

Fallowfield Campus Redevelopment Project

Environmental Statement: Volume I – Main Report

0053454

25 August 2023

Revision P02

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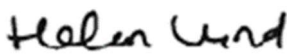
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date 25.08.23

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Table 1—1 Structure of the Environmental Statement

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1 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

- 1.1.1
- The University of Manchester (UoM) (the ‘applicant’) is seeking outline planning permission for development proposed at the UoM’s Fallowfield Campus (hereafter referred to as the ‘site). The location and boundary of the site can be found within Chapter 2 of this Environmental Statement (ES). The centre of the site is located at UK National Grid Reference SJ 85723 94142. The area of the site is approximately 9.49 hectares.
- 1.1.2
- The Fallowfield Campus Redevelopment Project (hereafter referred to as the “proposed development”) comprises redevelopment of the site to provide purpose built student accommodation as follows:

“Outline planning application (with access only) for the phased demolition of existing buildings and phased development of up to 3,300 Purpose Built Student Accommodation bedrooms (Sui Generis use class) with associated facilities including waste storage, laundry and cycle storage; up to 4,500 sq m of floorspace to be used for ancillary purposes associated with the student residential use of the site within Use Class F1a, Class E(a), E(b), E(c), E(d), E(g), Sui Generis (drinking establishment and hot food takeaway); ancillary supporting staff accommodation (up to 55 bedrooms) (Sui Generis use class), and up to 1,200 sq m, of ancillary residential dwellings (Use Class C3), plus associated car parking, hard and soft landscaping, open space, utilities, footpaths and roads.”
- 1.1.3
- This ES reports on the findings of the Environmental Impact Assessment (EIA) process and has been prepared on behalf of the applicant to accompany the planning application for the proposed development.

1.2 ABOUT THE APPLICANT

- 1.2.1
- UoM is a public research university in Manchester, founded in 2004. The university has 44,000 students across undergraduate, masters and research courses and 13,000 staff across academia and professional services. The university provides approximately 8,000 rooms in about 20 halls of residence which guarantees every first year undergraduate an offer of accommodation.
- 1.2.2
- UoM wants to redevelop its existing aging purpose built student residential accommodation at Owens Park, Woolton Hall and Oak House, all of which form part of the site. It is imperative to the ongoing success of UoM that it can continue to provide high-quality accommodation which provides the modern facilities that are needed to ensure the university can remain competitive and attract, and retain, the best students. The proposed development provides an opportunity to not just raise the standard of campus accommodation, but also in attracting returning students (2nd years, 3rd years and postgraduates) and meeting the existing demand of students that are unable to secure on-campus accommodation and instead are having to occupy houses in multiple occupation (HMOs) within the wider Fallowfield area and across the city.
- 1.2.3
- UoM recognises the current environmental challenges and its role in meeting these challenges. It has developed an Environmental Sustainability Strategy¹ which outlines the core goals and plan for reducing carbon footprint and promoting sustainability in learning, research and innovation, and engage and supporting the community in the transition to a more sustainable society. The University’s strategy has three core goals; social responsibility, teaching and learning, and research and discovery.

¹ University of Manchester (2023) Our Sustainable Future: Environmental Sustainability Strategy 2023-2028. [display.aspx \(manchester.ac.uk\)](#)

1.3 DEFINITION OF ENVIRONMENTAL IMPACT ASSESSMENT

- 1.3.1
- The term ‘environmental impact assessment’ describes a procedure that must be followed for certain types of project before they can be given ‘development consent’. The procedure is a means of drawing together, in a systematic way, an assessment of a project’s likely significant environmental effects. This helps to ensure that the importance of the predicted effects and the scope for mitigating them are properly understood by the public and the relevant competent authority before it makes a decision.
- 1.3.2
- EIA is defined as “*a process for identifying the environmental effects (positive and negative) of proposed developments before development consent is granted. The aim of EIA is to prevent, reduce or offset the significant adverse environmental effects of development proposals, and enhance positive ones. It is a means to ensure that planning decisions are made in the knowledge of the attendant environmental effects and with full engagement of statutory bodies, local and national groups and members of the public*”².

1.4 REQUIREMENT FOR ENVIRONMENTAL IMPACT ASSESSMENT

- 1.4.1
- The Town and Country Planning (EIA) Regulations 2017 (hereafter referred to as the “EIA Regulations”) transposed the European Union (EU) Directive 2014/52/EU (“2014 EIA Directive”) into UK law on 16th May 2017.
- 1.4.2
- Projects that require or may require an EIA are set out in Schedule 1 and 2 of the EIA Regulations. A Schedule 1 development automatically requires an EIA as this has the most potential to cause environmental effects. The proposed development is not considered a Schedule 1 development in accordance with the EIA Regulations.
- 1.4.3
- Schedule 2 relates to development, other than exempt development, of a description mentioned in column 1 of the table in Schedule 2, where:

a) Any part of the development is to be carried out in a sensitive area or

b) Any applicable threshold or criterion in the corresponding part of column 2 of Schedule 2 is respectively exceeded or met in relation to that particular development.
- 1.4.4
- With regards to the first criteria for Schedule 2 development, according to the EIA Regulations, a “sensitive area” relates to any of the following:

 - “Land notified under section 28(1) (sites of special scientific interest) of the Wildlife and Countryside Act 1981;
 - A National Park within the meaning of the National Parks and Access to the Countryside Act 1949;
 - The Broads;
 - A property appearing on the World Heritage List kept under article 11(2) of the 1972 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage;
 - A scheduled monument within the meaning of the Ancient Monuments and Archaeological Areas Act 1979;
 - an area of outstanding natural beauty designated as such by an order made by Natural England under section 82(1) (areas of outstanding natural beauty) of the Countryside and Rights of Way Act 2000 as confirmed by the Secretary of State;
 - A European site;”

² Department for Communities and Local Government (DCLG) (2006) Environmental Impact Assessment: A guide to good practice and procedures – A consultation paper, DCLG.

- 1.4.5

The site does not contain any of the designations outlined above, therefore it does not constitute a “sensitive area.” The surrounding area contains a scheduled monument (Nico Ditch) located approximately 160m north west of the site (which will not be affected by the proposed development) and numerous listed buildings.
- 1.4.6

Regarding the second criteria for a Schedule 2 development, the proposed development falls under Category 10b in Column 1 of the table in Schedule 2. This refers to infrastructure projects: urban development projects.
- 1.4.7

The 2017 EIA Regulations include ‘exclusion thresholds and criteria’, above which an EIA is required if significant environmental effects are considered likely. As the proposed development is classified as an urban development project, the following criteria set out in Column 2 of Schedule 2 apply:

1.

“The development includes more than 1 hectare of urban development which is not dwellinghouse development; or

2.

The development includes more than 150 dwellings; or

3.

The overall area of the development exceeds 5 hectares.”
- 1.4.8

Given the proposed development includes more than 150 dwellings and the site is approximately 9.49 ha in size, the applicant acknowledges that the project constitutes EIA development, and has therefore prepared an EIA for the proposed development, including production of this ES.

1.5 STRUCTURE OF THE ENVIRONMENTAL STATEMENT

- 1.5.1

This ES has been prepared to meet the requirements of Regulation 4 and Schedule 4 of the EIA Regulations. It is recognised within the EIA Regulations that the ES should report on the likely significant environmental effects of a proposed development and as a result, the content of this ES has focused on the likely significant residual environmental effects of the proposed development. The structure of the ES and supporting documentation is outlined below in Table 1—1.

Table 1—1 Structure of the Environmental Statement

Volume	Description
Non-Technical Summary	This provides a summary of the main ES in non-technical language. The Non-Technical Summary is available as a separate document.
Volume I – Main Report	This report introduces the proposed development description, alternatives considered, the methodology which has been followed in undertaking the EIA, the assessment of significant environmental effects (both beneficial and adverse) and consideration of cumulative interactive effects. Table 1—2 below provides further description.
Volume II – Heritage, Townscape and Visual Impact Assessment (HTVIA)	The HTVIA is provided in its own volume of the ES, due to the size of the assessment. The assessment is consistent with and follows the same structure and format as the environmental assessments contained within Volume I of the ES, where the conclusions are additionally captured from the HTVIA.
Volume III - Appendices to Main Report	These technical appendices comprise specific supporting documents such as site surveys and calculations etc. which support the assessments in Volume I.

- 1.5.2

Volume I of the ES, the main report, is structured as outlined in Table 1-2.

Table 1—2 Structure of the ES Volume I – Main report

Chapter	Description
1	Introduction: comprises an introduction to the proposed development, an account of the environmental assessment requirements and an overview of the ES structure.
2	Development description: describes the site location and surrounding area in terms of the existing physical and social characteristics and land uses. This chapter also provides an account of the proposed development in terms of the demolition/construction and operational phases.
3	Alternatives and design evolution: this chapter presents information on the alternatives that have been considered by the applicant.
4	Enabling Works, Demolition and Construction: this chapter provides a summary of the demolition and construction programme and activities.
5	Methodology: this chapter provides an overview of the approach undertaken to ensure the requirements of the EIA Regulations are fulfilled. It indicates how key issues have been identified and addressed within the ES and the approach that has been taken for the EIA process.
6 - 9	Technical assessments: • Air Quality; • Noise and Vibration; • Ecology and Biodiversity; and • Climate Change and Greenhouse Gas (GHG) Emissions. These chapters present the assessment of effects during demolition/construction and operational phases of the proposed development for each topic area. The format of each chapter is generally as follows: • Introduction; • Baseline; • Prediction of impacts and assessment of effects; • Mitigation; and • Residual effects.
10	Interactive effects: this chapter presents the interactive effects resulting from the accumulation of effects generated by the proposed development on the same receptors.
11	Summary of residual effects, mitigation, and conclusions: this chapter identifies potential mitigation measures and summarises residual effects of the development once mitigation has been applied.

- 1.5.3

Appendices support the technical assessments included in Volume I of the ES. These are included in Volume III of the ES as shown in Table 1—3.

Table 1—3 List of appendices included with Environmental Statement Volume II

Appendix number	Topic	Description
3-A	Alternatives and Design Evolution	Climate Change Resilience Risk Assessment
5-A	Methodology	EIA Scoping Report
5-B		EIA Scoping Opinion
5-C		Response to the EIA Scoping Opinion
6-A	Air Quality	Assessing the Risk of Dust Impacts
6-B		Construction Dust Mitigation Measures
7-A	Noise and Vibration	Glossary of Acoustic Terms
7-B		Noise Survey Equipment Details
7-C		Construction Noise and Vibration Prediction Data
7-D		PPG:N Noise Exposure Hierarchy Table
7-E		Noise Survey Results
7-F		Site Suitability Assessment
8-A	Ecology and Biodiversity	Constraints and Opportunities Report
8-B		Bat Survey Report

Appendix number	Topic	Description
8-C		Biodiversity Net Gain Assessment
9-A	Climate Change and GHG Emissions	Greenhouse Gas Calculation Inputs

1.5.4 The outline planning application will be supported by a number of stand-alone documents that are not part of the ES but which will be referred to in the chapters where relevant. This will include the following documents:

- Archaeology Desk Based Assessment;
- Tree Report;
- Crime Impact Statement;
- Design and Access Statement;
- Design Principles Document;
- Planning Statement;
- Sustainability and Energy Statement (including BREEAM pre-assessment);
- Environmental Standards Statement;
- Blue and Green Infrastructure Strategy;
- Operational Waste Management Strategy;
- Socio-economic Regeneration Statement;
- Student Demand/Need Report (captured within the Planning Statement);
- Student Management Plan;
- Statement of Community Engagement;
- Ground Conditions Phase 1 Desk Study Report;
- Daylight, Sunlight and Overshadowing Assessment
- Flood Risk Assessment;
- Outline Drainage Strategy;
- Transport Assessment and Travel Plan;
- Wind Microclimate Desk Based Assessment
- Broadband Connectivity Assessment
- TV Reception Assessment
- Outline Ventilation Strategy;
- Outline Fire Safety Report (note that a Gateway One Fire Statement is not needed at the outline planning stage but will be provided at reserved matters); and
- Demolition Environmental Management Plan (restricted to Phase 1 demolition).

1.6 TECHNICAL TEAM

1.6.1 In line with Regulation 18(5) of the EIA Regulations, this ES has been prepared and coordinated by a team of experienced and qualified environmental consultants to ensure its completeness and quality. All technical chapters have been reviewed and signed off by appropriately qualified consultants. The technical EIA coordination team and chapter contributors, and their relevant qualifications and experience, are listed in Table 1—4 and Table 1—5.

Table 1—4 EIA coordinators

Buro Happold Consultant	Qualifications, experience and memberships
Helen Lund	Associate Director with 20 years’ experience in the delivery of EIA in the UK. Helen specialises in the coordination and management of all stages of the EIA process and has directed, managed or contributed to over 50 EIAs for large scale regeneration and infrastructure projects. She is a Practitioner Member of the Institute of Environmental Management and Assessment (IEMA).
Paul Norman	Senior Environmental Consultant with seven years’ experience in EIA and technical chapters in the UK. Paul has coordinated several EIAs covering urban and rural developments and has contributed technical chapters to over 20 others. He is a Chartered Environmentalist and Full Member of IEMA.
Courtney Cooper	Graduate Environmental Consultant with Graduate Membership of IEMA. She has an Architecture MA(Hons) and an Environmental Management MSc.
Andrea Gergely	Graduate Environmental Consultant with Graduate Membership of IEMA. She has an Environmental Management MSc.

Table 1—5 EIA technical specialists

Specialism	Consultant	Qualifications, experience and memberships
Air Quality	Peter Henshaw	Full member of IES (MIEnvSc) and IAQM, and Chartered Scientist. Air quality specialist with over 10 years of experience carrying out EIAs for developments in London and the UK.
	Kit Benjamin	Air Quality Consultant with over two years professional experience including undertaking air quality assessments for a wide range of projects. He has a first class integrated master’s degree in meteorology and climate (MMet) from the University of Reading. He is an associate member of the Institute of Air Quality Management and Institution of Environmental Science (AMIEEnvSc).
Noise and Vibration	Anne Thompson	Associate Director, Member of the Institute of Acoustics, Post Graduate Diploma in Acoustics and Noise Control, BSc Environmental Science
	Chris Geoff	Associate Acoustic Consultant with over 11 years’ experience and full membership of the Institute of Acoustics (MIOA). He has a MSc in Environmental and Architectural Acoustics.
Ecology and Biodiversity	Jenny Ross	Full Member of the Chartered Institute of Ecology and Environmental Management (CIEEM). 13 years of experience completing surveys, biodiversity net gain assessments and ecological impact assessments for a variety of development types and scales.
	Monica Lozano Subiranas	Ecologist with 5 years of experience undertaking Preliminary Ecological Appraisals, Biodiversity Net Gain, BREEAM ecology assessments and Ecological impact assessments. Mónica is a Qualifying member of the Chartered Institute of Ecology and Environmental Management (CIEEM), in the process to upgrade to Associate member.
	Mark Crowther	Mark Crowther is a Chartered Environmentalist (CEnv) and Full Member of IEMA. He is an EIA specialist with experience of

Specialism	Consultant	Qualifications, experience and memberships
Climate Change and Greenhouse Gas Emissions		coordinating EIAs for a range of mixed-use developments in the UK over the last 13 years.
	Charlotte Ainsworth	Graduate Environmental Consultant with Graduate Membership of the Institute of Environmental Management and Assessment (IEMA). She has a Geography BSc and a Climate Change MSc.
	Andrea Gergely	Graduate Environmental Consultant with Graduate Membership of the Institute of Environmental Management and Assessment (IEMA). She has an Environmental Management MSc.
Built Heritage, Townscape and Visual	Kirsten McKnight	Kirsten McKnight BA (Hons), MA, MSc, Associate Director at Stephen Levrant Heritage Architecture with a full IHBC membership. Kirsten has 20 years' experience of working in the heritage sector and leads SLHA's Manchester office.
	Anna Manley	Anna Manley BA (Hons), MA, Heritage and Townscape Consultant at Stephen Levrant Heritage Architecture with an Affiliate Membership of the IHBC. Anna has an MA in Buildings Archaeology and five years' experience as a consultant in the built environment.

1.7 ENVIRONMENTAL STATEMENT AVAILABILITY

- 1.7.1 This ES and all planning application documents are available for viewing online on MCC’s planning portal at <https://pa.manchester.gov.uk/online-applications/>.
- 1.7.2 Comments on the planning application can also be made online during the applicable consultation period using the link above.
- 1.7.3 Hard copies of the ES are available for viewing by members of the public at MCC’s planning offices.
- 1.7.4 In addition, a printed version (with an appropriate charge for printing costs) or an electronic version (free of charge) of the ES can be obtained by emailing robert.griffin@manchester.gov.uk and quoting ‘Fallowfield Campus Redevelopment Project’.
- 1.7.5 The ES Non-Technical Summary can be obtained free of charge upon request in hard copy or as an electronic file.

1.8 REFERENCES

- Department for Communities & Local Government (2014) Planning Practice Guidance: Environmental Impact Assessment, <http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/>
- Department for Communities and Local Government (DCLG) (2006) Environmental Impact Assessment: A guide to good practice and procedures – A consultation paper, DCLG.
- European Union (2014). Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.
- Stationery Office (2017). The Town and Country Planning (Environmental Impact Assessment) Regulations 2017.
- University of Manchester (2023) Our Sustainable Future: Environmental Sustainability Strategy 2023-2028.

1.9 GLOSSARY

Term	Definition
DLUCH	Department for Levelling Up, Communities and Housing
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
GEA	Gross External Area
HTVIA	Heritage, Townscape and Visual Impact Assessment
IAQM	Institute of Air Quality Management
IEMA	Institute of Environmental Management and Assessment
IES	Institute of Environmental Scientists
IOA	Institute of Acoustics
MCC	Manchester City Council
MHCLG	Ministry of Housing, Communities and Local Government
NPPF	The National Planning Policy Framework
NTS	Non-Technical Summary
PPG	Planning Practice Guidance

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2 Development Description

2.1 INTRODUCTION

2.1.1 This chapter describes the site and its surrounds, and summarises the proposed development, as relevant to the Environmental Impact Assessment (EIA) process. Further information can be found in the Design and Access Statement (DAS) and the parameter plans which accompany the planning application.

2.2 THE SITE AND SETTING

Location and Context

2.2.1 The maximum anticipated planning application area comprises approximately 9.49 hectares and is centred on Ordnance Survey Grid Reference SJ 85723 94142, as shown in Figure 2—1 and Figure 2—2. The Fallowfield Campus is situated within a larger cluster of University accommodation within the south Manchester suburb of Fallowfield. The site is approximately 5.6 km south of the city centre immediately adjacent to one of the busiest bus corridors in Europe linking the campus into the Oxford Road corridor and the UoM and Manchester Metropolitan University sites. The site is bound by Moseley Road (B5093) to the south, Wilmslow Road (A6010) to the west and Whitworth Lane to the east. The site is located 750m west to the closest railway line. This line runs from Mauldeth Road Station north toward Manchester City Centre.



