulative effects associated with the development of the Site would not be significant.

15.6.5 No significant cumulative effects on landscape character, direct or indirect, are identified for the combination of the Site and the various current planning applications.

Visual amenity

15.6.6 There is relatively limited visibility of the existing Site from within the surrounding area. This is mainly limited to locations close to the site, or more distant, elevated positions to the north-west and south of the Site. Effects have been assessed for the

operational stage of the development, only, as it is considered that the short-term nature of construction works would not give rise to significant effects on visual amenity.

Residential receptors

15.6.7 A significant cumulative effect on the visual amenity of the occupants of **North Moor Farm** is identified for the combination of the proposed development and the wider IAMP ONE Phase One and IAMP TWO (northern development area).

15.6.8 No other significant cumulative effects on visual amenity have been identified for the remainder of the residential receptors within the study area.

Users of transport routes and rights of way

15.6.9 No significant cumulative effects on the visual amenity (including sequential effects) of users of the various transport routes and rights of way have been identified as part of this assessment.

Users of formal and informal open space and recreation areas

15.6.10 No significant cumulative effects on the visual amenity of users of the various formal and informal open space and recreation areas, have been identified as part of this assessment.

Viewpoints - assessment of cumulative effects

15.6.11 A significant cumulative visual effect has been identified for **Viewpoint 1**, from the combination of near distance views of the Site with the wider IAMP ONE Phase One development, for the short to medium term.

15.6.12 No other significant cumulative effects on visual amenity have been identified for this or the other two viewpoints used in the LVIA.

15.7 Cumulative impact assessment - waste

15.7.1 Cumulative effects of waste generation from neighbouring developments, namely the wider IAMP ONE development, IAMP TWO, and also those identified within para. 15.3.5, above, which include a gasification facility, extension to a farm shop, a hotel and roof mounted solar panels have been considered. These have potential to increase the significance of environmental burden of the development. These are unlikely to generate significant volumes of waste materials, and the local treatment

and disposal facilities assessed are deemed to have capacity to accommodate materials from the cumulation of these developments.

15.7.2 During the demolition phase of the development no other demolition works are programmed for the IAMP ONE site. However, there is likely to be some degree of demolition involved in IAMP TWO. Both IAMP ONE and IAMP TWO, and the other planned developments identified on Figure 2.1 are likely to include ground works / excavation of soils. Waste quantities produced are estimated to be minor, and initial assessment indicates that the cumulative effect of demolition remains of minor effect and not significant.

15.7.3 Excavation works for the entire IAMP site (IAMP ONE and TWO) are programmed to be undertaken as part of the development. It was determined that the overall site development has a minor impact in terms of potential excavation wastes.

15.7.4 Similarly, cumulative construction impacts will result from development of the wider IAMP ONE and IAMP TWO site. The application of consistent mitigation measures across the entire site means that the cumulative development impacts are likely to be moderate to minor effect and not significant.

15.7.5 During operation, cumulative waste arisings will arise from the IAMP ONE and IAMP TWO development sites. In line with the Environmental Statement for the wider site the cumulative impacts will remain minor to negligible and not significant.

15.8 Cumulative impact assessment – water resources

15.8.1 Potential cumulative effects, occurring when two or more major developments are constructed within the same catchment at the same time, include deterioration in water quality as a result of pollutants entering waterbodies during construction and alteration to the hydrological regime from inappropriate drainage design resulting in increased flood risk downstream of both developments.

15.8.2 Cumulative operational effects are considered unlikely to occur as developments would be designed to the appropriate standards to comply with strict planning guidance and regulations relating to the water environment, in order to be acceptable in planning terms. Consideration of cumulative impacts in relation to the water environment is therefore limited to the construction stage.

15.8.3 The Site (IAMP ONE Phase Two) forms part of the larger IAMP development, which also includes IAMP ONE Phase One, and IAMP TWO, shown on Figure 2.1. Chapter I

(Water Resources) of the IAMP ONE ES 2018 concluded that the potential changes to the receptors during construction, operation and decommissioning are predicted to be low, very low, or negligible. The effects, considering embedded mitigation, are predicted to be neutral or minor, and therefore, not significant. As a result it is considered that any cumulative effects on the water resources of the local area as a result of the construction, operation or decommission of the two phases of the IAMP ONE development would be negligible.

15.8.4 IAMP TWO will be subject to planning guidance and regulation to protect the water environment during the construction, operation and decommissioning phase of this area of the development. Additionally, it is assumed that the same best practice mitigation will be implemented during each stage of the development. As such it is considered that any cumulative effects on the water resources of the local area from the combination of development within the Site and IAMP TWO would be negligible

15.8.5 All of the proposed consented but not constructed, and in planning developments (see para. 15.3.5) are similarly within the same surface water and groundwater catchment as the Site, and there is the potential that these could be constructed at the same time. As noted above, there is no scope for the solar panel installation to impact on the water resources of the local area and this is not therefore considered. It is relevant to assume that the various developments will adhere to mitigation measures relating to drainage design, pollution prevention and so on.

15.8.6 The design of these developments, as with the Site, can be expected to incorporate appropriate mitigation measures and any discharges would be restricted to the respective greenfield runoff rate of their development sites (as is the case for the proposed development). Any development requiring permitted activities would also be subject to control and regulation by the relevant issuing authority. Given the proposed SuDS for the Site, it is likely that any adjacent developments will involve the same systems as those proposed for the Site and not use features such as deep soakaways, as they are not supported by the geology.

15.8.7 In addition, pollution prevention measures in a CEMP (or equivalent) including emergency response plans are likely to be implemented during the construction of other developments.

15.8.8 Therefore, the potential cumulative effects on the water environment, arising from the various major developments within the same catchments as the Site, are considered to be negligible.

15.9 Cumulative impact assessment – geology and soils

15.9.1 Cumulative effects have been considered both in terms of the cumulative effects of the various elements of the Proposed Development (intra-project) and the accumulated effects of the Proposed Development with other development proposed in the vicinity (inter-project).

Intra-project cumulative effects

15.9.2 There are no intra-project cumulative effects on the permanent loss of best and most versatile (BMV) land, as the only source of impact is permanent development including permanent land use change, on land that is non-BMV.

15.9.3 There are no intra-project cumulative effects on soil resources. There are no intra-project cumulative effects on the disturbance to or loss of soils as the only sources of impact are construction activities.

Inter-project cumulative effects

Agricultural land

15.9.4 No significant inter-project cumulative effects have been identified from the limited loss of sub-grade 3B (non-best and most versatile) agricultural land, in combination with any losses associated with the other proposed developments.

Soil resources

15.9.5 The residual impacts for disturbance and loss of soil resources for the Proposed Development were assessed as not significant. As such, it is not possible for a significant cumulative effect to arise from the effect of the Proposed Development combined with any of the 'other developments' listed.

15.9.6 It is also noted that in order to conform with planning policy and good practice guidance, all developments would be expected to apply similar standard soil management measures to those presented in ES chapter 11, section 11.8, so as to ensure that the disturbance and loss of soil resources is reduced to a level where it was acceptable in planning terms.

15.10 Cumulative impact assessment – ecology and biodiversity

15.10.1 It is considered that the primary driver of any significant cumulative effects will be the wider IAMP development. However, it was concluded within the 2018 Environmental Statement produced in relation to IAMP ONE that, with the implementation of the BCEMP, HMP and ELMA, although negative residual impacts would be experienced in the short-term, these would become neutral or positive in the medium to long-term (IAMP ONE 2018 ES, chapter K, section K.7.0, final para.).

15.10.2 The Habitat Management Plan for IAMP ONE proposes very frequent surveys for bats, birds and invertebrates. These species groups can act as indicators for the biodiversity being achieved within IAMP and the ELMA. To help ensure that cumulative effects are assessed and addressed, and biodiversity net gain achieved, it is recommended that standard survey techniques, such as the BTO territory mapping method for breeding birds, and fixed transect routes for bat and invertebrate surveys are agreed. Targets can then be set based on the population levels needed to demonstrate no net loss from the pre-development baseline, and measures identified to address any shortfall (including, if required, revisions to the management of the area.

15.10.3 Given this, and the anticipated limited residual effects of the current application detailed above, no significant cumulative effects are anticipated from the combination of effects of the Site with the wider IAMP development.

15.10.4 In respect of the planning applications set out in para. 15.3.5 above, these developments will have been subject to their own assessments and development of mitigation (as appropriate) and therefore the combination of the effects of the Site with these is unlikely to result in any significant adverse cumulative effects on the ecology and biodiversity of the local area.

15.11 Cumulative impact assessment – access and transport

15.11.1 Several environmental topics base all or part of their impact assessment on information about the quantity of traffic on the road network in the wider area surrounding the Site, its distribution, speed and movement.

15.11.2 This information was derived from a traffic model that has built into it, in accordance with standard guidelines, assumptions about traffic growth over time so the future operational traffic forecasts take into account proposed developments and infrastructure projects in the surrounding area. This means that cumulative effects

in relation to traffic are already built into these assessments and do not need to be considered further.