Figure 2—1 The site (shown outlined in red)



Figure 2—2 Site location with planning boundary line shown in red (Google (2023))

Surrounding Uses

2.2.2 The site forms part of the UoM Fallowfield Campus. Therefore, many of its immediate surroundings are UoM buildings. Surrounding uses include residential properties to the west and south, and student residential buildings to the south (Ladybarn House) and east (e.g., Richmond Park and Unsworth Park). Further UoM buildings are located to the north of the site boundary (e.g., Sheavyn House and Ashburne Hall) as shown in Figure 2—3. The surrounding area within and around the site provides significant green space including playing fields, areas of mature trees and parkland.

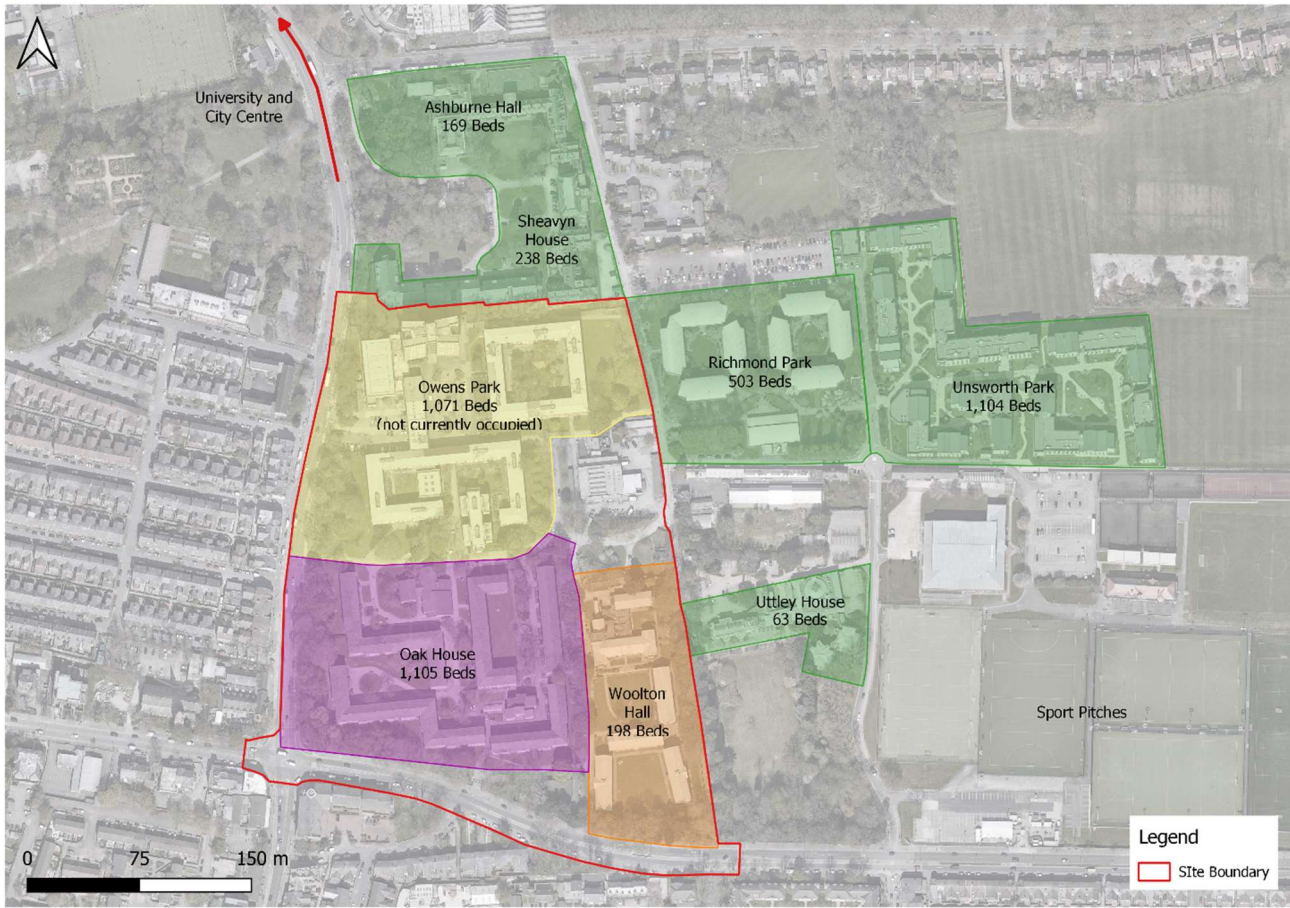


Figure 2—3 Surrounding buildings and land uses

- 2.2.3 There are no listed buildings or scheduled monuments within the boundary of the site. However, there are a number of listed buildings in the immediate vicinity (within 300m) of the site. This is discussed further in ES Volume II Heritage, Townscape and Visual Impact Assessment (HTVIA).
- 2.2.4 Identified heritage receptors include:
- Fallowfield War Memorial (Grade II);
 - Church of the Holy Innocent and St James (Grade II);
 - Queen of Hearts Public House (Grade II);
 - Ashburne Hall, including the Alice Barlow memorial gates and Ashburne Hall Lodge (Grade II);
 - Behrens Hall (Grade II);
 - The Firs and Attached Annes (Grade II);
 - Lodge of the Firs, with Attached Gateway (Grade II);
 - Unitarian Chapel, Platt Chapel (Grade II);
 - Hollings Building at Manchester Metropolitan University (Grade II);
 - Synagogue (Grade II); and

- Section of an early medieval boundary ditch known as the Nico Ditch in Platt Fields (Scheduled Monument).

Site Description

- 2.2.5 The existing site is currently purpose built student accommodation (PBSA) and university-related land uses. The current accommodation dates from the late 1950's to mid-1960's. The structures are of varying build quality, and the campus is now reaching the end of its functional life. Oak House and Woolton Hall are still in use as student accommodation. Owens Park covering the northern half of the site is now closed as it does not meet current quality standards for its uses as student accommodation. The buildings on the site are predominately four storeys in height, with one tower in the north of the site which is 18 storeys tall (Owens Park tower). These buildings will be demolished to accommodate the proposed development. The Limes Building may be relocated (under a future planning application).
- 2.2.6 The existing accommodation provides 2,374 beds. This comprises Owens Park (1,071 beds), Oak House (1,105 beds) and Woolton Hall (198 beds). There are 74 existing car parking spaces and 144 existing cycle parking spaces on site.
- 2.2.7 The site sits entirely within Flood Zone 1 which has a low probability of flooding from rivers and the sea.
- 2.2.8 There are a number of high value and mature trees on the site, and it is proposed to retain as many of these as possible, avoiding key groups of trees, and protecting Class A trees where possible.
- 2.2.9 Figure 2—4 shows the parts within the site boundary that are being developed and those buildings that are being retained in the wider campus area (UoM ownership boundary).

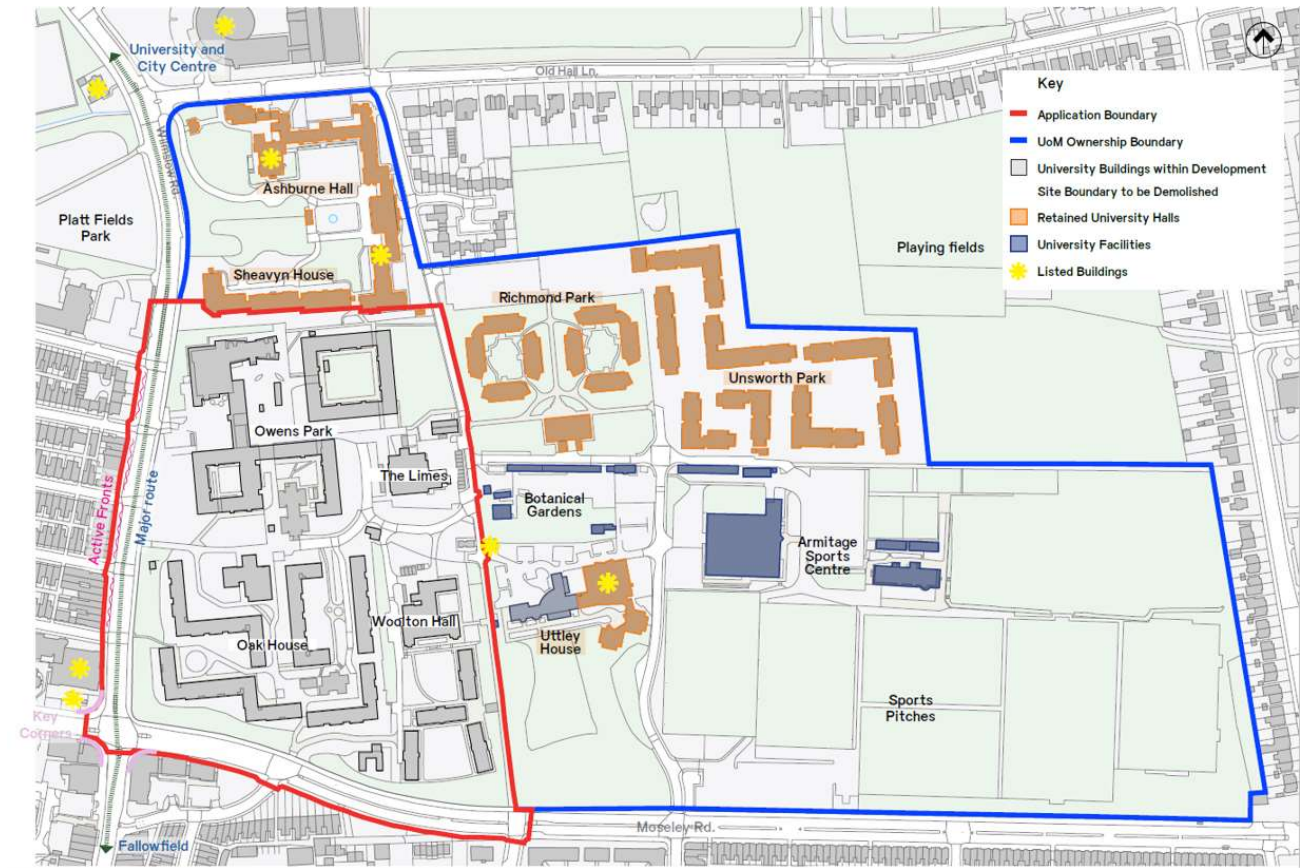


Figure 2—4 Map showing the site area and UoM ownership boundary

Planning History

- 2.2.10 A hybrid planning application for development of the Fallowfield campus, which included the site within a wider area (110184/FO/2015/S1) was submitted in 2015 and accompanied by an EIA. The application included the development of buildings between two and six storeys to replace the student accommodation with new PBSA. Detailed consent was sought for the majority of the proposals, with an element based upon a series of parameter plans (outline consent). The application proposed to remove 2,176 units and develop 3,209 new residential units for students. The majority of the proposals were not developed or constructed – including the area covered by the proposed development. However, 1,185 beds were delivered through part implementation of the 2015 consent, on land not previously in use as PBSA and therefore without any loss in bed spaces.

Site baseline for the purpose of the EIA

- 2.2.11 The existing current baseline are the conditions in 2023 which are representative at the time of the assessment. In summary this comprises a university campus providing predominantly student accommodation with current provision between Oak House and Wootton Hall for 1,303 student beds and associated student services. Owens Park in the north (1,071 beds) is closed as it does not meet current quality standards for its uses as PBSA. However, the accommodation remains in situ and would be capable of reoccupation without the need for planning permission, although this would require significant refurbishment and substantial extensive upgrades. This ultimately would not deliver a coherent scheme that maximises the site’s potential, such that redevelopment would be able to deliver.

- 2.2.12 The proposed development seeks to provide an increase in the number of student residential units compared to those currently on the site (proposed uplift of circa 950 beds).

2.3 OVERVIEW OF PROPOSED DEVELOPMENT

- 2.3.1 The proposed development comprises the demolition and redevelopment of part of the existing UoM Fallowfield Campus to create a new student residence. A total of up to 2,374 bedrooms, including those at Owen’s Park which is no longer used because of their condition, will be demolished as part of the proposed development.

- 2.3.2 The formal description of the proposed development for planning purposes is as follows:

“Outline planning application (with access only) for the phased demolition of existing buildings and phased development of up to 3,300 Purpose Built Student Accommodation bedrooms (Sui Generis use class) with associated facilities including waste storage, laundry and cycle storage; up to 4,500 sq m of floorspace to be used for ancillary purposes associated with the student residential use of the site within Use Class F1a, Class E(a), E(b), E(c), E(d), E(g), Sui Generis (drinking establishment and hot food takeaway); ancillary supporting staff accommodation (up to 55 bedrooms) (Sui Generis use class), and up to 1,200 sq m, of ancillary residential dwellings (Use Class C3), plus associated car parking, hard and soft landscaping, open space, utilities, footpaths and roads.”

- 2.3.3 The proposed development seeks to improve the student accommodation on the site, the quality of the public realm and landscaping between the buildings and the connections into the wider Fallowfield area.

Parameter plans and Design Principles

- 2.3.4 Reflecting the proposal to pursue an outline planning application, the parameters of the proposed development have been defined through two key parameter plans, see Figure 2-5 and Figure 2-6. To accord with EIA case law, these parameter plans form the basis of the main assessments contained within this ES, with the technical masterplan forming an optional (secondary) assessment in Chapter 8 of this ES (Ecology and Biodiversity) and within the HTVIA (see ES Volume II).
- 2.3.5 The Developable Area parameter plan (Figure 2-5) sets limits in relation to the number of new bedrooms; range of ancillary uses and amount of ancillary floor space; developable areas within the site and areas of the site which will be kept free from development (referred to as the exclusion zone, with no permanent structures allowed). The plan also defines the maximum cumulative footprint for the proposed buildings.
- 2.3.6 The Maximum Heights parameter plan sets limits in relation to the maximum heights permitted in metres Above Ordnance Datum (mAOD) across the site, along with a listed building setting zone, which takes into consideration adjacent listed buildings in the proposed heights.
- 2.3.7 The above parameters extend to more detailed design principles in the Design Principles Document which has been submitted alongside the outline planning application as a separate planning document. This provides guidance to inform the detailed design of the proposed development including in relation to the layout of the site, the interrelationship of buildings, the approach to open space and movement through the site and the architectural approach to individual buildings as well as the approach to achieving the desired sustainability standards, sustainable drainage and biodiversity net gain.
- 2.3.8 Figure 2—5 shows the developable area of the site for the proposed development.

Proposed land uses

- 2.3.9 As described above, up to 3,300 beds of PBSA will be provided as part of the proposed development, with associated uses including waste storage, laundry facilities and cycle storage.

- 2.3.10 Up to 4,500 sqm of floorspace will be provided for ancillary purposes to support the student residential use of the site, within use classes E(a), E(b), E(c), E(d), E(g), F1a and Sui Generis (drinking establishment and hot food takeaway). In addition, ancillary supporting staff accommodation (up to 55 bedrooms, and up to 1,200 sqm of floorspace for ancillary residential dwellings) will also be provided as part of the proposed development.
- 2.3.11 The proposed development will provide a total maximum floorspace of 118,669 sqm Gross External Area (108, 222 sqm Gross Internal Area).

Layout, massing and height

- 2.3.12 As noted above, the proposed development corresponds to maximum heights permitted across the site, which takes the form of a zonal plan. A height limit of 90.8mAOD has been set in the centre of the site, dropping in scale to 72.8mAOD towards the edges and a further drop to 66.8mAOD. To the south of the site, the height steps down from 90.8mAOD to 69.8mOAD and then to 63.8mAOD adjacent to the exclusion zone. Maximum heights can be seen in Figure 2—6.
- 2.3.13 A listed building setting zone of 63.80mAOD has been included at the northern end of the site to provide an appropriate height for the proposed development in this location and respect the setting of Ashburne Hall (Grade II). Similarly, along the eastern boundary of the site, a listed building setting zone (63.8mAOD) protects the setting of the Lodge of the Firs (Grade II listed building).
- 2.3.14 All maximum heights are based on the finished floor levels of the proposed development, and include an allowance for plant, some of which is anticipated to be located on the roof level of the proposed buildings.

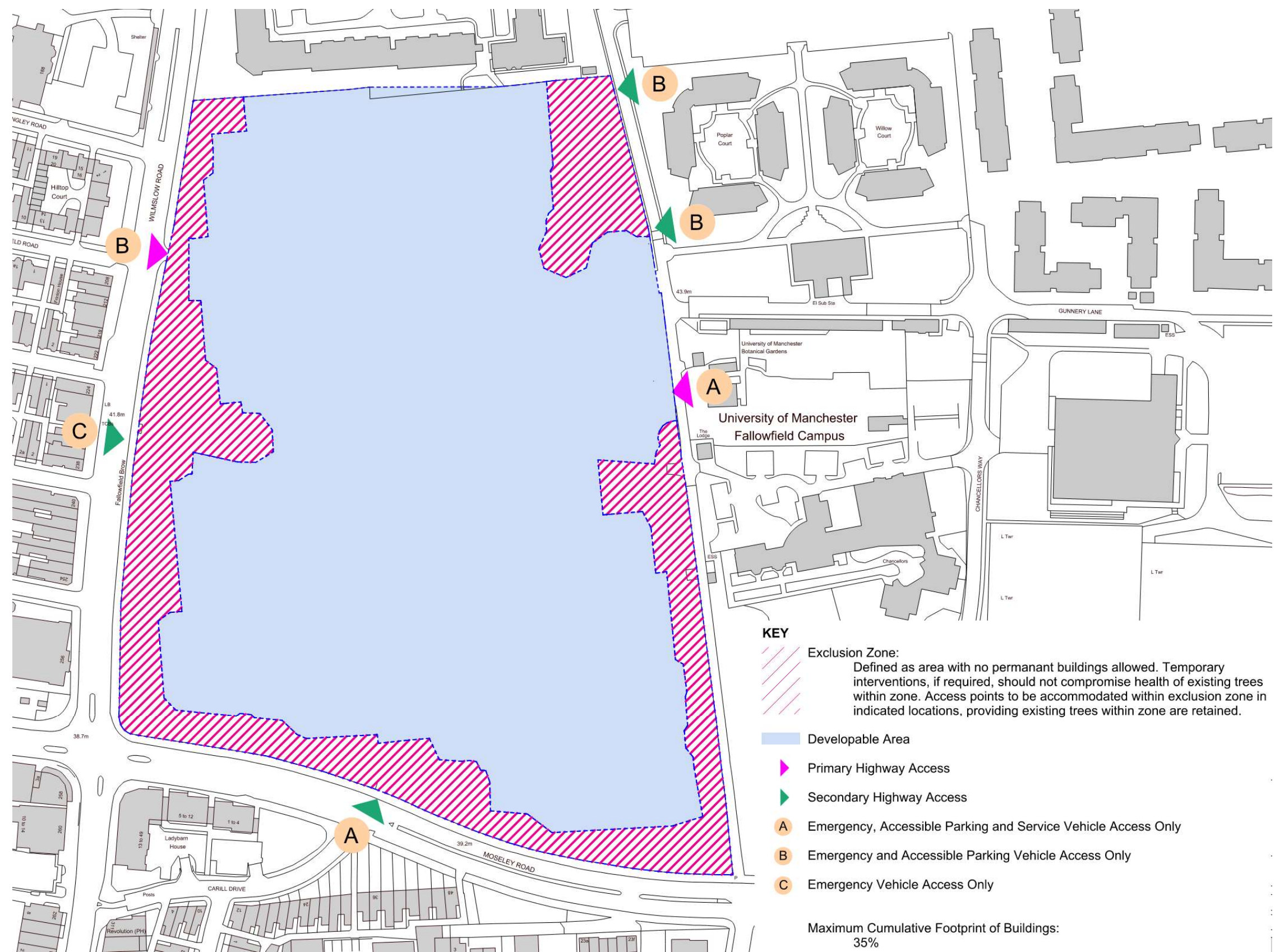


Figure 2—5 Proposed Development – Developable Area

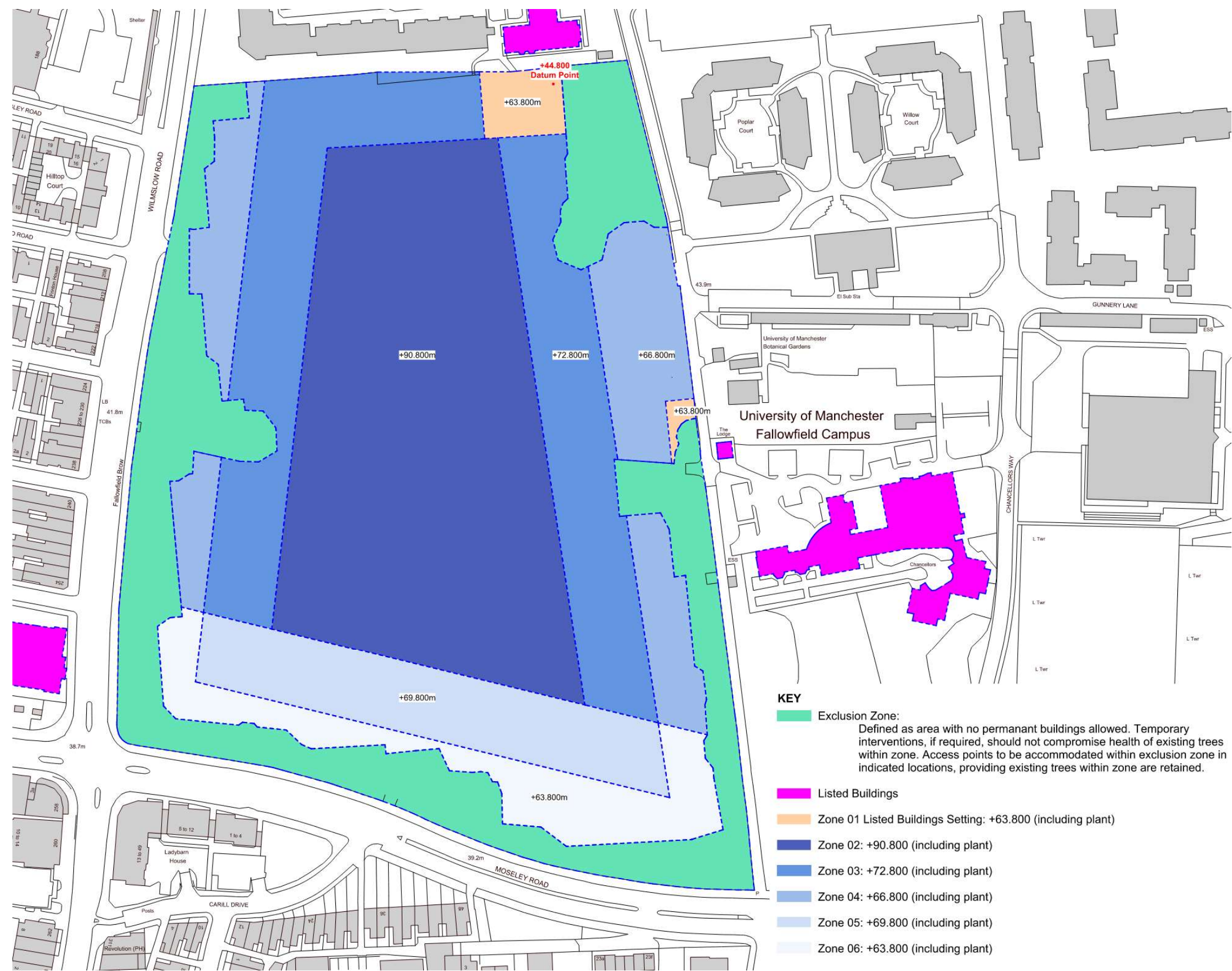


Figure 2—6 Proposed Development – Maximum Heights

Access, circulation and parking

- 2.3.15
- The proposed development will be largely car-free, with limited provision for vehicles other than accessible car parking spaces and access for refuse, maintenance, and emergency vehicles.
- 2.3.16
- It is proposed that 21 disabled car parking spaces and up to 825 cycle parking spaces will be provided as part of the proposed development.
- 2.3.17
- Reliance will be placed on using existing points of access to the site for entering and exiting the proposed development.

Vehicle access

- 2.3.18
- The northernmost existing car park and vehicular access via Wilmslow Road is likely to be modified to provide maintenance, servicing and emergency access only, and to accommodate moving in/out days. An additional access further south on Wilmslow Road will be retained for emergency vehicle access only.
- 2.3.19
- The existing vehicular access off Moseley Road onto Chancellors Way will be a controlled access route into the site and will be used by visitors to the campus and for maintenance, servicing and emergency vehicles, as well as on moving in/out days.
- 2.3.20
- The existing vehicular access off Old Hall Lane onto Whitworth Lane will be retained for accessible parking, emergency, maintenance, and servicing access as well as on moving in/out days.

Public transport access

- 2.3.21
- Once the proposed development is complete and operational, the majority of person trips to / from the site are expected to be by public transport and other sustainable travel modes (such as walking and cycling).
- 2.3.22
- The Fallowfield Campus occupies an important strategic location and is well connected to key student destinations, including the Oxford Road Campus and Manchester city centre, by a range of transport modes. Directly opposite the Owens Park entrance there is a large bus stop hub to accommodate waiting bus passengers travelling north on the Oxford Road Corridor.
- 2.3.23
- High frequency bus routes including late night services, serve these stops throughout the week. Buses connecting to the areas east and west of Fallowfield Campus serve existing bus stops on Moseley Road.
- 2.3.24
- Sustainable travel modes will be promoted at the proposed development as part of a Travel Plan. This will seek to encourage the use of sustainable travel modes and include measures to ensure that university residents travel by non-car modes and encourage a modal shift to healthy travel modes such as walking and cycling.

Cycle and pedestrian access

- 2.3.25
- The primary pedestrian access will be via the existing entrance to the campus on Wilmslow Road. This access point will serve not only the proposed development but also the entire Fallowfield Campus.
- 2.3.26
- The existing pedestrian access off Moseley Road will be retained and enhanced (to access Sainsbury’s and other local amenities to the south of the site) as a secondary access point. The existing pedestrian access point along Whitworth Lane will be retained and enhanced.
- 2.3.27
- Within the site boundary, site levels falls over 5m from north to south, and there are some steep gradients between level areas. Walking routes should be universally accessible throughout and building entrances should be integrated into landscape levels. The proposed development should provide level access routes – less than 1:21 gradient – to all areas.

Landscape and public realm

- 2.3.28
- The landscape design and use of open space is a key part of the proposed development, and tree retention on the site has been prioritised, including the entirety of the woodland boundary edges. The landscape within the site boundary has developed the characteristics of mature woodland and woodland edge habitats, with tall trees in belts and groups interspersed with small open spaces and sunny glades. These are biodiverse and resilient landscape types, which together make a distinctive and seasonally changing setting for student life. At the same time the range of planting types and species is relatively limited, relying heavily on non-native evergreen shrubs and high-maintenance grass lawns.
- 2.3.29
- The proposed development will enhance the existing landscape and biodiversity value of the site to achieve a 10% Biodiversity Net Gain, by considering the following:
 - Making use of native-species of forest and woodland edge trees to reinforce the tree belts, and provide a new generation of replacement trees which will maintain the resilience of the site in the face of environmental stresses associated with climate change;
 - Introducing shade-tolerant native species understorey shrubs and small trees which will increase the foliage canopy and biodiversity;
 - Introducing shade-tolerant native groundcover herbaceous plants which will supplement the biodiversity of the site;
 - replacing non-native evergreen planting with species which provide nectar- rich flowers for native pollinator species as well as visual interest in winter;
 - Providing more seasonal interest, by adding shrubs with winter flowers and colourful bark, as well as swathes of early spring bulbs;
 - Creating shelter beside walkways through the use of multi-species hedges which can clipped low to provide visibility;
 - Reducing areas of ornamental lawn by over planting with locally indigenous wildflower planting;
 - Making edible landscapes using orchard and fruit trees and herb plants, and providing accessible growing areas;
 - Making use of vertical surfaces and screens e.g. cycle and waste stores, as support for climbing plants; and
 - Integrating green roofs into the landscape infrastructure.
- 2.3.30
- For every one tree felled for the proposed development, three will be planted as replacement trees. Replacement trees will be planted on site, however where space is limited, one of the three replacement trees will be planted off-site, within land owned by the UoM in the wider Fallowfield Campus. Replacement trees should be planted no closer than 6m apart, or 3m distance to edge of existing tree canopy, to ensure they reach maturity.
- 2.3.31
- The selection and installation of plants should consider the use of species which are adaptable to local and future conditions, increase species diversity and promote biodiversity.

2.4 GLOSSARY

Term	Definition
AOD	Above Ordnance Datum
DAS	Design and Access Statement
EA	Environment Agency
ES	Environmental Statement
FFL	Finished Floor Levels
ICT	Information and Communication Technology
LLFA	Lead Local Flood Authority
PBSA	Purpose Built Student Accommodation

3 ALTERNATIVES AND DESIGN EVOLUTION

3.1 INTRODUCTION

- 3.1.1
- Schedule 4 of the Environmental Impact Assessment (EIA) Regulations requires environmental statements to include ‘*a description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by a developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects*’.
- 3.1.2
- It is widely regarded as good practice to consider alternatives as it results in a more robust application for planning permission and it facilitates the decision-making process. It is also recognised that options may be limited, but the nature and location of some developments may make consideration of alternative sites a material consideration.
- 3.1.3
- When considering at what level of detail to consider alternatives, the recommendations are for only those alternatives which are practical i.e. those which fulfil the criteria of need and purpose.
- 3.1.4
- This chapter describes how the design of the proposed development has evolved and the alternatives that have been considered as part of that process.

3.2 APPROACH TO CONSIDERING ALTERNATIVES

- 3.2.1
- The approach to the consideration of alternatives for a development is to firstly consider the ‘do nothing’ option, which identifies the environmental implications for the site and the surrounding area, should the site remain in its existing condition. In effect, this enables consideration of whether the benefits of the scheme outweigh the costs of the scheme. Following this, the following types of alternatives will be discussed:
- Alternative sites; and
 - Masterplan alternatives and design evolution.

3.3 THE ‘DO NOTHING’ ALTERNATIVE

- 3.3.1
- In evaluating the potential impacts of the proposed development, it is essential to consider the alternative scenario of doing nothing.
- 3.3.2
- The condition of Fallowfield campus, as it stands today, varies between plots, but is generally characterised by a state of disrepair to an extent that certain sections of the campus have fallen into disuse due to the need for extensive renovations. The existing student accommodation facilities have also reached a point where they no longer adequately meet the needs and expectations of the university's student population.
- 3.3.3
- Without intervention, the existing buildings and infrastructure on the site will continue to deteriorate over time. The lack of necessary renovations will exacerbate the existing maintenance issues, leading to further deterioration and diminished functionality. This state of disrepair may ultimately render portions of the campus unusable or present safety hazards to students and staff as well as reduce the amount of available student residence.

- 3.3.4
- By maintaining the status quo, the site will would continue to consume resources inefficiently. The outdated buildings and infrastructure are likely to require more energy and water, leading to increased resource consumption and higher operational costs. Furthermore, the unused and open-space areas of the campus represent land that could be better utilized through improved landscaping and public realm.
- 3.3.5
- The do nothing alternative would overlook the potential for much-needed regeneration and environmental improvement on the site. Constructing a new student residence campus provides an opportunity to implement sustainable building practices which could significantly reduce the campus's environmental impact, conserve resources, and contribute to a more sustainable UoM building stock.
- 3.3.6
- The ‘do nothing’ alternative would perpetuate the current state of environmental and structural degradation and would result in continued inefficiencies and a missed opportunity for sustainable development. By contrast, the proposed development would allow the UoM to bring forward an environmentally conscious and sustainable campus. Implementing best planning and design practices and revitalising the campus would not only mitigate existing environmental challenges but also deliver a more resilient and environmentally responsible campus design.

3.4 ALTERNATIVE SITES

- 3.4.1
- The proposed development seeks to provide up to 3,300 purpose-built student accommodation (PBSA) bedrooms and associated amenity and ancillary uses. There are limited sites within the UoM’s estate that would allow this to be delivered. Given the current condition of the buildings on the site and the necessary space required to develop a masterplan of this size, the proposed site is considered to be the most appropriate location for this project.

3.5 MASTERPLAN ALTERNATIVES AND DESIGN EVOLUTION

- 3.5.1
- The masterplanning exercise undertaken considered the proposed redevelopment with a number of options which evolved over time, in collaboration with the design team. This ensured a holistic design response, identifying key aspects of the proposed development to be committed to within the parameters for the EIA and providing further design detail to be included in the Design Principles Document.
- 3.5.2
- As part of the masterplanning exercise undertaken, engagement has taken place with key stakeholders and members of the public to inform the design evolution. This engagement process is summarised below.

Engagement

Pre-application

- 3.5.3
- Pre-application discussions have been held between the project team and MCC, in order for them to provide feedback on the proposed development.
- Public consultation
- 3.5.4
- The proposed engagement and public consultation approach was shared with MCC officers on 12th May 2023.
- 3.5.5
- Before launching the consultation, the Leader of MCC, the Executive Member for Housing and Development and the three Fallowfield ward councillors were briefed on the proposals and the public consultation activity. Following feedback from a Fallowfield ward councillor, the public consultation period was extended from 25th to 30th June.
- 3.5.6
- The pre-application public consultation period ran for three weeks from 6th June 2023 to 30th June 2023.

- 3.5.7 A consultation leaflet was issued on 6th June 2023 to properties in the vicinity of the site. This leaflet promoted the in-person consultation event being held on 14th June 2023 and a live webinar on 15th June 2023.
- 3.5.8 A press release was issued on 6th June 2023, providing introductory information about the proposals and details of the public consultation and how people could provide feedback. A consultation website, hosted on the University of Manchester’s website, also went live on 6th June 2023, providing details and a vision of the proposed development, as well as a ‘Have Your Say’ page, with links to the online feedback form, the project email address and the project telephone line. During the consultation period, there 1,941 webpage views (1,679 unique).

In-person Consultation event

- 3.5.9 A consultation drop in event was held at Uttley House, at the University of Manchester on 14th June 2023. In total, 25 people attended the event, and 8 feedback forms were submitted.

Methods for receiving feedback

- 3.5.10 There was a project email address, a freephone telephone number and an online form for providing feedback.

Summary of feedback received

- 3.5.11 In total, 115 responses were received during the consultation period. All responses were logged, and comments were considered by the project team ahead of the submission of the planning application. More detail on the consultation process and responses received can be found in the Statement of Community Involvement, which has been submitted alongside the planning application.

Design evolution

- 3.5.12 The evolution of the design of the proposed development is outlined below. This includes a summary of a previous design for the site and a summary of the evolution of the current design.

Previous design for the site – 2015 scheme

- 3.5.13 A hybrid planning application for development of the Fallowfield campus, which included the site within a wider area (110184/FO/2015/S1) was submitted in 2015 and accompanied by an EIA. The application included the development of buildings between two and six storeys to replace the student accommodation with new PBSA. Detailed consent was sought for the majority of the proposals, with an element based upon a series of parameter plans (outline consent). The application proposed to remove 2,176 units and develop 3,209 new residential units for students. The application was granted planning permission in 2015.
- 3.5.14 The majority of the proposals from the application were not developed or constructed - including the area covered by the proposed development. However, 1,185 beds were delivered through part implementation of the 2015 consent, on land not previously in use as PBSA and therefore without any loss in bed spaces. This proposal is shown in Figure 3—1.



Figure 3—1 Proposed location plan for 2015 scheme

Evolution of the current design

Feasibility stage

- 3.5.15 Early feasibility work was carried out considering a deep retrofit but was discounted as the buildings could not be feasibly adapted to provide the requirements of a modern student offer.

Initial concept approach

- 3.5.16 The initial concept stage design (Figure 3—2) was conceived around a series of courtyards formed by blocks that, as far as possible, respected groups of mature trees. The intention was to form ‘mini-communities’ within the wider Fallowfield community, each addressing a single central green space. As the team developed a broader understanding of the constraints of the site, this initial concept approach needed to incorporate the potential phased development of the Limes (which may be relocated under a future planning application) and the demolition of the Tower, which is the location of much of the centralised site infrastructure.



Figure 3—2 Initial concept stage design

Testing and evolving the concept

3.5.17 The next iteration of the design (Figure 3—3) took on board these constraints while further information on tree locations was gathered. The intention at this time was to maintain the ‘communities’ concept across the site. Feedback on the tree locations and the extent of the edge zone of ‘forest’ habitats challenged the design team to rethink their approach, as the ‘communities’ model was infringing on sensitive areas. The design team therefore looked again at how best to maintain the valuable edge habitats.