15.12 Cumulative impact assessment – vulnerability to major accidents and disasters

15.12.1 The assessment of the vulnerability of the project to major accidents and disasters has of itself considered the interaction between the different aspects of the environment and the proposed development. This concluded that the vulnerability of the project to this is low. Accordingly, no further assessment of intra-project effects is required.

15.12.2 In considering the potential for the project, in combination with the development of the wider IAMP site (IAMP ONE and IAMP TWO), to give rise to an increased risk of major accidents and disasters, it is assumed that the findings of the 2018 ES (Chapter N) for the IAMP ONE area will be applicable to the IAMP TWO area. As noted above, the potential for UXO within the development area is considered to be low and would be considered within the CEMP developed for the construction works on site. The IAMP ONE 2018 ES (Table N4) identified the potential for up to moderate effects on the vulnerability of the development to both natural and industrial hazards. However, these hazards would be addressed through the preparation of operational management plans, and emergency preparedness and response plans. As such, any residual effects would not be significant. The combination of the Site with the wider IAMP ONE and IAMP TWO development areas, given the proposed mitigation, is not considered to result in any significant cumulative effects with regard to the vulnerability of the development to major accidents and disasters.

15.12.3 In relation to the potential cumulative risks of the proposed development with other consented or in-planning projects, these would typically be at sufficient distance from the proposed development that any such cumulative risks are not considered likely to increase the scope for major accidents or disasters, either from or to the proposed development. Therefore, no inter-project cumulative effects have been assessed.

15.13 Cumulative effects on the natural environment

Introduction

15.13.1 The proposed development has the potential for cumulative impacts on the natural environment, in particular from the combination of effects on soil and water, and to

a lesser extent air quality, that may affect the natural heritage resource of the local area.

15.13.2 Construction operations in particular have the potential to adversely affect the soils, water and ecological environment of an area, not only as a result of disturbance from excavation and reinstatement, but also as a result of the risk of contamination from construction materials (fuels, cement and so on) or from poor construction practices resulting in run-off of soils or silt into groundwater or watercourses. The deposition of dust particles can also adversely affect vegetation and water, though such effects are usually only short-term. Changes to soil structure can alter the vegetation composition of areas, as can changes to the water content of soils (both increases and decreases).

15.13.3 Cumulative operational effects on the natural environment are less likely given that post-construction, the built environment will create a status quo that should of itself be less damaging, though effects of vehicle disturbance, noise and light pollution may still have scope to give rise to potential effects on the natural environment.

15.13.4 Whilst on the whole, the residual impacts of individual aspects relating to the natural environment are predicted not to be significant and in many cases are predicted to be negligible, when taken together, there could be some scope for significant cumulative effects.

Cumulative effects of construction

15.13.5 Potentially significant cumulative effects on the natural environment during construction could occur in relation to:

- the combination of removal of topsoils from the site in addition to loss of hedgerows and hedgerow trees within the site, resulting in adverse effects on the flora and fauna of the local area.

15.13.6 Given the limited benefits of the existing species-poor hedgerow and tree cover to flora and fauna as identified in ES chapter 12, any such cumulative effects are expected to be no greater than minor-moderate and not significant during construction. The mitigation measures identified in respect of soils handling and re-use, and for improvements to ecology and biodiversity, would ensure that cumulative effects are minimised and not significant.

Cumulative operational effects

15.13.7 Potentially significant cumulative effects on the natural environment during operation of the proposed development could occur in relation to:

- disturbance to native wildlife (in particular, birds and bats) from the combination of noise and the effects of lighting within the development site, together with presence of vehicles / vehicle movements. Such effects could occur during daytime and night-time periods.

15.13.8 Such effects have the potential to be moderate adverse and could be **significant** in the absence of (or failure to deliver) appropriate mitigation.

15.13.9 However, mitigation is proposed to address this. This includes setting aside the south-western corner of the Site for native woodland and scrub planting, and ensuring that, if possible, there is no or limited lighting associated with the façade of the building(s) facing towards this part of the Site. In addition, it is proposed that, if possible, the layout of the proposed development(s) be designed so as to place any compounds, loading bays and parking areas on the southern side of buildings, screening these areas from the adjacent ELMA, to the north.

15.13.10 With this mitigation in place it is considered that any significant cumulative effects on the natural environment would not be significant.

15.14 Cumulative effects on people and property

Introduction

15.14.1 Cumulative effects on the people and property of the area of the proposed IAMP ONE Phase Two development could result from the combination of effects associated with (during construction) construction noise, construction air quality, visual impacts of construction, impacts on agricultural land holdings, construction transport and traffic effects, and disturbance during construction to access and recreational amenity.

15.14.2 Operational cumulative effects on people and property would be more limited, encompassing combinations of effects associated with visual amenity, access (including access for agricultural land management activities), any effects on land use, operational transport and traffic effects, and from operational noise.

15.14.3 The relevant chapters of this ES have identified where such effects would be likely to occur and the mitigation measures necessary to address such impacts. With limited

exceptions, residual effects associated with individual aspects of the environment are not predicted to be significant. However, when these aspects are taken together there could be scope for some significant cumulative impacts.

Cumulative effects of construction

15.14.4 The occupants of North Moor Farm are located within a short distance to the north of the Site and although visual amenity effects during construction are not expected to be significant (due to the short-term nature of these), the combination of this in addition to effects of noise and air quality, and disruption of the access to the farm, could result in **significant** cumulative effects.

15.14.5 With the implementation of mitigation measures to address this, including delivery of mitigation for noise and air quality through an approved Construction Environmental Management Plan, as well as appropriate traffic management in relation to the access to North Moor Farm, cumulative effects would reduce to below significant levels.

15.14.6 There are no other people, or property with scope to experience cumulative effects from the construction of the proposed development.

Cumulative operational effects

15.14.7 Cumulative operational effects of the proposed development on the people and property of the area would similarly be limited to the occupants of North Moor Farm. Cumulative effects would relate to the combined effects of visual amenity, operational noise, lighting and access. In the absence of mitigation such cumulative effects would be **significant**.

15.14.8 However, with the implementation of the mitigation as outlined in the relevant chapters of this ES, including additional planting of hedgerow trees, perimeter tree and scrub planting, and attention to the detailed design of the individual plot layouts so as to mimimise scope for lighting spillage and positioning of compounds and loading bays to the south of buildings, the residual cumulative effects of the operational stage of the proposed development would reduce to below significant levels, particularly in the longer-term.

15.14.9 There are no other people, or property with scope to experience cumulative effects from the operation of the proposed development.

15.15 Summary and Conclusions

15.15.1 This chapter of the ES has provided a summary of the cumulative assessment undertaken for the various technical aspects addressed in ES chapters 6 – 14, of the proposed development in combination with other planned developments within the local area, including IAMP ONE Phase One and IAMP TWO (inter-project effects). In addition, consideration has been given to the potential for cumulative effects of the proposed development, during construction and operation, on the natural environment and on the people and property of the local area (intra-project effects).

15.15.2 The proposed development is considered to have very limited scope for significant cumulative effects, either as intra-project or inter-project effects, or in relation to the combined effects of the proposed development on the natural environment, and on the people and property of the area. The **occupants of North Moor Farm** are the only receptor for whom significant cumulative effects could result, in the absence of the proposed mitigation.

15.15.3 With the appropriate mitigation measures in place, as outlined in the relevant technical chapters of this ES, any cumulative effects would not be significant.

15.15.4 No additional mitigation measures are considered necessary in respect of cumulative effects.

16 SUMMARY AND CONCLUSIONS

16.1 Introduction

16.1.1 This chapter of the Environmental Statement (ES) summarises the conclusions of the previous chapters, in respect of the potential effects of the development of the IAMP ONE Phase Two site on the environment and people of the local area. Where possible, non-technical information and language is used in this chapter.

16.1.2 The proposed project is described in detail in chapters 1 and 3 of this ES. The Site comprises the remaining triangle of land in the south-western corner of the IAMP ONE overall area, but has included land within the IAMP ONE site boundary in order to ensure that the proposed development can be delivered, without any constraints in terms of access, landscape and flexibility of future development.

16.1.3 Access into the land proposed for development would be via the existing, consented access road; drainage for the Site, including the south-western triangle, has already been incorporated into the wider IAMP ONE area.

16.1.4 This ES (chapters 1 and 3) has set out the detail of the context for the project and the project characteristics. Effects on the environment of the project area; on planning and development; and on the people of the area have been considered. Cumulative effects for the individual environmental aspects, as well as on the natural environment and the people and property of the local area, have also been considered.

16.1.5 Assessments have been undertaken in accordance with best practice and approved methodologies; this information is set out within each technical chapter of this ES. Consultations with the relevant statutory organisations and others are referenced, where these have occurred. Supporting information is included in Appendices to this ES, and plans and figures illustrating the findings of the assessments are also provided.

16.2 Scope and Methodology

Informal consultation

16.2.1 Informal consultation with Sunderland City Council (SCC) was carried out between June and November 2019 and has informed the scope (content) and preparation of this ES.