Figure 3—3 Next design iteration

Rethinking the concept to protect habitats

3.5.18 At this stage a different design concept was tested (Figure 3—4), where new block forms were introduced so that the design could be more responsive to areas of trees across the site. Two primary routes following groups of trees organised the site from north to south, with different block forms creating a variety of spatial experiences and character areas across the site. This also enabled the team to increase block heights in the central zone of the site, reducing heights around the edges, which protected the setting of listed buildings (such as Ashburne Hall and the Lodge of the Firs) and key views into the site from public areas.

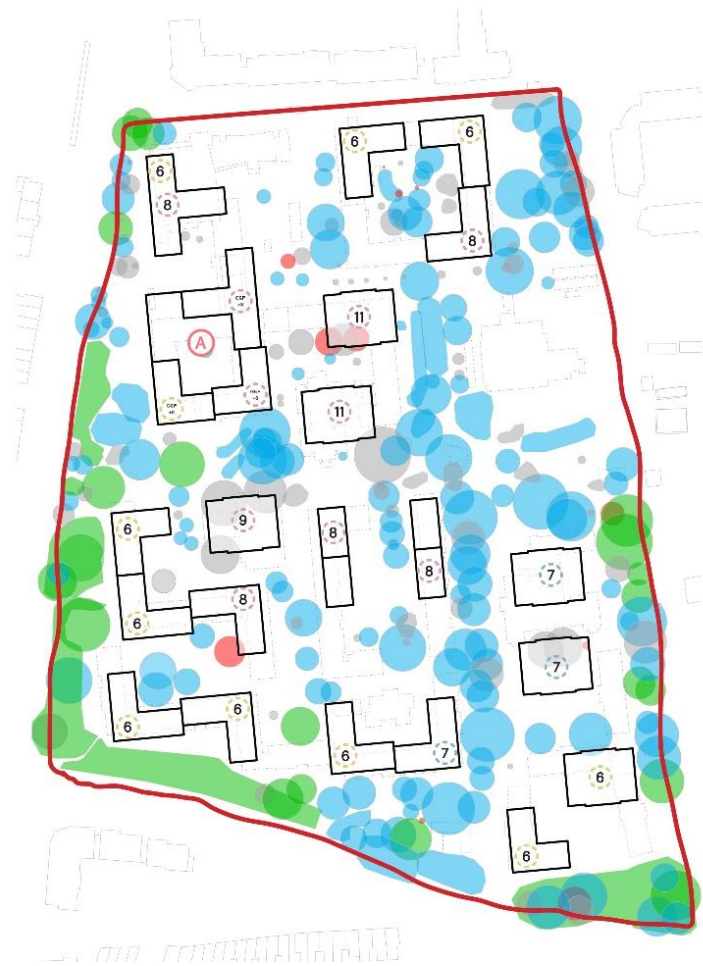


Figure 3—4 Design evolution showing how protected habitats are being considered

Refining and clarifying the structure of the site

3.5.19 This iteration (Figure 3—5) then went through a final process which brought a further degree of structure and organisation to the plan. This used the L-shaped blocks to form positive edges to the street and a series of smaller-scale green spaces (referring back to the original design concept), with a rectangular block typology, were placed more towards the centre of the plan and to the eastern boundary, opening up sight lines and views. This balanced approach enabled strong edges to the site to be formed and the height to be reduced around the sensitive edges. This ensured the best quality trees were protected and a variety of character areas were created.

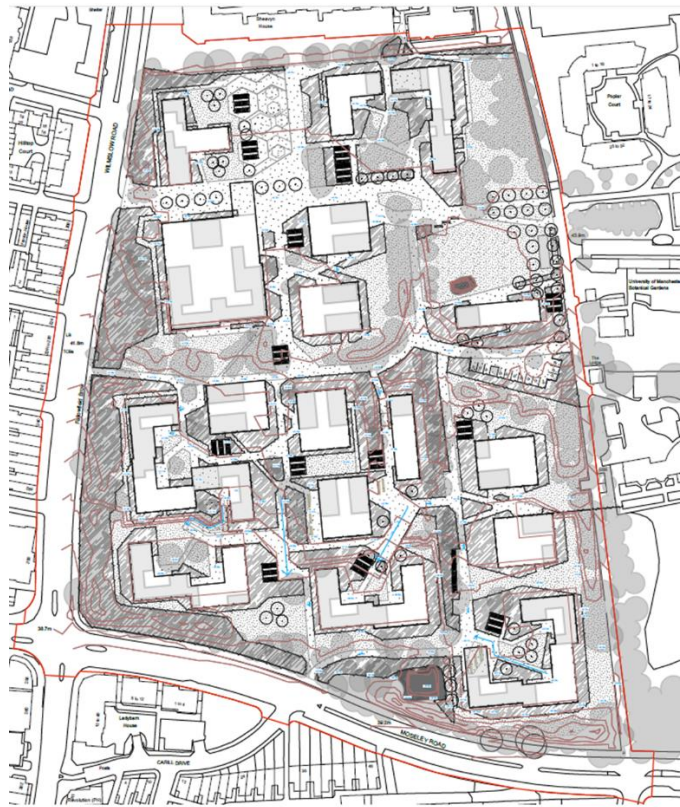


Figure 3—5 Technical Masterplan

Site constraints

- 3.5.20 The site is physically constrained to the west and south by major roads. The north and east are constrained by minor or private roads within the UoM ownership.
- 3.5.21 The site slopes down from north to south by circa 5 metres, which has resulted currently in the site having limited accessibility for ambulant disabled and wheelchair users.
- 3.5.22 The site sits in close proximity to a number of listed buildings, but none are within the site itself, see Figure 3—6.

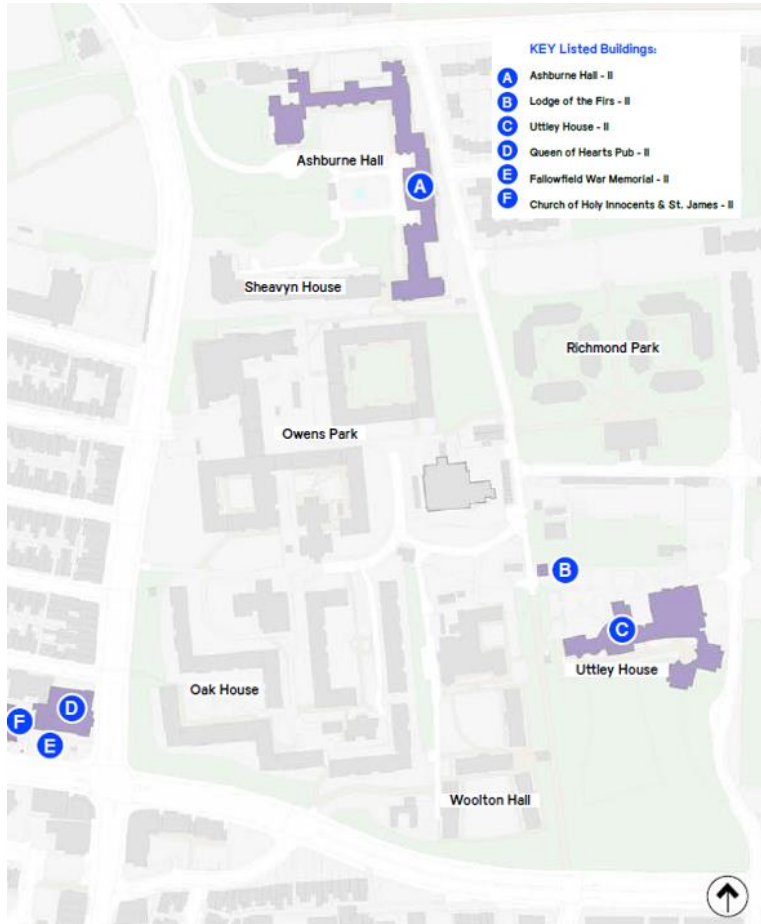


Figure 3—6 Listed buildings near the site

3.5.23 The site has significant mature tree coverage, particularly to the west and south boundaries, but also within the centre of the site. **Error! Reference source not found.**5 shows the current extent of tree canopy on the site as well as areas of soft landscape. The trees range in age and stature across the site, with some very mature large specimens growing close to existing buildings. Tree groups and lines provide a particularly important role in defining external spaces.

3.6 CLIMATE CHANGE RESILIENCE RISK ASSESSMENT

3.6.1 A climate change resilience risk assessment was completed for the proposed development based on the Institute of Environmental Management and Assessment (IEMA) EIA Guide to: Climate Change Resilience and Adaptation (IEMA, 2020).

3.6.2 The full report for the climate change resilience risk assessment has been appended to the ES (Appendix 3-A, Volume III). The risks associated with the effects of climate change on the proposed development have been determined by assessing the probability of a climate risk occurring and the consequence of that risk occurring. A current baseline assessment has been carried out which assesses the risk of a range of climatic effects to the proposed development, based on current climatic conditions. A second assessment has then carried out which assessed the risk of the same climatic effects to the proposed development considering future climate change (based on Met Office UKCP18 climate projections). Mitigation measures have been provided for climate effects that were deemed to have a risk rating of medium or higher when considering the effects of future climate change. Residual effects have then been assessed considering the mitigation measures and are summarised in Table 3—1.

Table 3—1 Summary of residual climate risks to the proposed development considering mitigation measures

Risk	Probability rating (1-5)	Consequence rating (1-7)	Risk rating
Rainstorm	5	1	5
Heavy snow	2	2	4
Fog	5	1	5
Hail	5	1	5
Severe wind	3	2	6
Extra tropical storm	3	4	12
Lightning	4	1	4
Extreme winter conditions	2	3	6
Cold wave	2	3	6
Extreme cold days	2	3	6
Heat waves	4	5	20
Extreme hot days	5	4	20
Drought	4	4	16
Flash/surface flood	3	6	18
River flood	4	6	24
Groundwater flood	3	6	18
Subsidence	1	6	6
Water-borne disease	2	3	6
Vector borne disease	1	4	4
Air-borne disease	2	3	6
Insect infestation	2	3	6

3.1 REFERENCES

- Institute of Environmental Management and Assessment (IEMA) (2020). Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation; and
- Manchester City Council (MCC) (2021). Manchester's Local Development Framework. Core Strategy Development Plan Document;
- Met Office (2018) UK Climate Projections 2018 (UKCP18).

3.2 GLOSSARY

Term	Definition
EIA	Environmental Impact Assessment
ES	Environmental Statement
IEMA	Institute of Environmental Management and Assessment
MCC	Manchester City Council

UKCP18	UK Climate Projections 2018
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4 ENABLING WORKS, DEMOLITION AND CONSTRUCTION

4.1 INTRODUCTION

- 4.1.1 This chapter of the Environmental Statement (ES) outlines the enabling works, demolition and construction works that are to be carried out as part of the proposed development.
- 4.1.2 Whilst the indicative programme set out in this ES chapter refer to ‘enabling works’, ‘demolition’, and ‘construction’ separately, it should be noted that when ‘construction effects’ are assessed within each of the technical ES chapters, these assessments consider the period from the start of the enabling works phase to the end of the final construction phase and include activities during each of these indicative phases.
- 4.1.3 The overall scope of the project, highlighting some key aspects relevant to enabling works, demolition and construction comprises the following aspects. These are phased (as described later in this chapter) and will be specific to each phase as the project progresses:
- Site preparation and set-up.
 - Demolition of existing buildings on site which comprise student residence and associated building uses and plant.
 - Pre-construction enabling works including earthworks, cut and fill, ground remediation, protection measures for existing trees etc.
 - Construction of new student residence campus buildings.
 - Associated landscaping and public realm infrastructure.
 - Preparatory site-works in advance of occupation and operation.

4.2 INDICATIVE DEMOLITION AND CONSTRUCTION PROGRAMME

- 4.2.1 All current buildings on site are proposed to be demolished and delivery of the proposed development will be phased, starting with the Owens Park area in the north and then progressing to the southern areas of the site.
- 4.2.2 The indicative start date for initial demolition work to begin on site is Q4 2023 with an estimated project delivery period of seven years through to completion of the final phase in Q3 2030.
- 4.2.3 Indicative phasing timescales are presented in Table 4—1 and an indicative phasing plan showing the areas that each phase comprise is presented in Figure 4—1. This indicative phasing plan will be developed by the UoM’s preferred Delivery Partner, with an updated phasing plan to be submitted at the reserved matters stage.

Table 4—1 Indicative phasing timescales.

Phase	Stage	Start	End
Phase A (Owens Park)	Demolition	Q4 2023	Q4 2024
	Construction	Q1 2025	Q3 2027
Phases B & C (Oak House & Woolton Hall)	Demolition	Q3 2027	Q1 2028
	Construction	Q1 2027	Q3 2030

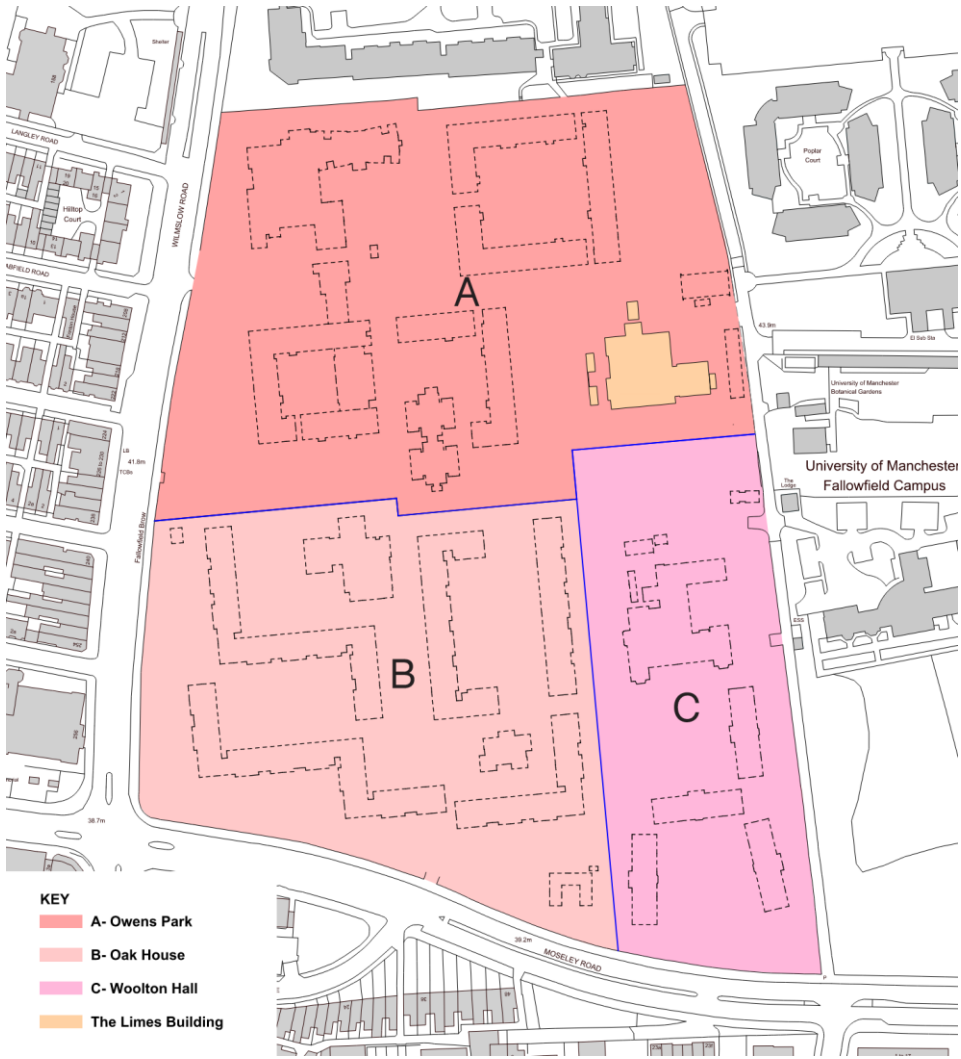


Figure 4—1 Indicative phasing plan. Note that demolition of the Limes Building will not form part of Phase A, but is likely to be undertaken in a subsequent phase.

- 4.2.22 During the works, parts of the wider Fallowfield campus will remain open to UoM staff and students. The areas that will remain under UoM occupation throughout the duration of the demolition works are:
- Ashburne Hall;
 - Sheavyn House;
 - Richmond Park;
 - Unsworth Park;
 - Uttley House; and
 - Firs Botanical Grounds.

4.3 SUMMARY OF ENABLING WORKS

- 4.3.1 Enabling works required to prepare the land for redevelopment include the removal of hazardous materials (including asbestos), demolition, and site clearance including the buildings, associated infrastructure, and foundation slabs in order to facilitate redevelopment. Specific activities required at an early stage to allow redevelopment include:
- Installation of temporary hoarding to the boundary to a standard height of 2.4 m;
 - Disconnection of existing redundant services and the protection of retained services crossing the site and
 - Removal and disposal of all asbestos containing/other hazardous materials as identified in the required Refurbishment and Demolition Surveys, and any other areas identified by the Principal Contractor.

4.4 SUMMARY OF DEMOLITION WORKS

- 4.4.1 All current buildings on site are proposed to be demolished and delivery of the proposals will be phased, starting with the Owen Park area in the north and then progressing to the southern areas of the site. The indicative programme envisages that Oak House and Woolton Hall will be demolished, starting in Q3 2027, with the timing of The Limes building potential demolition to be confirmed at a later date.
- 4.4.2 An Outline Demolition Environmental Management Plan (ODEMP) has been developed for the proposed development to support the planning application, and to allow demolition works to proceed following receipt of a planning consent from Manchester City Council (MCC).
- 4.4.3 The sequence in which demolition works will likely take place is outlined below, however some tasks may run concurrently:
- Completion of requisite surveys (asbestos, utilities etc.);
 - Utility disconnections;
 - Soft strip of buildings;
 - Equipment / plant removal;
 - Asbestos removal;
 - Structural demolition of buildings;
 - Floor slab and building foundations removal;
 - External hardstanding and utilities removal;
 - Crushing and screening of demolition arisings; and,
 - Filling of voids and site levelling.
- 4.4.4 Its currently anticipated that all trees will be retained during the demolition works. The removal of trees does not form part of the scope of the demolition, and tree removal will only be considered should there be a legitimate requirement to facilitate the demolition works and must be approved by the Client or their representative prior. The removal of trees will only be considered following a review of available options and confirmation that there are no ecological constraints. The pruning of trees to facilitate access will be permitted only with express written permission of the Client or their representative.
- 4.4.5 Some of the key measures to be put in place to mitigate and reduce disruption during construction include:

- Materials will be stored locally to the work area to minimise plant access;
 - Delivery timings will be coordinated to avoid peak time or high student traffic to alleviate congestion;
 - The demolition area will be enclosed with solid timber hoarding to temporary works design with vehicle access gate that is to be locked when not in use;
 - The areas of the immediate demolition areas to be enclosed with perimeter fencing;
 - All access gates onto the working demolition area and the contractor’s compound will be locked during evening/ night and closed during the working day;
 - Security will be provided by a specialist security firm erecting a number of CCTV cameras across the site. These will be monitored and a guard dispatched at any sign of intrusion; and
 - A daily fence inspection will be undertaken and recorded with any issues rectified immediately.
- 4.4.6 Mitigation measures will also be implemented in order to protect bats (a protected species), which have been identified as roosting in some of the existing buildings on the site (see Chapter 8 Ecology and Biodiversity for further details). These measures include:
- a European Protected Species Mitigation Licence from Natural England which will include the provision of appropriate mitigation measures and working method statements to ensure no risk of injury or mortality to bats during demolition or construction works will be required ahead of demolition commencing on B10, B11, B12, B19 and B25 (Natural England bat licence to be obtained by applicant and implemented by the Principal Contractor);
 - Update bat surveys will be conducted in the May-August ahead of demolition commencing on site for future phases of the proposed development (to be secured through planning condition);
 - Measures to protect the temporary and permanent bat roosts will be detailed within the CEMP. This will include identifying the roost location and ensuring no plant or materials are stored in front or beneath the roost and lighting does not illuminate the roost entrances (CEMP to be secured through planning condition and implemented by the Principal Contractor); and
 - Since there will not be new buildings constructed where artificial bat roosts could be provided ahead of the loss, mitigation bat roosts, in the form of maternity and day roosting bat boxes, will be provided on mature trees in locations in proximity to where the buildings were situated. Boxes will be placed in a variety of aspects to mimic the existing variety of use of the building elevations currently.
- 4.4.7 Further environmental risks and constraints are outlined in the ODEMP (which has been submitted with the application as a standalone planning document).

4.5 SUMMARY OF CONSTRUCTION WORKS

- 4.5.1 Subject to a delivery and sequence plan being proposed by the Delivery Partner, foundation works are likely to commence sometime after completion of the enabling works. These are likely to include the placement of a working platform/piling mat.
- 4.5.2 All groundworks will likely follow foundation installation and are likely to include placement of drainage pipework, pile cap installation core bases and lift pits.

- 4.5.3 The superstructure cores will likely be constructed from the core slab level, and the structural frame erected (likely to be reinforced concrete or light gauge steel frame). In addition, floor slabs will likely be cast as the erection sequence advances. Several cranes and hoists will likely be installed adjacent to the plots to assist with construction of the buildings.
- 4.5.4 The details relating to the external envelope of the proposed buildings (appearance and materials) will be determined at the reserved matters stage, however, they are likely to include brickwork, cladding windows and other façade features. Construction processes, sequencing, logistics strategy and design will be finalised upon appointment of a Delivery Partner. However, it is anticipated that all cladding materials will likely be taken up to the plots by means of materials hoists and / or cranes, delivered in consolidated loads pre-loaded on to the slabs with loads delivered during quieter delivery periods.
- 4.5.5 Internal fit-out works will then likely commence. The internal fit out of each building will be undertaken in sequence according to a detailed programme.
- 4.5.6 Hard and soft external landscaping works are likely to be completed as the construction works progress, with final finishes concluded at the latter stages of the project prior to buildings being handed over.
- 4.5.7 Permanent artificial bat roosts will be constructed in the new buildings provided on site during Phase A of construction. Integrated boxes to the buildings will be provided on a variety of aspects across multiple buildings to reproduce existing roosting choices exploited by the bats on site currently. The number, type and location of the bat boxes will be detailed in support of the Natural England licence application.

4.6 PLANT AND EQUIPMENT

- 4.6.1 The indicative plant and equipment that is likely to be used during the enabling, demolition and construction stages include the following:
- Tracked/wheeled 360-degree excavations;
 - Excavator-mounted hydraulic breakers and pulveriser;
 - Dumpers;
 - Concrete-crushing plant;
 - Mobile cranes/tower cranes;
 - Air compressors;
 - Diamond cutting tools/saws;
 - Handheld tools including breakers (pneumatic and hydraulic) and other power tools;
 - Power tools (percussions drills, cutting disks, pipe-threader);
 - Wheel washing plant;
 - Piling rigs (vibratory);
 - Mobile access platforms;
 - Scaffold / mast climbers;
 - Delivery trucks;
 - Trucks including skips and skip trucks; and

- Forklift trucks.

4.7 PEDESTRIAN AND VEHICLE ACCESS

- 4.7.1 All site staff will enter the site via a dedicated pedestrian access. Access to site will likely be via biometric entry system which will be provided to operatives upon completion of a site-specific induction. This allows the site team to quickly track and report on labour levels on a daily basis. Pedestrian and vehicular access will be segregated at all times.
- 4.7.2 All works on site will utilise existing vehicular access points. An additional temporary access point may be required off Moseley Road subject to contractor’s requirement and will be dealt with by a reserved matter application.
- 4.7.3 Construction traffic will be requested to access from Wilmslow Road into the Owens Park car park and for larger deliveries through Whitworth Lane which is approached from Old Hall Lane to the north of the site for Phase 1. Phases 2 and 3 are likely to be accessed via similar routes, although this will be finalised as the phasing plan is finalised at the reserved matters stage. Access for large deliveries associated with the demolition on Whitworth Lane will be restricted during rush hour periods to avoid adverse impact on residents using the road.
- 4.7.4 A Construction Logistics Plan (CLP) will be produced by the Principal Contractor during the planning determination period to manage the traffic related to the construction phase of the proposed development. This will describe details of the construction traffic management including the construction vehicle routing strategy, which will identify principal and secondary routes to the site, along with a methodology for managing the logistics plan for site access. An enforcement strategy will also be designed to ensure construction routing and best practices are kept and adhered to.
- 4.7.5 In line with the University Estate Traffic Management Standards the Principal Contractor must ensure all deliveries or collections by HGV shall be in compliance with the CLP relating to the project and working to the requirements of the Construction Logistics and Community Safety (CLoCS) standard. Particular attention must be given to the ‘last mile’ journey around the campus comprising schools and hospitals. The university campus is exceptionally busy with over 50,000 staff and students in the centre of Manchester so it is critically important that the risk of collision between HGVs and pedestrians or cyclists / motorcycles is carefully managed and mitigated against to keep everyone safe.

4.8 WASTE AND MATERIALS

- 4.8.1 Demolition waste arising from the site will be managed by the Principal Contractor. Demolition waste procedures are set out within the ODEMP. Construction waste arising from site will be managed by the Principal Contractor and waste procedures will be set out within a Construction Environmental Management Plan (CEMP), which will be developed as part of the design development and closer to the commencement of the construction activities.
- 4.8.2 The contractor will aim to ensure that construction waste produced during construction of the proposed development is minimised and handled in an environmentally sustainable manner in line with policy and industry best practice.

4.9 HOURS OF WORK

- 4.9.1 The proposed works are likely to take place within normal working hours, as set out below:
- 08:00 – 18:00 Monday – Friday, with no noisy works until 09:00am; and

- 08:30 – 13:00 on Saturdays and Sundays if required including bank holidays, with no noisy works until 09:00am.
- 4.9.2 Any essential work to be carried out outside these hours will be subject to prior agreement and/or reasonable notice to MCC, who may impose certain restrictions. Noisy works are taken to be heavy percussive, vibration or severe noise generating work, including breaking floor slabs. It is anticipated that there may be restrictions for noisy works.
- 4.9.3 All deliveries will be taken during normal site hours or occasionally restricted hours on certain days to support student activities. All deliveries will be received by a gateman/banksman. All suppliers will be informed of the site hours and provided a site layout plan at the time of placing order.

4.10 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

- 4.10.1 A CEMP will be prepared for the construction stages of the proposed development which relate to environmental issues. The CEMP will include roles and responsibilities, control measures and activities to be undertaken to manage environmental effects. As such, the site will be managed in accordance with industry-wide best practice standards.
- 4.10.2 The CEMP will be prepared prior to the commencement of site works, following discussion and agreement with MCC.
- 4.10.3 The environmental management commitments made within this ES will be incorporated into the CEMP. A summary of all recommended measures is provided in Chapter 11 Residual Effects and Conclusions.

4.11 GLOSSARY

Term	Definition
CEMP	Construction Environmental Management Plan
CLoCS	Construction Logistics and Community Safety
CLP	Construction Logistics Plan
ES	Environmental Statement
MCC	Manchester City Council
ODEMP	Outline Demolition Environmental Management Plan
UoM	University of Manchester

5 METHODOLOGY

5.1 INTRODUCTION

5.1.1 This chapter provides an overview of the EIA process. It outlines the EIA assessment methodology undertaken to assess the environmental effects of the proposed development.

5.2 APPROACH TO THE ENVIRONMENTAL IMPACT ASSESSMENT

- 5.2.1 This ES, which is a publicly available document, includes an assessment of the likely environmental effects of the proposed development.
- 5.2.2 The ES will allow MCC, other statutory consultees and members of the public to understand the likely significant effects of the proposed development, ahead of the planning application being determined.
- 5.2.3 The ES has been prepared in accordance with the EIA Regulations and with due regard to the following good practice guidance:
- Ministry of Housing, Communities and Local Government Planning Practice Guidance: Environmental Impact Assessment (MHCLG, 2014 (and as most recently amended in 2020);
 - Institute of Environmental Management and Assessment (2017) – Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice;
 - Institute of Environmental Management and Assessment (IEMA), Environmental Impact Assessment Guide to Shaping Quality Development, (IEMA, 2015); and
 - Institute of Environmental Management and Assessment, Guidelines for Environmental Impact Assessment, 2004 (amended 2006).

5.3 SCOPE OF THE ENVIRONMENTAL IMPACT ASSESSMENT

2017 EIA Regulations

- 5.3.1 An ES must meet the requirements specified in Regulation 18 of the EIA Regulations (2017) and contain the information specified in Schedule 4 that is relevant to the specific characteristics of the particular development and to the environmental features likely to be significantly affected.
- 5.3.2 Table 5—1 lists the information specified in Schedule 4, along with the section of the ES where this information is provided (where applicable). Further information on the Fallowfield Campus Redevelopment is provided in the subsequent sections of this chapter.

Table 5—1 Information specified in Schedule 4 of the EIA Regulations 2017 for inclusion in an ES

Item	Information specified in Schedule 4	Section of the Environmental Statement
1	A description of the development, including in particular: a) a description of the location of the development; b) a description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases; c) a description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural	ES Volume I: Chapter 2 Development Description

Item	Information specified in Schedule 4	Section of the Environmental Statement
	resources (including water, land, soil and biodiversity) used; and an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases.	
2	A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.	ES Volume I: Chapter 4 Alternatives and Design Evolution
3	A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.	ES Volume I: Chapters 6-9 (technical assessments, baseline sections)
4	A description of the factors specified in Regulation 4(2) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.	ES Volume I: Chapter 6-9 (technical assessments) ES Volume I: Chapter 10 Interactive Effects
5	A description of the likely significant effects of the development on the environment resulting from, inter alia: a) the construction and existence of the development, including, where relevant, demolition works; b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources; c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste; d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters); e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources; f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change; g) the technologies and the substances used; and The description of the likely significant effects on the factors specified in regulation 4(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development. This description should take into account the environmental protection objectives established at Union or Member State level which is relevant to the project, including in particular those established under Council Directive 92/43/EEC(a) and Directive 2009/147/EC(b).	ES Volume I: Chapter 2 Development Description ES Volume I: Chapter 6-9 (technical assessments) ES Volume I: Chapter 10 Interactive Effects
6	A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	ES Volume I: Chapter 6-9 (technical assessments) Technical appendices in ES Volume III
7	A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.	ES Volume I: Chapter 6-9 (technical assessments) ES Volume I: Chapter 10 (Interactive Effects) ES Volume I: Chapter 11 (Residual Effects and Conclusions)

Item	Information specified in Schedule 4	Section of the Environmental Statement
8	A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU(c) of the European Parliament and of the Council or Council Directive 2009/71/Euratom(d) or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.	Not included. The development is not out of keeping with the surrounding tenure and is unlikely to produce a significantly elevated risk of accidents or natural disasters. This information was scoped out for assessment during the scoping process. See subsequent sections of this chapter for further details.
9	A non-technical summary of the information provided under paragraphs 1 to 8.	ES Non-Technical Summary
10	A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.	ES Volume I: Chapter 6-9 (technical assessments)

Stages of development assessed

- 5.3.3 The EIA has addressed effects arising from the demolition, construction and operation of the proposed development as follows:
 - Demolition and construction effects may arise directly from demolition and construction activities (e.g. emission of dust and noise), but also from the temporary use of land (e.g. construction sites) or from associated changes in traffic/pedestrian movements (e.g. diversions); and
 - Operational effects may arise from the use of the new or modified infrastructure, landscape and buildings (e.g. the traffic generated by the new development or effects of development operations).
- 5.3.4 The significance of the effects that will arise in each of these phases is based on the magnitude of any changes compared to the baseline (i.e. those conditions which either exist or would exist if the scheme did not go ahead) and the importance or sensitivity of the resource or receptor¹ affected by the changes.

Consultation and agreement of technical scope

EIA scoping

- 5.3.5 Regulation 15 of the EIA Regulations (2017) indicates that an applicant may ask the relevant planning authority, in this case MCC, to state in writing their opinion as to the information to be provided in the ES (a “scoping opinion”).
- 5.3.6 A scoping exercise was undertaken to identify potentially significant environmental issues relating to the site and the proposed development. This ensured that these issues were subject to an appropriate level of assessment.
- 5.3.7 The EIA scoping report (Appendix 5-A) summarised the findings of the scoping exercise and set out the proposed scope of the EIA. The report was formally submitted to MCC on 6th June 2023. MCC, following input from a number of relevant consultees, subsequently provided its adopted EIA scoping opinion (Appendix 5-B) on 25th July 2023. This included responses from United Utilities, Greater Manchester Ecology Unit, Greater Manchester Archaeological Advisory Service, Manchester Airport Aerodrome Safeguarding Officer, Transport for Greater Manchester and the Environment Agency.

¹ In EIA terms, a receptor (or sensitive receptor) refers to something which could be affected by the presence of a new development – for example people, residential dwellings, or wildlife, protected species and ecological designations, to name a few.

- 5.3.8 Since the submission of the EIA scoping report to MCC, the applicant made a number of changes to the description of the proposed development. In summary, these comprised:
 - Inclusion of detail on the area of floorspace and use classes for the supporting ancillary uses associated with the student residential use of the site (up to 4,500 sqm of floorspace within Use Class F1a, Class E(a), E(b), E(c), E(d), E(g) and Sui Generis (drinking establishment and hot food takeaway); and
 - Inclusion of provision for ancillary supporting staff accommodation (up to 55 bedrooms) (Sui Generis use class), and up to 1,200 sqm of ancillary residential dwellings (Use Class C3).
- 5.3.9 On review, it is considered that these changes do not affect those topics which have been scoped out of the EIA in agreement with MCC (see section 5.3.13 below). In terms of the technical disciplines included in the ES, the relevant assessments have taken into account the above amendments. It is concluded that the adopted EIA scoping opinion issued on 25th July 2023 remains valid for the purposes of this EIA.
- 5.3.10 The EIA scoping report proposed to scope out the following disciplines from the ES, as significant effects were not considered likely to arise from the proposed development:
 - Daylight, Sunlight and Overshadowing – Given the scale of the proposed development and its distance from surrounding residential properties, significant effects are not anticipated.
 - Wind Microclimate – Receptors in relation to wind microclimate are the occupants and users of the proposed development, including areas of public realm. It is not considered that significant effects will arise during demolition/construction or operation of the proposed development. A stand-alone desk study looking at the potential impact of wind will be submitted with the planning application.
 - Ground Conditions – It is considered that the risks and resultant effects are sufficiently well understood and that based on the information currently available, it is likely that the residual effects associated with ground conditions would be insignificant. A Phase 1 Desk Study will be submitted with the planning application.
 - Water Resources and Flood Risk – With a low residual flood risk and a very low to low risk of surface water flooding, no likely significant effects are anticipated to arise with respect to flood risk, surface water drainage and foul water drainage. Furthermore, no likely significant effects are anticipated to water resources throughout the demolition and construction works following the implementation of a DEMP and CEMP and various standard mitigation measures both pre-commencement and throughout the works. A standalone FRA and an Outline Drainage Strategy will be submitted with the planning application.
 - Traffic and Transport – It is considered the proposed development will not generate any significant transport effects. Given that any increased traffic levels during the demolition and construction phase will be temporary and mitigation measures will be implemented by managing construction traffic through the implementation of the CLP, effects on road users related to delay, safety and amenity are unlikely to be significant. During operation, based on the availability of public transport services in the local area, and considering the implementation of travel planning measures and the car-free proposals, no significant traffic and transport effects are anticipated. A stand-alone Transport Statement and Framework Travel Plan will be submitted with the planning application.

- Archaeology – It is proposed that the topic of archaeology is scoped out of the EIA as it is unlikely that there will be significant effects. However, an archaeological deskbased assessment shall be undertaken and submitted alongside the planning application. An intrusive archaeological investigation of the site will also be carried out in advance of development to document non-statutory archaeological remains of low (local) significance.
- Socio-economic – It is not anticipated that the proposed development will result in significant effects in relation to socio-economics. Therefore, a socio-economics ES chapter is not considered necessary and will be scoped out of the ES. A Socio-Economic Regeneration Statement will be submitted with the planning application.
- Waste Management – It is proposed that waste management will be scoped out of the EIA for the proposed development as effects associated with waste management will be suitably mitigated through the use of relevant management plans and strategies. An Outline Operational Waste Management Plan (OWMP) will be submitted with the planning application.
- Artificial Lighting – A dedicated ES chapter assessing light spill is not considered necessary and is scoped out of the ES. However, it is anticipated that preparation of a Lighting Strategy will be included as a planning condition for the proposed development.
- Electronic Interference – No significant environmental effects anticipated due to the digital switchover. A standalone TV Reception Assessment will be prepared and submitted with the planning application.
- Aviation – It is proposed that aviation will not be included within the ES, as this primarily relates to health and safety requirements that are not necessarily well aligned to the EIA process. In addition, the existing Owens Park tower, at 18 storeys in height, exceeds that of the tallest building of the proposed development (maximum height of 14 storeys, plus roof plant).
- Major Accidents and/or Natural Disasters – Considering the nature of the proposed development, the commitment to building regulations/statutory requirements and the commitment to undertake an FRA and a climate change resilience risk assessment, a dedicated ES chapter assessing major accidents and or natural disasters is scoped out of the ES.
- Human Health - Potentially significant effects on human health will be directly or indirectly considered across the technical chapters of the ES, rather than in a dedicated ES chapter. Any additional non-significant human health aspects will be considered in the relevant standalone reports submitted with the outline planning application.