Methodology

16.2.2 The assessment of effects on the environment (environmental impact assessment or EIA), for each subject area, typically considers:

- site activities and/or sources of potential impact for that particular topic;
- potential effects (of construction and at the operational stage), including cumulative effects;
- mitigation measures – whether embedded in the design of the proposed development, or as additional measures to control effects;
- residual effects, once mitigation measures are assumed to be in place;
- whether any monitoring or follow-up is necessary to ensure that mitigation remains effective and appropriate;
- any limitations to the assessment; and
- cumulative assessment – the potential for cumulative effects, which may be in association with other aspects of the project, or with other projects that have been consented but not constructed, or that are awaiting determination.

16.2.3 Assessment methodologies have followed those used for the 2018 IAMP ONE EIA and are in accordance with industry best practice and standards. The assessments have been undertaken by experienced, qualified professionals. Assessments will typically consider the sensitivity (and possible value) of the receptor, the likely magnitude (or level) of change anticipated as a result of the proposed development, and the resulting level of effect, and whether this would be considered significant or not, in EIA terms.

16.3 Site and Scheme Description

The Site

16.3.1 The Site forms part of the overall IAMP area as identified in the Area Action Plan (AAP) for IAMP, being the second phase of the consented (and under construction, in part) IAMP ONE development. IAMP TWO is to be delivered and determined under the Nationally Significant Infrastructure Project (NSIP) route.

16.3.2 The triangular piece of land north and west of West Moor Farm was not included in the 2018 IAMP ONE planning application due to issues relating to the availability of up to date ecological survey information and the then occupancy of the West Moor Farm property (which has since been vacated).

16.3.3 The Site comprises a triangular area of agricultural land (primarily arable); the now-redundant buildings and associated hard standing associated with West Moor Farm and cottage (all of which are to be demolished) located in the south-eastern corner of the triangular site; and land within the wider IAMP ONE site, associated with Plots 1 and 2 and the adjacent section of access road. An area to the east of West Moor Farm is currently in use as a construction compound; Plots 3, 4, 5/6 are nearing completion.

16.3.4 The overall area within the red line boundary for the Site extends to some 25.85ha; the triangular area of land forming Phase Two of IAMP ONE is approximately 6.5ha.

16.3.5 Agricultural land within the Site has been classed as Grade 3b (not best and most versatile). Existing field and roadside hedgerow boundaries, including occasional trees (ash, birch, sycamore, hawthorn) run on the eastern edge of the triangular site and the southern edge of the wider Site. A walkover survey of the Site in 2019 confirmed that the hedgerows within the Site are species-poor.

16.3.6 There are no watercourses or waterbodies present within the Site area.

16.3.7 The land is largely level, with only minor variations in elevation. The wider area comprises very gently undulating topography dropping gradually to the River Don (690m-700m to the north); further to the south, south of the River Wear the land rises to a high point of 136m at the Penshaw Monument.

16.3.8 There is an existing access to the A1290 from the West Moor Farm property; this is some 300m to the east of the junction into the Nissan site from the A1290. The site also incorporates an access track linking northwards to North Moor Farm. Both these accesses would be closed to vehicular use, with the implementation of the proposed development.

The proposed development

16.3.9 The outline planning application seeks permission for:

"Outline planning permission for the erection of industrial units (up to 98,937.2sq.m.) (gross internal area) for light industrial, general industrial and storage and distribution uses (Class B1(c), B2 and B8) with ancillary office and research and development floorspace (Class B1(a) and B1(b)) with internal accesses, parking, service yards, electricity sub-stations, attenuation basins and associated infrastructure, earthworks and landscaping, as well as the demolition of the existing buildings at West Moor Farm. All matters are reserved for determination at a later stage."

16.3.10 Access is reserved for future approval because the precise location of any access routes into and within the Site are not yet known. Access to the Site itself will be taken from the A1290 via International Drive (International Drive is currently under construction).

16.3.11 In accordance with Policy S2 (Land Uses) of the adopted IAMP Area Action Plan (AAP) 2017-2032, the principal uses on site will be production, supply chain and distribution activities directly related to the Automotive and Advanced Manufacturing sectors and related supporting uses. The IAMP AAP recognises that an element of office space for business services and research and development space will be required in order to support the principal uses on site.

16.3.12 A series of plans, including indicative masterplans showing two potential development scenarios, and parameter plans setting out the limits of development (including plot extent and building height) have been used in order to undertake the EIA (Appendix 3.1 refers).

16.3.13 It is relevant to note that this application does not seek to increase the amount of floorspace above that already approved through the IAMP ONE permission. Buildings will be a maximum height of 30m above the average existing ground level within the part of the Site where the building is proposed.

16.3.14 The proposed development will follow the same Design Code as that approved for IAMP ONE Phase One. Full details of the building designs will be agreed at the reserved matters stage. Similarly, the finalised information relating to access to the individual development plots will be determined as part of the detailed design for each plot, using the same parameters as are being applied to the approved IAMP ONE Phase One site.

16.3.15 The landscaping of the Site will also follow the same principles as have been applied to the IAMP ONE Phase One development area, with perimeter screen planting, planting to individual plots, low topsoil bunding, retention and reinforcement of existing perimeter hedging and tree planting and so on. In addition, the south-western triangular corner of the Site, as well as the north-western and southern boundaries, will be planted with native woodland trees and scrub, as a screen to the proposed development and hedging will also be provided. The objective of this is to provide biodiversity net gain, in line with the requirements of Sunderland City Council's recently adopted Core Strategy and Development Plan.

16.3.16 A Landscape Management and Maintenance Plan, as well as a Habitat Management Plan, has been prepared for the IAMP ONE (Phase One) site. A planning condition of IAMP ONE requires the preparation of a Landscape and Ecological Management Plan for the development plots and public realm areas within the development area, prior to the commencement of any planting within these areas. This will include details of how the landscaping scheme will be managed and maintained in the future. It is likely that this requirement will extend into the area of the Site.

16.3.17 The IAMP development extents include 110ha of land allocated as Ecological and Landscape Mitigation Area (ELMA) within the IAMP AAP (see ES Figure 1.2). This land will be used to implement some of the mitigation and/or compensation for impacts of the IAMP development on the habitats and species of the area.

16.3.18 A detailed surface water design strategy has been developed for the infrastructure drainage, which will manage run-off from the main access roads, and will provide connection points for surface water from the development plot(s).

16.3.19 As the final development plot arrangements will not be finalised until the reserved matters stage, a detailed surface water design strategy has not yet been established for the development plot(s). The drainage design for the plot(s) will be submitted at the reserved matters stage.

16.3.20 The IAMP ONE Phase Two site development has been allowed for within all of the drainage design work undertaken in respect of the IAMP ONE Phase One site. No additional works are required therefore, other than to manage the surface and foul drainage associated with plot developments within the Site boundary.

Construction methodology and phasing

16.3.21 Construction of the development is anticipated as commencing in February 2021, subject to planning permission. The first phase of work will comprise the removal of topsoil from the areas proposed for built development (including roads and parking areas) and construction of the access road(s) into the individual development plots. Where possible, topsoil removed from within the development areas will be retained for use on site in bunding and landscaped areas.

16.3.22 In advance of construction work commencing on any plot within the Site, it is anticipated that a pre-commencement ecological survey / walkover and report will require to be completed, to ensure that there is no disturbance to any ecology (fauna and flora) as a result of construction operations.

16.3.23 The hours (excluding deliveries) during which construction is anticipated as occurring on site are:

- Mondays to Fridays, 0700 – 1800 hours.
- Saturdays, 0800 – 1700 hours.
- No working on Sundays and Bank or Public Holidays.

16.3.24 Access into the development plots for construction will be obtained from the main spine road within the IAMP ONE site, via the access constructed from the A1290 Washington Road.

16.3.25 A Construction Traffic Management Plan (CTMP) will be prepared, setting out the routes to be followed by construction traffic so as to avoid sensitive areas and areas of notable congestion, and the times when construction deliveries to the Site will be permitted (typically 0800 – 1430 hours, Mondays to Saturdays). These will ensure there is no potential conflict with times when shift changes take place within the adjacent Nissan factory.

16.3.26 The demolition of the West Moor Farm buildings will be carried out in accordance with an approved Construction Demolition Management Plan (CDMP). This will identify the types and volumes of waste arisings anticipated from the demolition and the means of re-using, recycling, recovering or otherwise disposing of these in a sustainable manner.

16.3.27 A Construction Environmental Management Plan (CEMP) will be prepared prior to the commencement of works on site, including mitigation identified within this ES relating to construction activities. The CEMP will include a Site Waste Management Plan (SWMP) and Dust Management Plan (DMP), setting out the measures by which construction can take place with minimal impact on the local environment.

16.4 Planning policy context

16.4.1 The following plans and guidance are primary material policy considerations relevant to this outline planning application:

- The National Planning Policy Framework (February 2019).
- Planning Practice Guidance (March 2014).
- The Adopted Development Plan, comprising:
  - Sunderland Core Strategy and Development Plan 2015-2033 (CSDP), adopted January 2020; and

- International Advanced Manufacturing Park, Area Action Plan, adopted November 2017.