5.3.11 The adopted EIA scoping opinion confirmed that MCC generally agreed with the scope and matters identified for inclusion in the ES. Two matters which required further discussion and agreement with MCC are summarised in Table 5—2, relating to human health and ground conditions. Table 5–2 formed part of a response on the EIA scoping opinion, issued to MCC on 22nd August 2023 (see Appendix 5-C for the full response to the case officer). Note that the table below does not form a complete summary of all consultee responses and only includes relevant points relating to the scope of the ES (see Appendix 5-B for MCC’s EIA Scoping opinion in full).

Table 5—2 Response to the EIA Scoping Opinion

Topic	Comment / Response
MCC Scoping Opinion response	
Air Quality	
The scope of the proposed air quality chapter of the ES is considered to be acceptable.	Current approach aligns. No further action.
Noise and Vibration	

Topic	Comment / Response
The scope of the proposed air quality chapter of the ES is considered to be acceptable.	Current approach aligns. No further action.
Ecology and Biodiversity	
The inclusion of ecology in the ES is welcomed due to the potential impact to bats.	Current approach aligns. No further action.
Climate Change and Greenhouse Gas Emissions	
The scope of the proposed Climate Change chapter of the ES is considered to be acceptable.	Current approach aligns. No further action.
Heritage, Townscape and Visual	
The scope of the proposed Heritage, Townscape and Visual chapter of the ES is acceptable. The proposed viewpoints for inclusion in the assessment as set out at figures 6-2 and 6-3 are accepted.	Current approach aligns. No further action.
Human Health	
The proposals impact on human health are proposed to be considered across a number of technical chapters of the ES, whilst this is generally considered an acceptable approach, given the type of proposal and its location, it is recommended in this instance that a chapter covering and bringing together the respective impacts of Human Health is contained within the ES.	As agreed, a specific section will be included within the Non-Technical Summary of the ES which will pull together consideration of the day to day impacts of the proposed development on residents as far as possible, based on information from relevant ES chapters (air quality, and noise & vibration). A separate ES chapter on Human Health is not proposed as this will produce a complex technical assessment focused on the effects of the proposed development associated with the protection and promotion of health in the population, based on the methodology of a health impact assessment (and would conclude all residual effects are negligible). It is therefore considered that an ES chapter on population and human health will not provide the content that MCC has requested (i.e. to understand, in plain English, how residents and the wider community will be affected by the proposed development). In the wider planning documentation, the standalone Socio Economic Regeneration Statement will consider the impacts of the proposals on residents and the local community in the Fallowfields district, along with the regenerative impacts of the proposals on the local economy. This commentary will be fairly high level and qualitative at this stage. The Planning Statement will then focus on the amenity impacts felt by the surrounding residents of Fallowfield. This will draw the supporting technical and survey work into a clear and succinct section.
Environment Agency Response	
Ground Conditions	
We have reviewed the report and considered the information to ascertain possible risks to controlled waters. Records held by the Environment Agency report the site is located above drift deposits comprised of glacial till designated a Secondary Undifferentiated aquifer which are in turn underlain by sandstone bedrock designated a principle aquifer. Whilst our records do not indicate any surface water features are mapped on site our records report Cringle Black Brook is located ~250m to the south of the site and Gore Brook is located ~400m to the north of the site. As identified with the EIA report the site is located within a Source Protection Zone 3.	As noted in the scoping document and the subsequent EA response, historic reports/data exist for the proposed development site including a Phase 1 Desk Study and Phase 2 Ground Investigation report. Upon review of all the available data, including the Phase 2 investigation, the scoping document concludes that the risks and resultant effects are sufficiently well understood and that based on the information currently available, it is likely that the effects associated with ground conditions and groundwater would not be significant. However, as part of the proposed development an updated Phase 1 Desk Study along with a scheme specific Ground Investigation will be carried out.

Topic	Comment / Response
As documented within section 5.5 in the EIA report, Phase 1 and 2 reports have already been prepared for the site which have concluded that the site poses a low risk to controlled waters and therefore ‘ground conditions’ have been scoped out of the EIA report as documented within section 7.0. Having reviewed the Phase 1 report included within the EIA scoping report, potential on site sources have been reported to be the deposition of made ground materials as fill during previous phases of development and potential off-site sources reported to be associated with the former petrol station previously located to the southeast of the site and former disused railway to the south site. Whilst a copy of the Phase 1 report has been included within the EIA scoping report a copy of the Phase 2 report has not been included. Given we have not reviewed the Phase 2 report we do not consider that ‘ground conditions’ should be scoped out of the EIA report.	Furthermore, it is envisaged that several procedures will need to be fulfilled pre-commencement of the works across the site to ensure the protection of human health and the environment. The procedures are standard practices that need to be undertaken prior to the start of below ground works on any site and would be undertaken in accordance with relevant legislation. It is envisaged that the fulfilment of these procedures would be secured through appropriately worded planning conditions attached to the planning permission. Planning conditions pertaining to the following are anticipated: • Selection of appropriate piling techniques and preparation of a piling method statement so as not to result in any unacceptable risk to groundwater; • Preparation and execution of a site investigation scheme. The site investigation scheme shall be based on the risks identified in the preliminary risk assessment and shall provide provision for, where relevant, the sampling of vapour, ground gas, surface and groundwater; • As required, preparation of a remediation method statement which will detail any required remediation works and shall be designed to mitigate any remaining risks identified in the risk assessment; • As required, the execution of the remediation method statement and preparation of a verification report; • Definition of the procedures for long term monitoring past the completion of the development works to verify the success of the remediation works; • Definition of the procedures if any unexpected contamination is found on site including the reporting procedure for its identification and management Based on the foregoing, we are of the opinion that no significant effects are considered, and as such a full Ground Conditions Chapter is not needed as part of the EIA process. Any issues relating to ground conditions can be dealt with under the planning and legislative process in the normal way as outlined above. If required, the Phase 2 data that is summarised in the scoping document and the Desk Study can be forwarded for information.

Temporal scope

Overview

5.3.12 The temporal scope for the proposed development is considered to include the preparation works and enabling works, the demolition of existing structures on site, construction works and the operation of the proposed development for the duration of its design life.

Baseline year

5.3.13 Environmental impacts and effects will be described in terms of the extent of change to the baseline environment. The baseline used in the assessment of effects in this ES is the year 2023.

5.3.14 During the works, parts of the Fallowfield campus will remain open to UoM staff and students as the redevelopment progresses in phases.

Demolition period, construction period and operational year

5.3.15 The indicative start date for initial demolition work is Q4 2023 with an estimated project delivery period of seven years through to completion of the final phase. The future baseline year used in the operational assessment of effects in this ES is therefore 2030.

Intermediate year

5.3.16 All current buildings on site are proposed to be demolished and delivery of the proposals will be phased. The indicative phasing plan shows demolition and construction works starting with the Owen Park area in the north and then progressing to the southern areas of the site.

5.3.17 New potential receptors will arise during the project works as current residents will be receptive to the impacts of the first phases being built and the new residents become receptive to the latter phases being completed.

Spatial scope

5.3.18 The spatial extent of the EIA is defined by the geographical area potentially affected by the proposed development. The definition of the spatial scope has taken account of:

- The footprint of the proposed development defined by the red line/construction boundary;
- The nature of the existing baseline environment;
- The manner in which effects are likely to be propagated;
- The wider area affected by, for example, transport movements; and
- The geographical boundaries of the political and administrative authorities which provide the planning and policy context for the scheme.

5.3.19 For the proposed development, the geographical extent of the assessment will include the site and its neighbours, as well as any sensitive receptors in the wider area. The spatial scope for each assessment has been defined based on a combination of desk study, existing survey data, consultation and professional experience.

5.4 PLANNING CONTEXT

5.4.1 Planning permission is being sought for one outline planning application. The application includes parameter plans for approval. Reference should be made to ES Chapter 2 ‘Development Description’ and the Design and Access Statement (DAS) for further details.

5.5 ASSESSMENT OF EFFECTS

Type of effect

5.5.1 The identification of effects within the EIA process has been completed with reference to the EIA Regulations (2017) and good practice guidance. The following types of effects have been considered in undertaking the EIA:

- Direct effects – effects that arise from activities that form an integral part of the project (e.g. land take);
- Indirect or secondary effects – effects that arise from activities not explicitly forming part of the project (e.g. noise changes due to an increase or decrease in road traffic flows on existing off-site roads resulting from the construction works);

- Interactive effects – these arise from the interaction of a number of effects. These include effects of a different nature at a particular location; at different locations but affecting the same receptor; of the same nature at different locations; reoccurring over a period of time. The interactive effect of two or more effects, which may be non-significant by themselves, can be significant on the one receptor;
- Short-term, medium-term and long-term effects, as defined below:
 - Short-term effects are those that would be of short duration and would occur for up to 2 years.
 - Medium-term effects are those that occur for a period of between 2-10 years.
 - Long-term effects are those that occur for 10 years or more and include permanent effects.;
 - Permanent effects – effects that result from an irreversible change to the baseline environment or which persist for the foreseeable future;
 - Temporary effects – effects that persist for a limited period only and possibly reverts to an original or identified baseline state; and
 - Beneficial and adverse effects – having a beneficial or adverse influence on receptors and resources.

5.5.2 The above types of effects have been assessed for the demolition, construction and operational phases of the proposed development.

Determining significance

- 5.5.3 The EU Directive 2014/52/EU and EIA Regulations (2017) require that the ES reports the likely significant effects of the proposed development on the environment. Although there is no statutory definition of what constitutes a significant effect, it is clear that the principal purpose of identifying the significant effect of a project is to inform the decision maker such that the effects can be taken into account when considering whether or not permission should be granted.
- 5.5.4 For the purposes of this ES, an ‘impact’ is the change to the baseline attributable to the proposed development, while an ‘effect’ is the result of that impact on the resource or the receptor (of a given sensitivity). The way in which the significance of an effect is determined will vary for each environmental topic area, but in broad terms it may be described as the magnitude of the change to the baseline conditions that can be attributed to the proposed development and the value or sensitivity of the receptor affected.
- 5.5.5 A consistent approach between topic areas has generally been applied to assessments, supplemented in some instances by the specialists’ experience and professional opinion. The chapters have adopted consistent terminology in defining the significance of the effect. An explanation of relevant and specific discipline terminology will be clearly described if different to the more consistent terminology.
- 5.5.6 In general, significance of effect has been defined as being major, moderate, minor or negligible, whereby major and moderate are considered to be ‘significant’ and minor or negligible considered ‘not significant’. This is shown in a matrix in Table 5–3 . Any changes or variations to this methodology are detailed in specific technical topic chapters.

Table 5—3 Matrix for determining effect significance

		Magnitude of change / impact			
		Large	Medium	Small	Negligible
Receptor sensitivity	High	Major	Major	Moderate/Minor	Negligible
	Moderate	Major	Moderate	Minor	Negligible

	Low	Moderate/Minor	Minor	Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

5.6 MITIGATION AND RESIDUAL EFFECTS

- 5.6.1 Where possible, a development will achieve environmental enhancement; however, where adverse effects exist, the reduction of effect significance through mitigation will take into consideration the following hierarchy:
- Avoidance of the significant effect;
 - Reduction of the impact & effects;
 - Finding a way to reverse or repair the effect; and as a last resort
 - Compensation (or off-setting).
- 5.6.2 Residual effects (assuming mitigation options are applied) will then be classified by significance, as appropriate.

5.7 DEVELOPMENT ALTERNATIVES

- 5.7.1 A number of alternatives have been considered for the proposed development. These are discussed in Chapter 3 of this ES and include:
- The ‘do nothing’ option; and
 - Alternative masterplan options including how the proposals have developed in response to initial EIA findings, public and stakeholder consultation comments.

5.8 CUMULATIVE EFFECTS

- 5.8.1 EIAs are also required to provide a review and assessment of the combined effects of the proposed development with other proposed developments. Cumulative projects that are of a size relevant to be considered for the cumulative effects assessment are typically those that are of a significant size (e.g. other EIA projects) within the zone of influence of the proposed development, defined as 1km from the site boundary. As an approximate threshold, the developments that would be relevant for inclusion in an intra-project cumulative assessment are:
- Those submitted for planning via a planning application, permitted/with a resolution to grant, or under construction;
 - Located within approximately 1 km of the site;
 - Those which are 10,000 square meters or greater gross external area (GEA); and
 - Schemes below the above thresholds but of more than 50 residential units.
- 5.8.2 A review has been undertaken and there are no cumulative developments under construction, consented or proposed within the zone of influence of the proposed development that meet these criteria. Therefore, the intra-project cumulative assessment has been scoped out of this EIA.

CLIMATE CHANGE PROJECTIONS

- 5.8.3

IEMA guidance ‘EIA Guide to Climate Change Resilience and Adaptation’ (first published in 2015 and revised in 2020) describes the significant uncertainties in the magnitude, frequency and spatial occurrence of climate change projections, which make it difficult to assess the impacts and effects specific to any one project. Detailed quantitative assessment has therefore not been included in the ES.
- 5.8.4

In line with the IEMA (2020) guidance, there are two key strands to assessing climate change resilience and adaptation issues within EIA, as outlined below:

•

The risks of changes in the climate to the project (i.e. the resilience or conversely the vulnerability of a project to future climate changes). The IEMA (2020) guidance states that this is generally best reported in the analysis of alternatives and it is better suited to a risk assessment type process than traditional EIA ‘determination of significance’. Therefore, a climate change resilience risk assessment has been completed for the proposed development and appended to Chapter 4 Alternatives and Design Evolution; and

•

The extent to which climate exacerbates or ameliorates the effects of the project on the environment (i.e. ‘in-combination’ effects). The IEMA (2020) guidance states that this is best analysed in the existing chapters of the ES and is suited to using traditional significance criteria from the respective chapters. Therefore, this has been included throughout each of the technical chapters and has been completed by each technical specialist.
- 5.8.5

In accordance with IEMA (2020) guidance, the relevant assessments have taken into account the future climate change scenarios identified in The UK Climate Projections (UKCP18, 2018) for north-west England. UKCP18 uses Representative Concentration Pathways (RCPs). These are named according to the concentration of greenhouse gas modelled to occur in the atmosphere in 2100. There are four RCPs available in the UKCP18 climate projections: RCP 2.6, RCP 4.5, RCP 6.0 and RCP 8.5. In line with the IEMA (2020) guidance, RCP 8.5 has been used, which represents the most conservative, highest-impact scenario. Projected change in selected climate variables for north-west England, based on UKCP18 data, is included in Table 5—4. Timescales up to the 2090s have been reviewed, considering the potential long lifespan of the proposed development.

Table 5—4 Projected change in selected climate variables for north-west England, based on UKCP18 data

Season	Variable	Time Period	Projected Change At		
			10th percentile	50th percentile	90th percentile
Winter	Mean temperature (°C)	2020 - 2039	-1 to 0	0 to 1	1 to 2
		2040 - 2059	0 to 1	1 to 2	2 to 3
		2060 - 2079	0 to 1	2 to 3	4 to 5
		2080 – 2099	1 to 2	3 to 4	5 to 6
	Mean precipitation change (%)	2020 - 2039	-10 to 0	0 to 10	10 to 20
		2040 - 2059	-10 to 0	0 to 10	10 to 20
		2060 - 2079	0 to 10	10 to 20	20 to 30
		2080 – 2099	0 to 10	10 to 20	30 to 40
	Mean daily maximum temp change compared to 1981-2000	2020 - 2039	-1 to 0	0 to 1	1 to 2
		2040 - 2059	0 to 1	1 to 2	2 to 3
		2060 - 2079	0 to 1	2 to 3	5 to 6
		2080 – 2099	1 to 2	3 to 4	6 to 7
	Mean daily minimum temp change compared to 1981-2000	2020 - 2039	-1 to 0	0 to 1	1 to 2
		2040 - 2059	0 to 1	1 to 2	2 to 3
		2060 - 2079	0 to 1	2 to 3	5 to 6
		2080 – 2099	1 to 2	4 to 5	6 to 7
Summer	Mean temperature (°C)	2020 - 2039	0 to 1	1 to 2	1 to 2
		2040 - 2059	0 to 1	1 to 2	3 to 4
		2060 - 2079	0 to 2	3 to 4	5 to 6
		2080 – 2099	1 to 2	4 to 5	7 to 8
	Mean precipitation change (%)	2020 - 2039	-30 to -20	-10 to 0	10 to 20
		2040 - 2059	-40 to -30	-20 to -10	-10 to 0
		2060 - 2079	-60 to -50	-30 to -20	-10 to 0
		2080 – 2099	-80 to -70	-40 to -30	-10 to 0
	Mean daily maximum temp change compared to 1981-2000	2020 - 2039	0 to 1	1 to 2	2 to 3
		2040 - 2059	0 to 1	1 to 2	3 to 4
		2060 - 2079	0 to 1	3 to 4	6 to 7
		2080 – 2099	2 to 3	5 to 6	8 +
	Mean daily minimum temp change compared to 1981-2000	2020 - 2039	0 to 1	0 to 1	1 to 2
		2040 - 2059	0 to 1	1 to 2	3 to 4
		2060 - 2079	1 to 2	2 to 3	4 to 5
		2080 – 2099	2 to 3	4 to 5	7 to 8

5.9 HUMAN HEALTH

5.9.1 As agreed via the EIA scoping process, potentially significant effects on human health will be considered across some the ES technical chapters, rather than in a dedicated ES chapter. Similarly, exposure to pollution and disturbance will be assessed within the Air Quality (Chapter 6) and Noise and Vibration (Chapter 7) ES chapters. Visual amenity will be assessed within the HTVIA (Volume II of the ES). As a result of feedback from MCC via the EIA scoping opinion, a section will be included in the ES NTS in plain English to identity how residents and the wider community will be affected by the proposed development on a day to day basis.

5.10 REFERENCES

- Department for Communities and Local Government Planning Practice Guidance: EIA, (2014, amended in 2017).
- Institute of Environmental Management and Assessment, Guidelines for EIA 2004 (amended 2006).
- Institute of Environmental Management and Assessment, EIA Guide to Shaping Quality Development, (2015).
- Institute of Environmental Management and Assessment, Delivering Proportionate EIAL A Collaborative Survey for Enhancing UK Environmental Impact Assessment Practice (2017).
- UKCP18, Environment Agency. Accessed June 2023 at <https://ukclimateprojections-ui.metoffice.gov.uk/ui/home>

5.11 GLOSSARY

Term	Definition
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
IEMA	Institute of Environmental Management and Assessment
MCC	Manchester City Council
UKCP18	United Kingdom Climate Projections 2018

5.12 APPENDICES (ES VOLUME III)

Term	Definition
5-A	EIA Scoping Report
5-B	EIA Scoping Opinion
5-C	Response to the EIA Scoping Opinion

6 AIR QUALITY

6.1 INTRODUCTION

- 6.1.1 This chapter of the ES assesses the likely environmental effects of the proposed development with respect to air quality. This chapter also describes the methods used to assess the effects; the baseline conditions currently existing at the site and surrounding area; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been adopted.
- 6.1.2 Interactive effects associated with air quality have additionally been considered within the ES and can be found in Chapter 10 Interactive Effects.