Planning history

16.4.2 The outline planning application being submitted for this Site forms part of the wider planning base for the delivery of the International Advanced Manufacturing Park (IAMP). In order to bring forward and meet the demand for early development on part of the IAMP site, an area (known as IAMP ONE) was made subject to consent by means of a planning application. Part of that IAMP ONE area (Phase Two) was not included within the 2018 planning application for the development due to the need for updated ecology surveys and also as the property within that parcel of land (West Moor Farm) was still occupied, at that time.

16.4.3 This outline planning application is being submitted to ensure that the whole of the IAMP ONE area can benefit from a planning consent, and thereby deliver the benefits anticipated at the outset of the process.

16.5 Community consultation and consideration of alternatives

Community consultation

16.5.1 Consultation with the local community was undertaken following discussions with Sunderland City Council on the type of consultation considered to be appropriate for the proposed planning application. This was agreed as a leaflet drop, targeted at specific residential and commercial areas in the vicinity of the site and immediate surroundings, in addition to organisations and businesses with connections to the IAMP site.

16.5.2 The leaflet drop was carried out in February 2020. There were very few comments received in response to this; these are summarised in Chapter 4 of the Planning Statement (Lichfields, March 2020).

16.5.3 A response on behalf of a landowner within IAMP TWO raised various questions in relation to the proposed outline planning application and indicated that further comments would be provided once the planning application is submitted.

16.5.4 Responses from the general public ranged from no objections; the suggestion that IAMP should be suspended and that manufacturing could be leaving the area rather than moving in; and that bringing jobs to the area is welcomed but increased traffic is

not, and that the metro line should be extended to Washington using the nearby closed Leamside Line.

16.5.5 Further information on these aspects is included in ES Chapter 5.

Alternatives

16.5.6 Consideration of the reasonable alternatives studied by the developer, and a description of these is a requirement of the EIA legislation.

16.5.7 Typically, consideration of alternatives may include aspects such as the 'do nothing' option, potential alternative sites, designs, site accesses or alternative technologies.

16.5.8 In the case of the proposed development of the IAMP ONE Phase Two site, the planning application is required to complete the suite of consents necessary to deliver the IAMP development as a whole, in accordance with the adopted IAMP Area Action Plan. Alternative sites and accesses, and the 'do nothing' option, are not therefore relevant. As the application is for outline planning consent, this leaves open the type of industry that may wish to develop land within the Site boundary.

16.5.9 It is therefore considered that, given the work previously completed in this regard, there is no requirement for any further consideration of reasonable alternatives as part of this submission.

16.6 Air Quality

16.6.1 An air quality screening assessment has been completed which considers the potential air quality effects of both the construction and operational phases of the IAMP ONE Phase Two development proposals.

16.6.2 A construction phase risk assessment has concluded there is a risk of potential disamenity dust and fine particulate matter releases during the demolition, earthworks, construction and trackout activities during construction of the development. Mitigation to control and limit dust generation during construction would be outlined in a Construction Environmental Management Plan.

16.6.3 A qualitative review of the potential air quality effects during operation of the development has been undertaken. A review of the baseline indicates pollutant concentrations in the local area are well below the air quality objectives and limit values.

16.6.4 The proposed development will complete the suite of planning permissions required to implement IAMP ONE. IAMP ONE and all traffic arising from it has been assessed

in a previous Environmental Statement, prepared by Golder Associates. The planning application was granted, and the Air Quality Chapter concluded negligible air quality changes and no significant effect. There are no vehicle increases proposed as part of this development, therefore there will be no adverse air quality changes arising. A negligible and not significant effect is predicted. No significant cumulative impacts on air quality have been identified.

16.7 Noise

16.7.1 A noise assessment has been undertaken for the development's construction and operational phases, to assess the potential impact at the nearest Existing Sensitive Receptor which is North Moor Farm.

16.7.2 The baseline noise levels at North Moor Farm have been taken from those identified within the previous IAMP ONE application and potential construction and operational noise impact assessments carried out for this sensitive receptor.

16.7.3 Baseline data was used to establish potential threshold for construction noise and these were compared to predictions of construction noise levels. The effects of noise during construction was found to be not significant in EIA terms and no mitigation measures are required. However, the use of best practice during construction should be employed to reduce the potential impact and examples have been provided.

16.7.4 In the absence of detailed information, indicative noise predictions have been carried out for the potential noise sources during the operational phase. The predicted noise levels at North Moor Farm were compared to background levels. The effects of noise during operation is predicted to be well below background levels and not significant in EIA terms. Indicative mitigation measures are suggested and these would be reviewed at the detailed planning stage.

16.7.5 No cumulative noise impacts have been identified.

16.7.6 For this development, noise should not be a determining factor in granting outline planning permission in accordance with the current guidance.

16.8 Landscape and visual impact

Landscape character and the landscape resource – during construction

16.8.1 Although demolition and construction works would take place in close proximity to the area of Green Belt, effects would be indirect and temporary and are assessed as not significant.

16.8.2 There would be changes to the character of the landscape from the demolition of West Moor Farm and from the presence of plant and machinery within the Site, as well as from the permanent loss of internal lengths of hedgerow and some hedgerow trees. Effects would be adverse, but not significant.

16.8.3 Minimal changes to the landform are anticipated. Lighting would be required during construction, more particularly in winter months, or for security, but would be short term and temporary; effects would be adverse but not significant.

16.8.4 Effects of construction on the landscape character area within which the site is located are assessed as a high magnitude of effect, on a low-medium sensitivity receptor and would not be significant. Indirect effects on the wider landscape character areas would not be significant.

Landscape character and the landscape resource – post-completion

16.8.5 The operational effects of the proposed development would be permanent and long-term.

16.8.6 Effects (indirect) on the adjacent areas of Green Belt land from the presence of the completed development would be partially buffered by the perimeter landscaping of the Site; these have been assessed as not significant.

16.8.7 There would be changes to the scale of the Site from the presence of the large-scale building and from its association with the wider IAMP ONE development area. The generally medium scale of the existing landscape (within a wider area of medium to large scale) is likely to increase to large scale. The scale of the wider landscape is influenced by the presence of the existing and under-construction buildings within IAMP ONE Phase One; these are largely c. 13-15m in height, with one building that is c. 19m high at its tallest. The magnitude of effect is assessed as medium-high, on a low-medium sensitivity receptor, and as such **the change in landscape scale would be significant**.

16.8.8 There would be changes to the degree of enclosure experienced within the site, and from the presence of lighting associated with the development plots and spine road. Loss of existing hedgerows and trees would be compensated by the provision of replacement tree and scrub planting as well as the infilling of gaps within the retained hedging. This will in the longer-term make a positive contribution to the landscape character of the local area.

16.8.9 Overall, the effects of the developed site on the landscape resource of the local area are assessed as not significant, other than from the change in landscape scale.

16.8.10 Changes within the Site will result in changes within the *Coalfield Lowland Terraces (Usworth Lowland)* LCA. This is assessed as **significant**. However, indirect effects on the wider landscape character areas from the presence of the developed Site are assessed as not significant.

Cumulative effects on landscape character and the landscape resource – post-completion

16.8.11 Cumulative effects on the landscape resource, from the presence of the operational Site in combination with the development of the IAMP ONE and IAMP TWO areas, would relate to the increased loss of hedgerows and trees from within the development area. This can be expected to be a significant effect for the larger IAMP ONE Phase One and IAMP TWO sites. The combination of the relatively small area which comprises the part of the Site without planning permission, with the wider IAMP development, is not considered to result in a significant cumulative effect on the landscape resource.

16.8.12 No significant cumulative effects are predicted on the landscape resource, from the combination of the Site with the various consented but not constructed, and awaiting determination planning applications (ES Figure 2.1 refers).

16.8.13 Equally, no significant effects on landscape character are anticipated from the proposed development in combination with the wider IAMP ONE Phase One and IAMP TWO sites. Notwithstanding the prediction of a significant effect on the *Urban Fringe, Boldon Fell* LCA as a result of IAMP TWO, the greater distance of the Site from this LCA suggests that cumulative effects would not be significant.

16.8.14 No significant cumulative effects on landscape character, direct or indirect, are identified for the combination of the Site and the various consented but not constructed, and awaiting determination planning applications.

Visual amenity – post-completion

16.8.15 There is relatively limited visibility of the existing Site from within the surrounding area. This is mainly limited to locations close to the site, or more distant, elevated positions to the north-west and south of the Site. Effects have been assessed for the operational stage of the development, only, as it is considered that the short-term

nature of construction works would not give rise to significant effects on visual amenity.

Residential receptors

16.8.16 Significant effects on visual amenity have been identified for the occupants of **North Moor Farm**, to the immediate north of the Site; also for the occupants of the **properties at Hylton Bridge Farm** and the **two roadside properties at Hylton Grove Farm**. No other significant visual effects have been identified for residential receptors.

Users of transport routes and rights of way

16.8.17 Notwithstanding the close proximity of visual receptors using the A1290, no significant effects on visual amenity have been identified for users of this or other roads or rights of way (including the dismantled railway line on the eastern edge of Washington, west of the Site). Views from the road for users of the A1290 within the section of road passing the site, when assessed in their totality, would experience a range of near-distance, transient and oblique views of the Site, seen in the context of the wider industrial development of this area; this is assessed as not significant.

Users of formal and informal open space and recreation areas

16.8.18 No significant effects on visual amenity have been identified for visitors to the Penshaw Monument, or for visitors to the North East Aircraft Museum.

Appraisal of key views

16.8.19 Three viewpoints were selected for use in this assessment: two on the A1290, to the west and east of the Site, and a view from Penshaw Monument, to the south.

16.8.20 For **Viewpoint 1**, at the junction of the A1290 with the new access road into the IAMP ONE development areas, there would be significant effects on visual amenity associated with the **near distance views of the developed Site from this location**, for the short to medium term associated with the establishment of internal and perimeter planting. Effects on visual amenity during construction are not assessed as significant. Cumulative effects at this viewpoint are predicted to be significant for the **combination of the Site with the wider IAMP ONE Phase One development in the short to medium term**; in the longer term, with the assimilation of the development into the general area, and the establishment of the perimeter and internal landscaping, cumulative effects would reduce to below significant levels. No other significant cumulative effects are identified for this viewpoint.

16.8.21 No significant effects on visual amenity, including cumulative visual effects, have been identified for any stage of the proposed development on the views from Viewpoints 13 and 16.

Cumulative effects on visual amenity

16.8.22 Significant cumulative effects on the visual amenity of the occupants of **North Moor Farm** are identified for the combination of the proposed development and the wider IAMP ONE Phase One and IAMP TWO (northern development area), in the short to medium term.

16.8.23 No other significant cumulative effects on visual amenity have been identified for any other visual receptors.

Mitigation measures

16.8.24 Mitigation is proposed, along similar lines to that for IAMP ONE Phase One, in respect of the landscaping of the site perimeter and within development plots (including the longer-term management and maintenance of this).

16.8.25 An area in the south-western corner of the Site is proposed for native tree and scrub planting, providing some softening of the proposed building within the Site for views from the A1290 to the west as well as compensating for the loss of internal trees and hedging, and providing habitat (in the longer-term) for species of birds and other fauna.

16.8.26 Other mitigation will include reinforcement of the hedging alongside the A1290 (where this is to be retained, and along the new roadside edge), including hedgerow tree planting.

16.8.27 If possible, the south-western corner of the Site should remain as dark as possible, with no or limited lighting within or directed into this area and avoiding service yards or parking areas facing this corner.

16.8.28 In relation to the demolition of the buildings within the West Moor Farm area, it is proposed that adjacent trees and hedging be protected against damage during demolition works, with Heras or other equivalent fencing erected as protection in accordance with the requirements of BS5837 (1991): Trees in Relation to Construction.

16.8.29 In relation to the potential for cumulative effects on visual amenity on the occupants of North Moor Farm from the combination of the proposed development and the

wider IAMP ONE Phase One and IAMP TWO (northern development area), it is recommended that consideration be given to the provision of additional hedgerow trees within the hedgerows to the south, east and north-east of North Moor Farm, planted as heavy standards (species as specified for the ELMA).

Residual effects

16.8.30 In the short to medium-term, significant effects on visual amenity (including cumulative visual effects) would remain for the occupants of **North Moor Farm**. Significant effects on visual amenity would also remain for the occupants of **the properties at Hylton Bridge Farm** and **the two roadside properties at Hylton Grove Farm**. In the longer-term, with the assimilation of the proposed development into the general area and the implementation of the proposed mitigation, it is considered that there would, overall, be scope for some positive effects on the landscape character, landscape resource and visual amenity of the local area.

16.9 Waste

16.9.1 An assessment has been carried out of the potential significant effects of the development of the IAMP ONE Phase Two site (construction and operation) on waste management. Both hazardous and non-hazardous wastes are assessed.

16.9.2 The proposed development will require demolition of existing farm buildings; levelling and grading of the existing site, including excavation of an estimated 300mm depth of topsoil from areas of agricultural land; construction of the new manufacturing buildings; construction of ancillary buildings and infrastructure; and landscaping. This assessment has focused on the likely quantities and waste types arising from these activities and how they can best be managed.

16.9.3 It is expected that the majority of waste arisings will be sent for disposal to local landfill sites or to suitable off-site locations for re-use. The anticipated waste volumes form a small fraction of regional waste generation and capacity. Any hazardous waste arisings would be dealt with by a specialist hazardous waste operator.

16.9.4 No significant environmental effects have been identified as a result of waste arisings and management practices in relation to the proposed IAMP ONE Phase Two development.

16.10 Water resources

16.10.1 The Site is located on the watershed of two surface water catchments. To the north of the watershed, water drains to the River Don, to the south of the watershed, water drains to watercourses/drains that are not located within a WFD surface water catchment.

16.10.2 The Site is located within the Tyne Carboniferous Limestone and Coal Measures groundwater catchment.

16.10.3 Superficial deposits that underlie the Site are comprised of the Pelaw Clay Member. According to the Environment Agency (EA), these deposits are classified as Unproductive Strata (aquifer). There are limited isolated pockets of groundwater within permeable horizons; however, these are likely to be small and hydraulically isolated from each other. Groundwater was also encountered at the base of the formation overlying weathered bedrock. In these areas it is likely that the basal superficial deposits are in continuity with the underlying weathered bedrock and therefore are under confining pressure from the above clay deposits.

16.10.4 The bedrock underlying the Site belongs to the Pennine Middle Coal Measures Formation, which is formed of sequences of sandstones, siltstones, mudstones and associated coal seams. The Pennine Middle Coal Measures Formation is a Secondary A Aquifer. The bedrock aquifer is entirely confined by the Pelaw Clay Member on-site. Due to the low permeability of the Pelaw Clay Member and the upward head gradient within the bedrock aquifer there is no pathway between the Site and the bedrock, therefore affording the aquifer protection from any potential contamination associated with the works on-site.

16.10.5 There are no surface water or groundwater private water supplies within 2km of the Site. There are no groundwater abstractions within 2km of the Site.

16.10.6 The assessment found that, with appropriate mitigation in place, the scale of potential effects was no greater than negligible. As such, there would be no significant effect from the proposed development on the water environment.

16.10.7 ES Appendix 10.1 (Flood Risk Assessment and Drainage Strategy) found that the majority of the Site is located within flood zone 1 (less than 0.1% chance of flooding every year) from fluvial flooding. Climate change impacts are estimated to have potential medium to high flood risks within the northern corners of the Site, associated with fluvial flooding; however, these are mitigated by the introduction of a

set development platform. There are small areas of the Site located within areas of medium to high risk of surface water flooding; however, the majority of the Site is at a low risk of surface water flooding. With appropriate mitigation in place the risk level has been assessed as between very low and low.

16.10.8 The assessment has concluded that, with appropriate mitigation in place, the scale of potential effects would be no greater than negligible. Additionally, an assessment of potential cumulative impacts as a result of the wider IAMP development and additional nearby developments has concluded that any cumulative impacts on the water environment would be no greater than negligible. As such, there would be no significant effect on the water environment, from the proposed development.

16.11 Geology and soils

16.11.1 The Proposed Development is located on 25ha of arable agricultural land plus 0.85ha of non-agricultural land (the site of West Moor Farm). The loss of 18.74ha of the agricultural land within the Site has already been consented by the grant of planning permission for IAMP ONE Phase One; therefore, the grant of planning permission for the Proposed Development (IAMP ONE Phase Two) would only involve a further loss of 6.26ha.

16.11.2 Two detailed soil and ALC surveys have been conducted within the Site, both showing the soils to be slowly permeable clay loams over clays, the wetness of which limits the agricultural quality of the land to ALC Subgrade 3b (moderate quality, non-BMV).

16.11.3 All land within the Site would be permanently removed from agricultural use due to the Proposed Development. However, as the land is non-BMV the loss is considered not to be significant.

16.11.4 The application of standard good practice soil management measures would reduce levels of soil loss and disturbance to negligible and not significant. Additionally, where practicable, the reuse of soils within areas of landscaping and greenspace would be maximised, with excess soils transported from Site for beneficial reuse elsewhere.

16.11.5 As the effects of the Proposed Development are negligible and not significant, there is no scope for any significant inter-project cumulative effect when the proposed Development is considered in combination with ‘other developments’ in the locality.

16.12 Ecology and biodiversity

16.12.1 The IAMP as a whole includes 110ha of land allocated as Ecological and Landscape Mitigation Area (ELMA). This land will be used to implement some of the mitigation and/or compensation for impacts of the IAMP development on the habitats and species of the area. Of the 110 hectares of ELMA, 43.6 hectares is associated with IAMP ONE and 66.4 hectares relates to IAMP TWO. The ecological mitigation for IAMP ONE has already been agreed with the Council through the approval of the IAMP ONE Habitat Management Plan (DWS Ecology, November 2018) and is being established on-site. As such, the mitigation for part of the Site that overlaps with the 2018 IAMP ONE permission has already been agreed and is being established.

16.12.2 The effects of the proposed development on the ecology within the triangular area of land (the area without planning consent) has now been assessed and relates to the loss of possible barn owl and bat habitat associated with the demolition of the West Moor Farm buildings, as well as the loss of a small area of arable land and associated hedgerows from within the triangle of land in the south-western part of the Site. Assessment of the remainder of the Site has been carried out as part of the work done to inform the 2018 IAMP ONE ES, and as ongoing survey work.