METHODOLOGY AND ASSESSMENT CRITERIA

EIA Scoping

- 6.1.3 The following response to the EIA scoping report was received from MCC with regards to air quality:
- “The scope of the proposed air quality chapter of the ES is considered to be acceptable.*
- The application site is close to the Greater Manchester Air Quality Management Area (map available at: <https://uk-air.defra.gov.uk/aqma/maps>) and future occupants of the development may be exposed to air pollution; consideration of this will be required within the Air Quality chapter.”*
- 6.1.4 The exposure of future site occupants to air pollution has been considered in this assessment and is presented in section 6.5.

Baseline study methodology

- 6.1.5 Baseline air quality data has been gathered from the Greater Manchester Combined Authority 2021 Air Quality Annual Status Report (GMCA, 2021a). This presents air quality monitoring in Greater Manchester for each of the five years up to 2020 (i.e. 2016-2020).
- 6.1.6 2019 is considered to be the baseline year as this is the most recent full year that was not impacted by the COVID-19 pandemic. The restrictions imposed in response to the COVID-19 pandemic, in addition to the changes in travel patterns and subsequent emissions, significantly impacted pollutant concentrations making monitoring results from 2020 and 2021 atypical from previous years. Therefore, the baseline assessment assumes 2019 to be the most representative year of baseline conditions.
- 6.1.7 Background pollutant concentrations have been obtained from Defra’s air quality background maps (Defra, 2018). Defra provide modelled background air pollution data for NO₂, PM₁₀ and PM_{2.5} for each 1km-by-1km OS grid square. Background pollutant concentrations are modelled from a reference year of 2018 and based upon ambient monitoring and meteorological data from 2018 with projections for future years up to 2030.

¹ The transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction/demolition site with

Assessment approach

Construction assessment methodology

- 6.1.8 Potential construction effects are assessed in accordance with the Institute of Air Quality Management (IAQM) best practice guidance (Holman, et al., 2014). This document provides a methodology for assessing air quality impacts from demolition, earthworks, construction and trackout¹; activities which may be associated with a development. The construction assessment methodology involves the following steps:
- i. A screening assessment to identify the need for detailed assessment. Detailed assessment will be required where there is:
 - A. A human receptor within:
 - o 350m of the site boundary; or
 - o 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).
 - B. An ecological receptor within:
 - o 50m of the site boundary; or
 - o 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).
 - ii. Assess the risk of dust impacts by:
 - A. Defining the potential dust emission magnitude;
 - B. Defining the sensitivity of the area; and
 - C. Assessing the risk of impacts. Criteria for defining the dust impacts are shown in Appendix 6A.
 - iii. Determine site-specific mitigation for each of the four possible construction activities; and
 - iv. Examine residual effects to determine whether these are significant.
- 6.1.9 This assessment will focus on demolition, earthworks, construction, and trackout. IAQM guidance suggests that the significance of any adverse effects is reported post-mitigation, assuming all actions to avoid or reduce environmental effects are an inherent part of the proposed development. Appendix 6A outlines the construction methodology in full.

Construction traffic emissions

- 6.1.10 Owing to the outline nature of the planning application, there is limited detail regarding predicted construction traffic likely to be generated by the proposed development. It is anticipated that a Construction Logistics Plan (CLP) will be produced in order to minimise construction traffic associated with the proposed development. It is therefore recommended that assessment of construction traffic emissions is scoped out of this assessment and any necessary assessment be carried out at the detailed design/reserved matters stage.

dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site.

Operational assessment methodology

Criteria for assessing operational impacts

6.1.11 The Environmental protection UK (EPUK) and IAQM have published guidance on consideration of air quality within the planning and development control process (Moorcroft, et al., 2017). This guidance includes criteria which identify when relevant operational impacts can be screened out as insignificant or require further assessment. Criteria relevant to this assessment are detailed in Table 6-1.

Table 6-1 Indicative screening criteria for requiring a detailed air quality assessment.

The development will:	Indicative criteria to proceed to detailed assessment:
Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans)	A change of LDV flows of: - more than 100 annual average daily traffic (AADT) within or adjacent to an Air Quality Management Area (AQMA); or - more than 500 AADT elsewhere.
Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA; or - more than 100 AADT elsewhere.
Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors. NB. this includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping.	Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates. Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

Combustion plant emissions

6.1.12 Owing to the outline nature of this application there is limited detail in terms of the proposed energy strategy, however it is anticipated that air source heat pumps will be utilised as the heating plant. These will not give rise to any onsite air pollutant emissions. Combustion plant emissions have therefore been assessed qualitatively and it is recommended that any proposed combustion plant be assessed based on the detailed design at the reserved matters stage.

Operational Traffic emissions

6.1.13 Operational traffic emissions have been assessed qualitatively in relation to the screening thresholds detailed in Table 6-1.

Exposure of future site occupants to poor air quality

6.1.14 As the proposed development is located within an AQMA, the exposure of future site users to air pollution has been assessed qualitatively.

Assessment of effects

Receptor sensitivity

Construction

- 6.1.15 Sensitivity of receptors with regards to construction dust are presented in Table 6A-1 in Appendix 6A.
- 6.1.16 For the sensitivity of people and their property to soiling, the IAQM recommends that the air quality practitioner uses professional judgement to identify where on the spectrum between high and low sensitivity a receptor lies, taking into account the general principles in the Table 6A-1.
- 6.1.17 For the sensitivity of people to the health effects of PM₁₀, the IAQM recommends that the air quality practitioner assumes there are three sensitivities based on whether or not the receptor is likely to be exposed to elevated concentrations over a 24-hour period, consistent with the Defra’s advice for local air quality management.

Operation

- 6.1.18 Operational impacts are considered at human receptor locations where there is relevant exposure to national air quality objectives, in line with Defra LAQM TG22 (Defra, 2022). Examples of receptors, dependent on the averaging period for pollutant concentration, are shown in Table 6-2. Air quality objectives are based on standards which are set at a level below the lowest concentration at which more sensitive members of the public have been observed to be affected by pollutant exposure.
- 6.1.19 As any member of the public could be present at receptor locations which have relevant exposure, it is considered that all receptors are of equal sensitivity. Therefore, all receptors considered, where there is relevant exposure, will be of high sensitivity.

Table 6-2 Receptor sensitivity principles: operation

Averaging period	Sensitive receptors occur at	Sensitive receptors generally do not occur at
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
Hourly mean	All locations where the annual mean and 24-hour mean objective apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

Magnitude of change / impact

Construction

6.1.20 With regards to construction, the magnitude of dust emission is determined separately for demolition, earthworks, construction and trackout. The dust emission magnitude is based on the scale of the anticipated works and are classified as Small, Medium, or Large, following the criteria outlined in Appendix 6A.

Operation

6.1.21 Magnitude of impact due to emissions arising from the operation of the proposed development is determined with respect to the change in pollutant concentration at a receptor, in relation to the relevant air quality objective (AQO) for a pollutant.

Significance evaluation

Construction

6.1.22 The construction assessment defines a risk of impact of dust soiling, human health and ecology during earthworks, construction and trackout. Mitigation is recommended based on this level of risk. The IAQM guidance recommends that dust mitigation measures are considered an inherent part of the development and that significance of effects is only reported after mitigation is applied. Therefore, the significance of effects of construction dust on health and amenity is only reported post-mitigation.

Operation

6.1.23 Where a detailed assessment is required (see Table 6-1), IAQM has produced the guidance ‘Land Use Planning & Development Control: Planning For Air Quality’ (Moorcroft, et al., 2017), which provides a framework for describing the degree of impact resulting from a change in air pollutant concentration. Impact is described by expressing the magnitude of incremental change as a proportion of a relevant assessment level and then to examine this change in the context of the new total concentration and its relationship with the assessment criterion (or Air Quality Assessment Level (AQAL)). In this instance, the AQAL by which significance is determined is the UK air quality objective value.

6.1.24 The significance of a potential impact is derived by considering both the total concentration and the magnitude of change at the receptor location, as demonstrated in Table 6-3.

Table 6-3 Long term impact descriptors for individual receptors

Long term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

6.1.25 IAQM guidance states the following with regards to assessing the exposure of site occupants to poor air quality:

‘Where the air quality is such that an air quality objective at the building façade is not met, the effect on residents or occupants will be judged as significant, unless provision is made to reduce their exposure by some means. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.’

6.2 LEGISLATION AND POLICY WHICH HAS INFLUENCED ASSESSMENT OR MITIGATION

European policy

6.2.1 The 2008 Ambient Air Quality Directive (2008/50/EC) (EU, 2008) set legally binding limits for pollutant concentrations. This directive was made law in England through the Air Quality (Standards) Regulations 2010 (HM Government, 2010). The Regulations were subsequently updated in 2016 (The Air Quality Standards (Amendment) Regulations 2016).

National policy and guidance

Environment Act 1995

6.2.2 Part IV of the Environment Act 1995 (HM Government, 1995) places a duty on the Secretary of State for the Environment to develop, implement and maintain an Air Quality Strategy (AQS) with the aim of reducing atmospheric emissions and improving air quality. The Environment Act 2021 requires the AQS to be reviewed at least every five years and create a progress report annually.

6.2.3 The latest AQS for England was published in 2023 (Defra, 2023a), providing the framework for ensuring the air quality limit values are complied with based on a combination of international, national and local measures to reduce emissions and improve air quality. A key measure is the statutory duty, also under Part IV of the Environment Act 1995, for local authorities to undergo a process of Local Air Quality Management (LAQM). This requires local authorities to review and assess air quality within their boundaries against a series of objectives and appraise development and transport plans against these assessments regularly and systematically.

6.2.4 In areas where air quality objectives are not likely to be met by the relevant target date, local authorities are required to declare an AQMA and develop an air quality action plan in pursuit of the air quality objectives (AQO). The national air quality objectives relevant to this assessment are detailed in Table 6-4.

Table 6-4 National Air Quality Objectives relevant to the assessment.

Pollutant	Objective
Nitrogen dioxide (NO ₂)	200 µg/m ³ measured as a 1-hour mean, not to be exceeded more than 18 times a year
	40 µg/m ³ measured as an annual mean
Particulate Matter (PM ₁₀)	50 µg/m ³ measured as a 24-hour mean, not to be exceeded more than 35 times a year
	40 µg/m ³ measured as an annual mean
Particulate Matter (PM _{2.5})	20 µg/m ³ measured as an annual mean

6.2.5 The Environment Act was amended in 2021 (HM Government, 2021), requiring the government to set new targets for PM_{2.5}. The subsequent Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 (HM Government, 2022) set the following targets:

- Annual mean PM_{2.5} concentration of 10 µg/m³ by 2040.
- At least a 35% reduction in population exposure of PM_{2.5} by the end of 2040.

- 6.2.6 The Environment Act 2021 requires the publication of an Environmental Improvement Plan every five years, with progress against the set targets reported on annually. The Environmental Improvement Plan 2023 (Defra, 2023b) sets the following interim target for PM_{2.5}:
- Annual mean PM_{2.5} concentration of 12 µg/m³ by 2028.
 - At least a 22% reduction in population exposure of PM_{2.5} by the end of 2028.

National Planning Policy Framework

- 6.2.7 The National Planning Policy Framework (NPPF) (DLUHC, 2021) underlines the importance of local authorities contributing towards improving and protecting the environment. With particular regard to air quality management, Section 9 of the NPPF notes that the environmental impact of transport and traffic should be identified and assessed, whilst mitigating adverse effects to bring about net environmental gains. The guidance states that the planning system should actively manage patterns of growth, offering a choice of transport modes to reduce air pollution:
- ‘Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health.’*
- 6.2.8 Further to this, Section 15 of the NPPF notes that planning policies should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of AQMAs and Clean Air Zones (CAZ), and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Additionally, the NPPF states that planning decisions should ensure that any new development in AQMAs and CAZs is consistent with the local air quality action plan.

Planning Practice Guidance

- 6.2.9 Planning Practice Guidance (PPG) (DLUHC and MHCLG, 2021) provides guiding principles on how the planning process can take account of the impact of new development on air quality. The PPG states:
- ‘Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.’*

Regional policy and guidance

Greater Manchester Air Quality Action Plan

- 6.2.10 An AQMA has been declared across the City of Manchester and encompasses all major roads within Greater Manchester (GM) owing to exceedances of the annual mean AQO for nitrogen dioxide (NO₂). Thereby, an Air Quality Action Plan (AQAP) has been produced by the Greater Manchester Combined Authority (GMCA, 2016). This outlines the mitigation measures and strategic approach to improve air quality within the city and surrounding boroughs from 2016-2021.
- 6.2.11 Several actions are relevant to the proposed development:

- Production of construction management guidance: Greater Manchester (GM) councils to adopt the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction as current best practice guidance to assess and mitigate emissions from construction sites.
 - Where a Key Priority Area is affected by a proposed scheme, a high level of mitigation control will be requested.
- Production of development planning guidance: GM councils will adopt the most recent IAQM/EPUK guidance for air quality assessment as current best practice guidance, to help ensure that planning applications consider potential local air quality impacts, and opportunities to improve air quality are realised.
 - Where a Key Priority Area is significantly adversely affected by a proposed scheme, a high level of mitigation control will be requested.
 - GM councils to recommend mitigation controls in accordance with the most recent guidance and the other actions in this document for new developments that contribute to a deterioration of air quality in Key Priority Areas.
 - Air quality monitoring data will be requested as a standard policy for proposed schemes that trigger an air quality assessment to inform the assessment or to confirm effects.
- Creation of a cumulative development database: A centralised database of planning applications and air quality assessments will be managed by Transport for Greater Manchester (TfGM) as a record of cumulative effects of multiple developments and thereby facilitate combined approaches to minimising emissions.
- Green Infrastructure: TfGM will promote the contribution of green infrastructure to improve air quality and will work with authorities to investigate the potential of green screens at significant locations, such as schools.

Greater Manchester Clean Air Plan

- 6.2.12 The ten GM local authorities have been instructed by the government to bring NO₂ pollution levels within legal limits by 2026 at the latest. This was originally planned to be through a Clean Air Plan (CAP), featuring a GM-wide category C charging Clean Air Zone (CAZ) (Clean Air Greater Manchester, 2023). Plans for the CAZ have not been approved and therefore a new investment-led approach without a charging CAZ has been proposed. Evidence for this approach is due to be submitted to the government by the end of June 2023.
- 6.2.13 The alternative approach involves a review of local policies, improvements to the bus fleet and targeted funding aimed at the most polluted areas.

The Greater Manchester Strategy

- 6.2.14 The Greater Manchester Strategy (GMCA, 2021b) sets out the city’s ambition improve wellbeing of those living, working and studying in Manchester. The strategy sets a route from 2021 to 2031 to deliver this plan, which focusses on the key aims of creating a greener, fairer and more prosperous Manchester.
- 6.2.15 One of the shared commitments is to create “a carbon neutral Greater Manchester by 2038, with better air quality and natural environment.” One of the key progress indicators for this commitment is monitoring of the level of NO₂ emissions and exceedances. A further progress indicator is the percentage and total annual trips made via public transport or active travel.

GMCA 5-year Environment Plan 2019-2024

- 6.2.16 The 5-Year Environment Plan (GMCA, 2019) sets out the long-term vision and immediate actions for the environment across Greater Manchester. The plan includes key priorities for improving air quality and reducing emissions caused by travel, including reducing the necessary travelling distance, increasing public transport and active travel, phasing out fossil fuelled vehicles, establishing a zero-emission bus fleet and decarbonising road freight transport.
- 6.2.17 Air quality is highlighted as a one of the five key environmental challenges, particularly with regard to nitrogen dioxide (NO₂) emissions arising from road transport. The environment plan sets an aim to meet World Health Organisation (WHO) guidelines on air quality by 2030 and supporting the UK Government in meeting and maintaining all thresholds for key air pollutants at the earliest date. It should be noted that this was adopted prior to the update to the WHO guidelines in 2021, which significantly reduced the guideline concentrations.
- 6.2.18 There are several key actions outlined in the plan that are relevant to the proposed development with regards to air quality:
- Phasing out gas boilers so that they account for less than 35% of home heating, with 60% of all heating (domestic and commercial supplied by low carbon heating).
 - Increase the proportion of trips by sustainable modes.
 - Reduce the overall amount people travel.
 - 100% of all cars are zero tailpipe emissions by 2035.
 - 22% reduction in heating and cooling demand, with a 10% reduction by 2025.

Greater Manchester Transport Strategy 2040

- 6.2.19 Greater Manchester Transport Strategy 2040 (Transport for Greater Manchester, 2021a) sets out a commitment to provide a transport system which:
- Supports sustainable economic growth and the efficient and effective movement of people and goods.
 - Improves the quality of life for all by being integrated, affordable and reliable.
 - Protects environment.
 - Supports the net zero target as well as improving air quality.
- 6.2.20 The Transport Strategy has adopted a number of policies relevant to air quality, including the following:
- **Policy 3:** We will maintain a programme of interventions encouraging people to make sustainable journeys. We will support this programme through journey planning tools, and information to encourage travel behaviour change and mode shift, in order to make the most efficient use of available capacity (particularly during peak periods).
 - **Policy 9:** We will work with partners and key stakeholders to bring nitrogen dioxide (NO₂) levels on local roads within legal limits, and to reduce levels of particulate matter.
 - **Policy 16:** We will work with partners to support a rapid transition towards low-emission vehicles in Greater Manchester, including developing a clear strategy on the Electric Vehicle Charging Infrastructure network required to provide greater confidence to residents and businesses to invest in electric vehicles.