16.12.3 The site does not lie within, or in close proximity to any designated areas of ecological interest.

16.12.4 Analysis of the ecological interest of the Site has identified this to be of no greater than local level.

16.12.5 No significant adverse effects on the ecology and biodiversity of the local area are predicted, including cumulative effects. Mitigation and compensation measures are proposed to ensure that the development of the Site can make a long-term, positive contribution to the local ecology and biodiversity interest of the area. Measures to ensure that there is biodiversity net gain within the Site, in accordance with Sunderland City Council's Core Strategy and Development Plan Policy NE2, are proposed.

16.12.6 These mitigation measures include the provision of barn owl and bat boxes as compensation for loss of the barns within West Moor Farm. Demolition of the buildings will only commence once a Natural England licence method statement is in place for key buildings (along with precautionary method statements for other buildings) and checking surveys of all the buildings have been completed.

16.12.7 Further habitat enhancement may be required within the Ecological and Landscape Mitigation Area (ELMA); this could include:

- reducing the average field size to around 2ha, allowing the creation of new species-rich hedgerows with deep ditches alongside designed to retain water;
- using game cover crops to support wintering birds and species such as grey partridge;
- creation of new field ponds at hedge junctions;
- allowing hedgerows to grow beyond the 2m height and 1.5m width currently specified;
- inversion ploughing and re-seeding of the fertile grass field (Field 1 within the Mitigation Plan for IAMP ONE, DWS, November 2018); and
- creation of skylark / lapwing plots within arable fields through topsoil stripping in areas where winter waterlogging is likely, with the arisings distributed over the adjacent arable land.

16.13 Access and transport

16.13.1 Consideration has been given to the potential access and transport impacts of the proposed development during construction and operation. Maximum residual impacts have been assessed as major adverse (significant) in relation to fear and intimidation, and moderate adverse (which may be significant) in relation to pedestrians and cyclists – from severance, changes in amenity and delay.

16.13.2 Mitigation measures have been identified for IAMP ONE Phase Two to address these aspects. Importantly, the IAMP ONE Phase Two development will not generate any additional traffic, due to the constraint on floor space being limited to that consented previously for IAMP ONE (Phase One).

16.13.3 The mitigation measures for IAMP ONE Phase One will be equally applicable for Phase Two (i.e. provision of facilities for cyclists, pedestrians and bus travel, other sustainable transport measures, compliance with the Highways Operational Management Plan and the development of a Construction Traffic Management Plan, for example). With these measures in place, it is anticipated that any residual effects on access and transport will not be significant.

16.13.4 The negative effects associated with the construction phase are temporary and, during its operational phase, the mitigation measures will reduce the impact on the transport environment.

16.13.5 Overall, the mitigation measures outlined above have the potential to enable IAMP ONE Phase Two to be built in a positive way. In addition, the Travel Plan, managed by the Travel Plan Coordinator, will increase community participation in further meeting the travel demands of the development, once operational. Indeed, the Travel Plan is one of the primary mitigation measures.

16.14 Vulnerability to major accidents and disasters

16.14.1 An assessment has been carried out of the vulnerability of the proposed development to major accidents and disasters. This has considered the scope for the proposed development to be vulnerable to any existing, albeit low-likelihood, environmental hazards that would introduce (or increase) the risk of adverse effects on sensitive receptors (people and the environment). Construction and operational effects have been considered separately; cumulative effects (with IAMP ONE and IAMP TWO, and with other proposed developments) have also been assessed.

16.14.2 The assessment has considered natural and man-made / industrial hazards. Mitigation measures are identified where required.

16.14.3 The assessment has concluded that, with the appropriate measures to control aspects such as dust dispersion, and flood risk, the vulnerability of the proposed development to major accidents and disasters, including cumulatively with other developments, can be considered to be very low and not significant.

16.15 Cumulative effects

16.15.1 An assessment of the potential for the development to result in cumulative effects, from the combination of environmental aspects associated with the proposed development itself (intra-project effects) and from the combination of the proposed development and other developments within the local area (including the wider areas of IAMP ONE Phase One and IAMP TWO).

16.15.2 The proposed development is considered to have very limited scope for significant cumulative effects, either as intra-project or inter-project effects, or in relation to the combined effects of the proposed development on the natural environment, and on the people and property of the area. The **occupants of North Moor Farm** are the only

receptor for whom significant cumulative effects could result, in the absence of the proposed mitigation.

16.15.3 With the appropriate mitigation measures in place, as outlined in the relevant technical chapters of this ES, any cumulative effects would not be significant.

16.15.4 No additional mitigation measures are considered necessary in respect of cumulative effects.

16.16 Summary

16.16.1 The proposed development of the IAMP ONE Phase Two site (the Site) has been assessed for its potential effects on the environment of the local area. Only a limited number of significant effects have been identified.

16.16.2 Significant effects on visual amenity have been identified for the occupants of **North Moor Farm**, to the north of the Site, from the operational presence of the proposed IAMP ONE Phase Two development and also in relation to cumulative effects on visual amenity, from the combination of the proposed development and the wider areas of IAMP ONE Phase One and IAMP TWO (northern development area). In addition, significant effects on visual amenity have been identified for the occupants of the properties at Hylton Bridge Farm and the two roadside properties at Hylton Grove Farm. No other significant visual effects have been identified for residential receptors. With the implementation of the proposed mitigation (perimeter planting and additional hedgerow tree planting) these effects would reduce to below significant in the longer-term.

16.16.3 Of the three viewpoints assessed within the LVIA, the only significant effects identified were in relation to users of the A1290, westbound, in the vicinity of the main entrance to the site (Viewpoint 1). Views for west-bound motorists at this location, post-completion and cumulatively with IAMP ONE Phase One, would be near-distance; in the medium to longer term these significant effects would reduce with the establishment of perimeter and internal tree planting.

16.16.4 Some significant adverse effects have been identified in respect of access and transport, specifically in relation to effects on pedestrians and cyclists, but the mitigation measures proposed as part of IAMP ONE Phase One can be expected to reduce these to below significant levels.

16.16.5 Provided that the identified mitigation is implemented as proposed, no significant residual longer-term cumulative effects on the natural environment, or on the people and property of the area, have been identified. In the absence of such mitigation there would be scope for significant cumulative effects on the **occupants of North Moor Farm**.

16.16.6 Overall, it can be concluded that the effects of the proposed development of the IAMP ONE Phase Two area can be suitably mitigated such that there would be no unacceptable level of harm to the environment of the local area.

17 GLOSSARY

TERM	DESCRIPTION
Aged or veteran tree	A tree which, because of its great age, size or condition is of exceptional value for wildlife, in the landscape, or culturally.
Agricultural Land Classification (ALC)	Agricultural Land Classification (ALC) is the standardised method for classifying the quality of agricultural land in England and Wales according to its versatility, productivity and workability, based upon inter-related parameters including climate, relief, soil characteristics and drainage. These factors form the basis for classifying agricultural land into one of five grades: Grade 1 (excellent); Grade 2 (very good); Grade 3 (good to moderate), divided into Subgrades 3a (good) and 3b (moderate); Grade 4 (poor); and Grade 5 (very poor). For detailed descriptions of the grades and the ALC methodology the reader is referred to MAFF (1988) Agricultural Land Classification (ALC) of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land (available online at: http://webarchive.nationalarchives.go v.uk/20130402200910 /http://archive.defra.gov.uk/foodfarm/landmanage/land-use/documents/alc-guidelines-1988.pdf).
Air Quality Management Areas	Areas designated by local authorities because they are not likely to achieve national air quality objectives by the relevant deadlines.
Ambient noise	Total encompassing sound in a given situation at a given time usually composed of sound from many sources near and far. Includes both the residual noise and the specific noise from site operations when present.
Analysis (Landscape)	The process of breaking the landscape down into its component parts to understand how it is made up.
Ancient woodland	An area that has been wooded continuously since at least 1600 AD.
Archaeological interest	There will be archaeological interest in a heritage asset if it holds, or potentially may hold, evidence of past human activity worthy of expert investigation at some point. Heritage assets with archaeological interest are the primary source of evidence about the substance and evolution of places, and of the people and cultures that made them.
Article 4 direction	A direction which withdraws automatic planning permission granted by the General Permitted Development Order.
Assessment (Landscape)	An umbrella term for description, classification and analysis of landscape.
Best and most versatile (BMV) agricultural land	The National Planning Policy Framework (Department for Communities and Local Government, 2012) defines BMV agricultural land as land of excellent (ALC Grade 1), very good (Grade 2) and good (Subgrade 3a) agricultural quality. BMV land is afforded a degree of protection against development within planning policy. See above for Agricultural Land Classification (ALC) definition.

TERM	DESCRIPTION
Competent person (to prepare site investigation	A person with a recognised relevant qualification, sufficient experience in dealing with the type(s) of pollution or land instability, and membership of a relevant professional organisation.
Conservation (for heritage policy)	The process of maintaining and managing change to a heritage asset in a way that sustains and, where appropriate, enhances its significance.
Constraints Map	Map showing the location of important resources and receptors.
Countryside	The rural environment and its associated communities (including the coast).
Cumulative effects	The summation of effects that result from changes caused by a development in conjunction with other past, present or reasonably foreseeable actions.
dB(A)	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness.
Decibel (dB)	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference level. For sound pressure level the reference quantity is 20 micro-pascals, the threshold of hearing (0 dB). 140 dB(A) is the threshold of pain.
Designated heritage asset	A World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under the relevant legislation.
Development Consent Order (DCO)	The means whereby nationally significant infrastructure projects are taken through the planning process, simplifying consents on complicated projects (typically where there are multiple landowners). Introduced by the Planning Act 2008 and intended to simplify and speed up the planning process.
Development plan	This includes adopted Local Plans, neighbourhood plans and the London Plan, and is defined in section 38 of the Planning and Compulsory Purchase Act 2004. (Regional strategies remain part of the development plan until they are abolished by Order using powers taken in the Localism Act. It is the government's clear policy intention to revoke the regional strategies outside of London, subject to the outcome of the environmental assessments that are currently being undertaken.)
Diversity	Where a variety of qualities or characteristics occurs.
"Do-nothing" scenario	The predicted future environmental conditions which would exist in the absence of the development.
"Do Nothing" Situation	Continued change/evolution of landscape or of the environment in the absence of the proposed development.
EIA Planning Regulations	In England and Wales these are The Town and Country Planning (Assessment of Environmental Effects) Regulations 2017, plus amendments.

TERM	DESCRIPTION
EIA Directive	Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment. Reproduced in the Guide to Procedures.
Ecological networks	These link sites of biodiversity importance.
Economic development	Development, including those within the B Use Classes, public and community uses and main town centre uses (but excluding housing development).
Ecosystem	A community of interdependent plants and animals together with the environment which they inhabit and with which they interact.
Ecosystem services	The benefits people obtain from ecosystems such as, food, water, flood and disease control and recreation.
Element	A component part of the landscape (e.g. roads, hedges, woods).
Enhancement	Landscape / visual improvement through restoration, reconstruction or creation.
Environment	Our physical surroundings including air, water and land.
Environmental Appraisal	A generic term for the evaluation of the environmental implications of proposals. (Used by the UK Government in respect of policies and plans).
Environmental Assessment	A process by which information about the environmental effects of a project is collected, both by the developer and from other sources, and taken into account by the relevant decision-making body before a decision is given and whether the development should go ahead.
Environmental Effects	The consequences for human being in terms of health and well-being, including the well-being of ecosystems and natural systems on which human survival depends, which stem from environmental impacts.
Environmental Fit	The relationship of a development to identified environmental opportunities and constraints in its setting.
Environmental Impacts	The processes whereby a change, which may be adverse, beneficial, or both, is brought about in the existing environment as a result of development activities.
Environmental impact assessment (EIA)	The evaluation of the effects of particular development proposals on the environment.
Environmental Statement	A document which reports on the assessment of the likely effects (the EIA) of the specific project on the environment and which is submitted in conjunction with an application for planning permission.
European site	This includes candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas, and is defined in regulation 8 of the Conservation of Habitats and Species Regulations 2010.

TERM	DESCRIPTION
Fauna	All members of the animal kingdom: vertebrates (e.g. birds, mammals and fish) and invertebrates (e.g. insects).
Field Capacity	The water content of soil after it has been saturated in the field and excess water has drained away (usually 48 hours following a rainfall event). The soil is fully saturated and has no capacity to absorb additional water, further rainfall would infiltrate quickly under the force of gravity or create waterlogging, consequently the soil moisture deficit is zero.
Field Capacity Days (FCD)	The median number of days at which the soil is at field capacity.
Field pattern	The pattern of hedges and walls that define fields in farmed landscapes.
Flora	All members of the plant kingdom: higher ferns, ferns and fern allies, mosses and liverworts, algae and phytoplankton, fungi and lichens.
Free Field	An external sound field in which no significant sound reflections occur (apart from the ground).
Geodiversity	The range of rocks, minerals, fossils, soils and landforms.
Geographical information system	Computerised database of geographical information that can easily be updated and manipulated.
Gleying	Gleying is the process of iron reduction (opposite to oxidation) in soils from ferric (reddish in colour) to ferrous compounds (colourless), by microorganisms or by-products of decomposing organic matter, and subsequent removal of those compounds by water moving through the soil profile (ferrous compounds are soluble in water). Gleying occurs in areas devoid of oxygen when the soil is waterlogged. The resulting mottling (spots or blotches of colour) can therefore be used to identify occurrence of temporary excessive soil wetness.
Green infrastructure	A network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities.
Group 7.1: Stagnogley soils	Have a distinct topsoil. They occur widely in lowland Britain, on tills and soft argillaceous rocks.
Group 8.1: Sandy gley soils	Are predominantly sandy and developed chiefly in aeolian (wind-blown) or glaciofluvial (water sediments settled during glaciation periods) deposits.
Historic environment	All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora.
Historic environment record (HER)	Information services that seek to provide access to comprehensive and dynamic resources relating to the historic environment of a defined geographic area for public benefit and use.

TERM	DESCRIPTION
Indirect Impacts	Impacts on the environment, which are not a direct result of the development but are often produced away from it or as a result of a complex pathway. Sometimes referred to as secondary impacts.
International Advanced Manufacturing Park	The area of land set aside for the development of automotive and associated manufacturing industries with the objective of bringing investment and employment to the north-east of England.
International, national and locally designated sites of importance for biodiversity	All international sites (Special Areas of Conservation, Special Protection Areas, and Ramsar sites), national sites (Sites of Special Scientific Interest) and locally designated sites including Local Wildlife Sites.
$LA_{10,T}$	The "A weighted" noise level exceeded for 10 per cent of the specified measurement period (T). It gives an indication of the upper limit of
$LA_{90,T}$	The "A weighted" noise level exceeded for 90 per cent of the specified measurement period (T).
$LA_{eq,T}$	The "A weighted" equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as the actual fluctuating sound over the same time period (T).
Land Use	The primary use of the land, including both rural and urban activities.
Lmax	The highest noise level recorded during a noise event or measuring period.
Landcover	Combinations of land use and vegetation, that cover the land surface.
Landform	Combinations of slope and elevation, that produce the shape and form of the land.
Landscape	Human perception of the land conditioned by knowledge and identity with a place.
Landscape Capacity	The degree of change (e.g. due to development or land use change) that can take place in a landscape without unacceptable adverse effects on its character. The acceptable level of change is usually defined through consultation.
Landscape Character	The distinct, recognisable and consistent combination (or pattern) of elements which occurs in an area of landscape; the way in which all the components come together to make the landscape distinctive.
Landscape Effects	Change in the elements, characteristics, character and qualities of the landscape as a result of development. These effects can be positive or negative.
Landscape Evaluation	The process of attaching value (non-monetary) to a particular landscape, usually by the application of previously agreed criteria, including consultation and third party documents, for a particular purpose (e.g. designation or in the context of the assessment).
Landscape Factor	A circumstance or influence contributing to the impression of a landscape (e.g. scale, enclosure, elevation).

TERM	DESCRIPTION
Landscape Feature	A prominent eye-catching element, e.g. wooded hill top or church spire.
Landscape Quality	The state of repair or condition of the elements of a particular landscape, its integrity and intactness, and the extent to which its distinctive character is apparent.
Landscape Resource	The combination of elements that contribute to landscape context, character and value.
Landscape Sensitivity	The extent to which a landscape can accept change of a particular type and scale, without unacceptable adverse effects.
Landscape Type	Types of landscape that are homogenous in character, sharing broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern.
Landscape Value	The importance attached to a landscape or view, (often as a basis for designation or recognition) which expresses national or local consensus, because of its quality, special qualities, cultural associations or ecological state.
Local Nature Partnership	A body, designated by the Secretary of State for Environment, Food and Rural Affairs, established for the purpose of protecting and improving the natural environment in an area and the benefits derived from it.
Local Plan	The plan for the future development of the local area, drawn up by the local planning authority in consultation with the community. In law this is described as the development plan documents adopted under the Planning and Compulsory Purchase Act 2004. Current core strategies or other planning policies, which under the regulations would be considered to be development plan documents, form part of the Local Plan. The term includes old policies which have been saved under the 2004 Act.
Local planning authority	The public authority whose duty it is to carry out specific planning functions for a particular area. All references to local planning authority apply to the district council, London borough council, county council, Broads Authority, National Park Authority and the Greater London Authority, to the extent appropriate to their responsibilities.
Lower Plastic Limit	The lower plastic limit (also referred to as plastic limit) is defined as the moisture content at which soil begins to behave as a plastic material. If the moisture content is below the lower plastic limit, it is considered to behave as a solid, or a non-plastic material. (See also, Plastic)
Magnitude	A combination of the scale, extent and duration of an effect.
Major group 7: Surface-water	Seasonally waterlogged slowly permeable soils, prominently mottled above 40 cm depth.

TERM	DESCRIPTION
Major group 8: Ground-water gley soils	Normally developed within or over permeable materials, have prominently mottled or uniformly grey subsoils resulting from periodic waterlogging by a fluctuating groundwater-table.
Mitigation	Any process, activity or thing designed to avoid, reduce or remedy adverse environmental impacts likely to be caused by a development project.
National Trails	Long distance routes for walking, cycling and horse riding.
Nature Improvement Areas	Inter-connected networks of wildlife habitats intended to re-establish thriving wildlife populations and help species respond to the challenges of climate change.
Open space	All open space of public value, including not just land, but also areas of water (such as rivers, canals, lakes and reservoirs) which offer important opportunities for sport and recreation and can act as a visual amenity.
Pathways	The routes by which impacts are transmitted through air, water, soils or plants and organisms to their receptors.
Perception (of landscape)	The psychology of seeing and possibly attaching value and/or meaning (to landscape).
Planning condition	A condition imposed on a grant of planning permission (in accordance with the Town and Country Planning Act 1990) or a condition included in a Local Development Order or Neighbourhood Development Order.
Planning obligation	A legally enforceable obligation entered into under section 106 of the Town and Country Planning Act 1990 to mitigate the impacts of a development proposal.
Plastic	A plastic material can be moulded into a shape and the material will retain that shape. When a soil is in a plastic state it is considered to be too wet to be handled. (See also Lower Plastic Limit)
Pollution	Anything that affects the quality of land, air, water or soils, which might lead to an adverse impact on human health, the natural environment or general amenity. Pollution can arise from a range of emissions, including smoke, fumes, gases, dust, steam, odour, noise and light.
Potential impacts	Impacts which could occur in the absence of appropriate design modifications or preventative measures.
Precautionary Principle	Principle applied, to err on the side of caution where significant environmental damage may occur, but knowledge on the matter is incomplete, or when the prediction of environmental effects is uncertain.
Predicted impacts	Those impacts which are predicted as a consequence of the development although the nature and severity of their effect will be conditioned by the scope for mitigation.
Preference	The liking by people for one particular landscape element, characteristic or feature over another.

TERM	DESCRIPTION
Priority habitats and species	Species and Habitats of Principle Importance included in the England Biodiversity List published by the Secretary of State under section 41 of the Natural Environment and Rural Communities Act 2006.
Quality	(See landscape quality)
Ramsar sites	Wetlands of international importance, designated under the 1971 Ramsar Convention.
Receptor	Physical landscape resource, special interest or viewer group that will experience an effect.
Receptors	A component of the natural or man-made environment such as water, air, a building, or a plant that is affected by an impact.
Regulatory Authority	The planning or other authority responsible for planning consents or project authorisation (synonymous with Determining or Competent Authority).
Residual noise	The ambient noise remaining at a given position in a given situation when the specific noise is suppressed to such a degree such that it does not contribute to the ambient noise.
Rochdale Envelope	
Safeguarding zone	An area defined in Circular 01/03: Safeguarding aerodromes, technical sites and military explosives storage areas, to safeguard such sites.
Scenario	A picture of a possible future.
Scoping	An initial stage in determining the nature and potential scale of the environmental impacts arising from the proposed development, and assessing what further studies are required to establish their significance.
Sense of Place (Genius Loci)	The essential character and spirit of an area: Genius Loci, literally 'spirit of the place'.
Sensitivity	(See landscape sensitivity)
Setting of a heritage asset	The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.
Sieve Mapping	Technique for mapping environmental constraints, working from a series of overlays, sieving out less important factors.
Significance (for heritage policy)	The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.

TERM	DESCRIPTION
Site investigation information	Includes a risk assessment of land potentially affected by contamination, or ground stability and slope stability reports, as appropriate. All investigations of land potentially affected by contamination should be carried out in accordance with established procedures (such as BS10175 (2001) Code of Practice for the Investigation of Potentially Contaminated Sites). The minimum information that should be provided by an applicant is the report of a desk study and site reconnaissance.
Site of Special Scientific Interest	Sites designated by Natural England under the Wildlife and Countryside Act 1981.
Soil	The surface layer of the Earth's crust composed of weathered rock, alive and dead organic matter (plant roots, soil fauna and microorganisms), water and air. Soil has important functions such as providing habitat for plant growth, transformation of mineral and organic compounds, carbon storage (in soil organic matter, or humus), water and air filtration, support for buildings, protection of archaeological artefacts. Soil is typically divided into horizontal layers, the main ones are: topsoil and subsoil. Topsoil is the most biologically active and fertile surface layer rich in organic matter. Typical topsoil depth is 25 to 35 cm (plough layer in arable farming). Subsoil is typically characterised by low content of organic matter (except peat or organic soils) and is less biologically active and fertile, it typically extends to 1.20m or bedrock, if the soil is shallower.
Soil Association	Soil association is a geographic grouping of soils identified by the name of the most frequently occurring soil series and by the combination of ancillary soil series. Soil associations are mapped as map units on the Soil Survey of England and Wales soil maps, each unit has got a number code indicating predominant major soil group, group and subgroup. For example, association 821b (Blackwood) is dominated by soil of the Blackwood series belonging to subgroup 8.21, the *typical* subdivision of soil group 8.2, *Sandy gley soils*, which are part of major group 8, *Ground-water gley soils*.

TERM	DESCRIPTION
Soil horizons	***A horizon*** The A horizon is often referred to as the 'topsoil'. This layer contains enough partially decomposed organic matter to give the soil a darker colour than the lower horizons. This horizon is often coarser in texture, having lost some of the finer materials by translocation to lower horizons and by erosion. Most biological activity occurs in this layer. This horizon can be subdivided into *Ap* (ploughed) or *Ah* (uncultivated). ***B Horizon*** The B horizon is formed below an A horizon and has undergone sufficient changes during soil genesis, such that properties of the original parent material are no longer discernible. This horizon is commonly referred to as the 'subsoil'. Materials typically accumulate through alluviation, where the materials gradually wash in from overlying horizons. This horizon can be subdivided into *Bt* (enriched with alluvial clay), *Btg* (affected by gleying under periodically waterlogged reduced conditions to give a greyish matrix of chroma < 3 and value ≥ 4), *Bw* (altered by weathering to release clay and iron oxides, soil structure formation, and/or carbonate removal to give a distinct colour or structure), *Bs* (enriched with iron or aluminium to give reddish hue ≥ 7.5YR and chroma ≥ 4), *Bf* (cemented to form a thin (< 5 mm) iron pan) or *Bk* (calcareous, enriched with whitish alluvial carbonates).
Soil series	Soil series is the lower categorical level of the soil classification used in England and Wales. Soils series are defined using a combination of three main properties, the broad type of parent material present (substrate type), the texture of the soil material (textural grouping) and the presence or absence of material with a distinctive mineralogy.
Specific noise	The noise source under investigation.
Stepping stones	Pockets of habitat that, while not necessarily connected, facilitate the movement of species across otherwise inhospitable landscapes.
Strategic Environmental Assessment	A procedure (set out in the Environmental Assessment of Plans and Programmes Regulations 2004) which requires the formal environmental assessment of certain plans and programmes which are likely to have significant effects on the environment.
Supplementary planning documents	Documents which add further detail to the policies in the Local Plan. They can be used to provide further guidance for development on specific sites, or on particular issues, such as design. Supplementary planning documents are capable of being a material consideration in planning decisions but are not part of the development plan.
Sustainable transport modes	Any efficient, safe and accessible means of transport with overall low impact on the environment, including walking and cycling, low and ultra low emission vehicles, car sharing and public transport.

TERM	DESCRIPTION
Sustainability	The principle that the environment should be protected in such a condition and to such a degree that ensures new development meets the needs of the present without compromising the ability of future generations to meet their own needs.
Technique	Specific working process.
Threshold	A specified level in grading effects e g of magnitude, sensitivity or
Tonality	The degree to which a noise contains clearly discernible pure tones. Noise without such tonal content (Broadband noise) is generally less annoying than noise with identifiable tones.
Transport assessment	A comprehensive and systematic process that sets out transport issues relating to a proposed development. It identifies what measures will be required to improve accessibility and safety for all modes of travel, particularly for alternatives to the car such as walking, cycling and public transport and what measures will need to be taken to deal with the anticipated transport impacts of the development.
Transport statement	A simplified version of a transport assessment where it is agreed the transport issues arising out of development proposals are limited and a full transport assessment is not required.
Travel plan	A long-term management strategy for an organisation or site that seeks to deliver sustainable transport objectives through action and is articulated in a document that is regularly reviewed.
Visual Amenity	The value of a particular area or view in terms of what is seen.
Visual Effect	Change in the appearance of the landscape as a result of development. This can be positive (i.e. beneficial or an improvement) or negative (i.e. adverse or a detraction).
Visual Envelope	Extent of potential visibility to or from a specific area or feature.
Visualisation	Computer simulation, photomontage or other technique to illustrate the appearance of a development.
Wildlife corridor	Areas of habitat connecting wildlife populations.
Worst Case Situation	Principal applied where the environmental effects may vary e.g. seasonally to ensure the most severe potential effect is assessed.
Zone of Theoretical Visibility	(ZTV) Area within which a proposed development may have an influence or effect on visual amenity. Usually based on a bare ground model with no localised variations in ground level, buildings or tree screening included.