Five-Year Transport Delivery Plan 2021-2026

- 6.2.21 To achieve long-term ambitions as set out in the Transport Strategy, the Five-Year Transport Delivery Plan (Transport for Greater Manchester, 2021b) has been published to respond to the transport opportunities and challenges facing Greater Manchester, in parallel with the spatial planning processes over 2021-2026. The aim is to provide an integrated approach to transport and land use planning by identifying the strategic transport interventions required to deliver the scale of growth envisaged across GM.
- 6.2.22 Improving air quality is one of the key areas for GMCA's investment and intervention in the five-year plan. To do so, GMCA pledged to deliver:
- "a package of interventions forming the Clean Air Plan that are reasonably expected to reduce NO₂ concentrations to legal levels and have wider air quality benefits"*

Local policy and guidance

Manchester Core Strategy Development Plan (2012-2027)

- 6.2.23 The Manchester Core Strategy Development Plan (MCC, 2012) is the primary strategic planning document in the city's Local Development Framework. It outlines the council's vision for Manchester from 2012 to 2027 and sets out planning policies that aim to help the city achieve the Local Development Framework's vision.
- 6.2.24 The Manchester Core Strategy Development Plan has adopted a number of policies relevant to air quality, including the following:
- Policy EN 16 (Air Quality)
- 6.2.25 *"The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester's principal traffic routes and at Manchester Airport. Developers will be expected to take measures to minimise and mitigate the local impact of emissions from traffic generated by the development, as well as emissions created by the use of the development itself, including from Combined Heat and Power and biomass plants.*
- 6.2.26 *When assessing the appropriateness of locations for new development, the Council will consider the impacts on air quality, alongside other plan objectives. This includes cumulative impacts, particularly in Air Quality Management Areas."*

Policy DM 1 (Development Management)

- 6.2.27 Policy DM 1 outlines the key parameters that should be addressed as part of the planning proposal, those relevant to Air Quality include:
- Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals, which would be sensitive to existing environmental conditions, such as noise.
 - Design for health.
 - Green infrastructure including open space, both public and private.

Policy T 1 (Sustainable Transport)

- 6.2.28 Policy T 1 outlines proposals that the council will support with regards to shifting towards sustainable modes of transport and helping to deliver a sustainable, high quality transport system. Those with particular relevance to air quality include:

- Improve pedestrian routes and the pedestrian environment.
- Improve and develop further Manchester’s cycle network (for example the Manchester Cycleway and the Trans Pennine Trail).
- Facilitate modes of transport that reduce carbon emissions e.g by incorporating charging points for electric vehicles, subject to their appropriate design and location.
- Would reduce the negative impacts of road traffic, for example, congestion, air pollution and road accident casualties.

Policy CC 5 (Transport)

6.2.29 *“Proposals will be supported that improve pedestrian safety, improve air quality and increase the scope for accessible public realm improvements.”*

Policy EN 7 (Energy Infrastructure opportunities)

- 6.2.30 Policy EN 7 sets out a general presumption in favour of low and zero carbon decentralised energy schemes, subject to a number of considerations. Those that relate to air quality, in particular, are as follows:
- Any new generating plant capable of producing heat and cooling as well as electricity should be located in a way that facilitates future connection to a local distributed energy system.
 - Consideration should be given to biofuel delivery by rail and waterways where possible. Where large-scale fuel or feedstock delivery is required by road the energy centre must be located in or adjacent to light industrial, industrial or leisure uses with any impact on local residential amenity minimised.
 - The cumulative impact of energy schemes will be taken into account when considering applications, to include modelled impacts on air quality and landscape character, with reference to Policy EN 16 (Air Quality).

MCC Air Quality & Planning Technical Guidance

- 6.2.31 One of the actions outlined in the GM air quality action plan (MCC, 2022) is to develop air quality and planning guidance. The guidance document aims to encourage developers to follow good practice and to mitigate impacts. It outlines the expectations of MCC with regards to air quality in the planning context for both the construction and operation of a development.
- 6.2.32 The guidance recommends following IAQM and EPUK guidance when assessing impacts associated with both construction and demolition. It also recommends usage of Defra’s damage cost calculations (for additional pollutant population exposure emissions costs) for major developments and/or where there may be a cumulative impact.
- 6.2.33 Furthermore, it sets out recommended electric vehicle charging provision and chimney stack heights.

Manchester Climate Change Strategy 2017-50 and Implementation Plan 2017-22

- 6.2.34 Manchester’s Climate Change Strategy 2017-50 (Manchester Climate Change Agency, 2017a) outlines the city’s commitment to play its full part in limiting the impacts of global climate change, locally and globally and to become zero carbon, zero waste, and climate resilient by 2050. The strategy has five headline objectives:
- Sustainable economy and jobs.
 - Healthy communities.
 - Resilience to climate change.

- Zero carbon.
- Culture change.

- 6.2.35 The implementation plan (Manchester Climate Change Agency, 2017b) set out the actions to be delivered within a given five-year period, to make progress against the strategy’s objectives and to undertake preparatory work that will enable progress to be made in future five-year periods. The actions in these plans are the strategic actions that will help to drive, enable and support Manchester’s physical and cultural transformation to 2050 and beyond. Actions that are relevant to air quality include:
- **Building: Policy B4:** Identify and secure funding opportunities to invest in energy efficiency programmes, particularly focusing on fuel poverty challenges for the city’s residents.
 - **Transport: Policy T1:** Recognise the city’s views and commitment to shift from private car use and make Manchester a walking and cycling city, aiming to secure £20 per person per year for the long-term investment.

Assessment limitations (technical deficiencies or lack of knowledge)

- 6.2.36 Diffusion tubes, the monitoring technique used to help determine baseline conditions, have an inherent uncertainty associated with them. Whilst this can be mitigated to an extent through bias adjustment, a lack of precision cannot be corrected for. This uncertainty should be considered when interpreting local authority monitoring results.

6.3 BASELINE CONDITIONS

Current baseline

Air quality management areas

- 6.3.1 An AQMA has been declared across Manchester city centre and surrounding arterial roads owing to consistent exceedances of the AQO for annual average ambient NO₂ concentrations. The AQMA was first declared in 2001 and has undergone a number of revisions, most recently in 2016. Roads are the predominant source of emissions within the AQMA. The AQMA covers most of the major roads in the area, including the roads that bound the site, namely Winslow Road and Moseley Road (Figure 6-1). This highlights that poor air quality has been a persistent issue at roadside locations in the area.

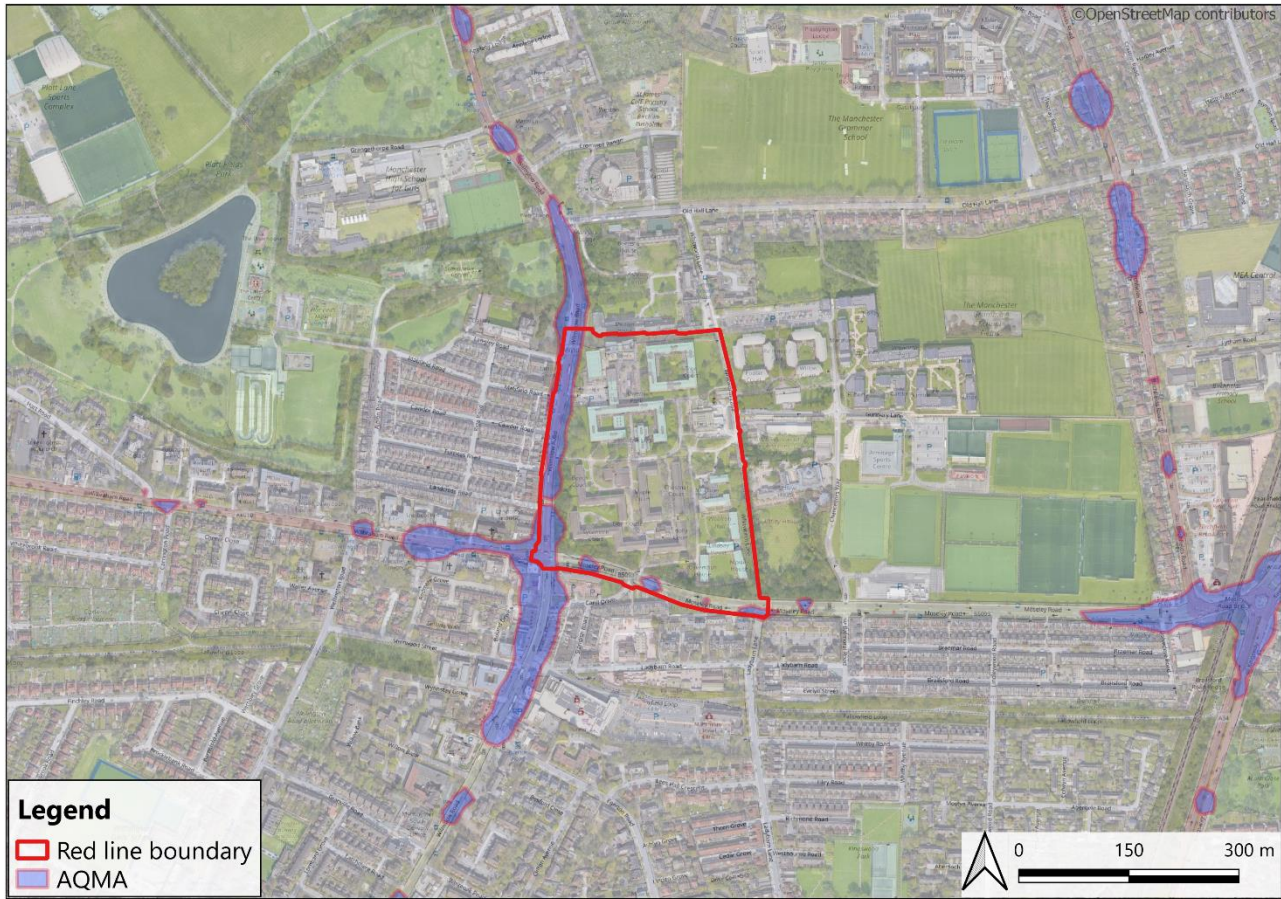


Figure 6-1 MCC air quality management area in the vicinity of the site

Local authority air quality monitoring

6.3.2 MCC monitors air quality at 39 locations, using non-automatic diffusion tubes and three continuous automatic monitoring sites. Data from the diffusion tubes within 2 km of the site and the nearest automatic monitoring sites are presented in Table 6-5, with the locations shown in Figure 6-2.

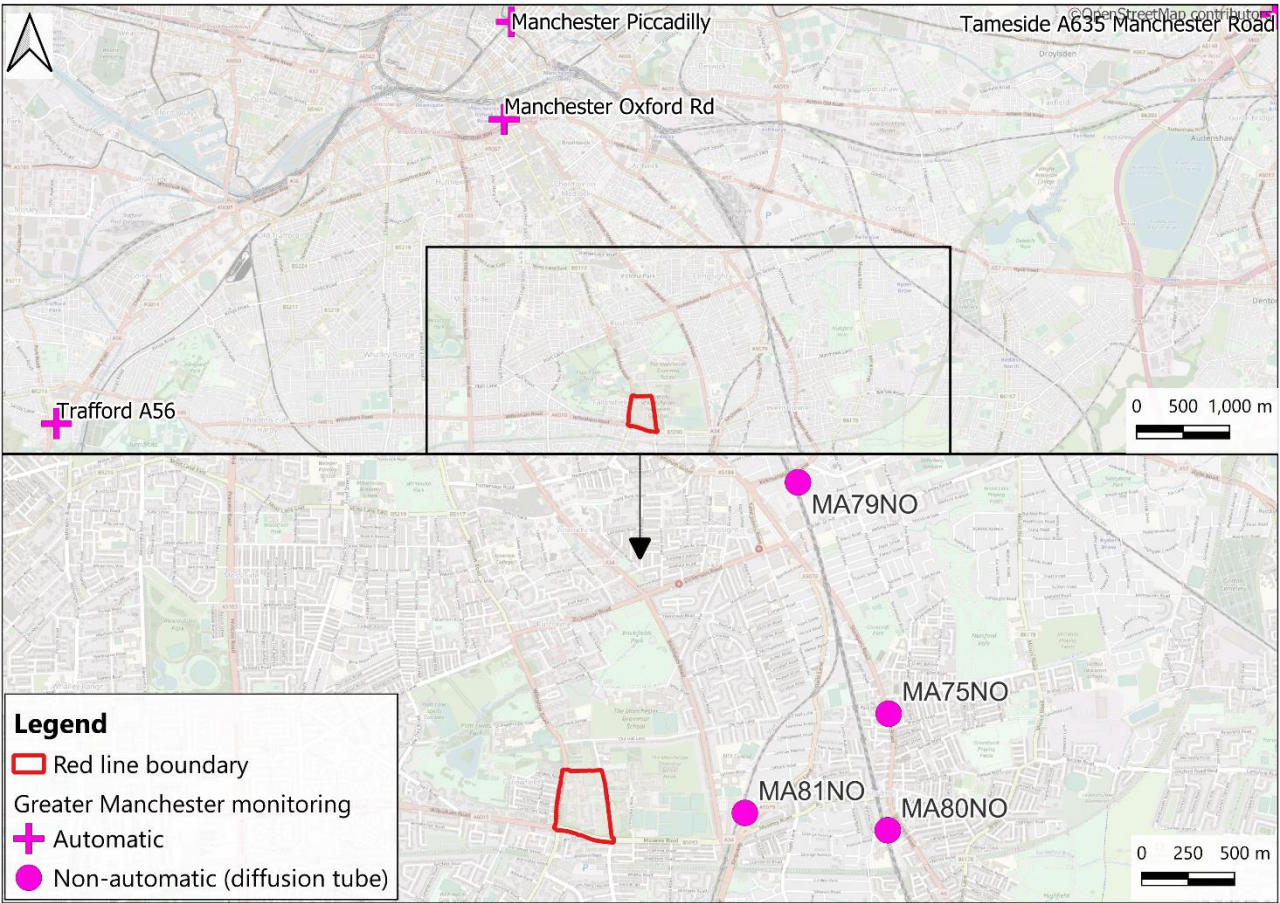


Figure 6-2 Greater Manchester automatic (top) and non-automatic (bottom) air quality monitoring locations in the vicinity of the site.

- 6.3.3 The nearest monitoring site is an urban background diffusion tube on Peaceville Road, 720 m to the east of the site (MA81NO). This location recorded an annual average NO₂ concentration of 23.1 µg/m³ in 2019, well below the 40 µg/m³ AQO.
- 6.3.4 Concentrations are elevated at the roadside of major roads in the area. For example, site MA75NO at the roadside of Stockport Road, recorded an annual average NO₂ concentration of 47.0 µg/m³ in 2019, which is above the 40 µg/m³ AQO.
- 6.3.5 Site MA80NO is on Alma Road, a minor road, approximately 80 m from Stockport Road. The 2019 annual average NO₂ concentration (33.2 µg/m³) was significantly less than at MA75NO, which is roadside of Stockport Road itself. This highlights the significant influence of the surrounding major roads on air quality.
- 6.3.6 The nearest automatic monitoring site is in Manchester City Centre at the kerbside of Oxford Road. This site has recorded significantly elevated concentrations over the last five years. The annual average concentration exceeded 60 µg/m³ in 2017 and 2018 and was within 1 µg/m³ of this benchmark in 2019. Therefore, it exceeded the annual average NO₂ AQO each of these years by a significant margin. It also exceeded the annual average AQO in 2022. This monitoring site is closer to the city centre than the site so it will not be directly representative of conditions on-site. However, it does highlight the extent of the air quality issues in Manchester.
- 6.3.7 Whilst there have been exceedances of the 1-hour average NO₂ AQO (200 µg/m³) at Oxford Road in the last six years, there have not been more than the 18 allowable exceedances in this time (Table 6-6). In the last six years, there has been only one exceedance at the urban centre site at Manchester Piccadilly (in 2017) and no exceedances at the Trafford A56 roadside site.

6.3.8 There has been a general trend of decreasing NO₂ concentrations at all sites since 2017. Concentrations decreased significantly in 2020. This is likely to be primarily due to the influence of the COVID-19 pandemic on travel patterns. Concentrations increased in 2021 but were still lower than in 2019. Both 2020 and 2021 are considered to be atypical years due to the influence of the COVID-19 pandemic.

Table 6-5 Monitored annual average NO₂ concentrations recorded at local authority monitoring sites in the vicinity of the proposed development.

Site ID	Site Address	Distance from proposed development (m)	Site type	Site classification	Annual average NO ₂ concentration (µg/m ³)					
					2017	2018	2019	2020	2021	2022
MA81NO	Peaceville Road	705	Diffusion tube	Urban Background	25.2	21.8	23.1	16.6	18.1	-
MA80NO	Alma Road	1490	Diffusion tube	Roadside	34.2	32.2	33.2	22.5	25.7	-
MA75NO	Stockport Road	1600	Diffusion tube	Kerbside	47.7	47.6	47.0	33.7	39.0	-
MA79NO	Victoria Terrace	1860	Diffusion tube	Urban Background	31.8	29.9	29.3	22.3	25.6	-
MAN1	Oxford Road	3400	Automatic	Kerbside	65	62	59	36	44	43
MAN3	Manchester Piccadilly	4300	Automatic	Urban Centre	36	35	36	27	30	29
TRE2	Trafford A56	6200	Automatic	Roadside	30	29	30	21	23	24

*Note: numbers highlighted in **bold** indicate exceedance of the annual average AQO (40 µg/m³). Numbers highlighted in **bold and underline** indicate risk of exceedance of the 1-hour AQO (60 µg/m³).

Table 6-6 Number of monitored exceedances of short-term (1-hour) NO₂ AQO (18 allowable exceedances) at automatic monitoring sites in the vicinity of the proposed development.

Site ID	Site Address	Distance from proposed development (m)	Site type	Site classification	Number of exceedances of 1-hour NO ₂ AQO (> 200 µg/m ³)					
					2017	2018	2019	2020	2021	2022
MAN1	Oxford Road	3400	Automatic	Kerbside	6	2	1	0	0	3
MAN3	Manchester Piccadilly	4300	Automatic	Urban Centre	1	0	0	0	0	0
TRE2	Trafford A56	6200	Automatic	Roadside	0	0	0	0	0	0

6.3.9 As with NO₂, the highest PM₁₀ concentrations in the area were recorded at the Oxford Road monitoring site (Table 6-7). Despite this, concentrations at this location have not exceeded the 40 µg/m³ annual average AQO since at least 2017. A maximum annual average concentration of 30 µg/m³ was recorded in this time. Similarly, there have been multiple exceedances of the 24-hour PM₁₀ objective, but it has not been exceeded more than the 35 days allowable specified in the AQO.

6.3.10 Manchester Piccadilly is the only nearby automatic monitoring sit that monitors PM_{2.5}. This has not exceeded the annual average PM_{2.5} AQO (20 µg/m³) since at least 2017 (Table 6-8). However, it should be noted that the 2019 annual average concentration (12 µg/m³) exceeded the new 10 µg/m³ target set by the Environmental Targets (Fine Particulate Matter) (England) Regulations 2023. This site is an urban centre site in the centre of Manchester so is unlikely to accurately represent conditions on-site.

Table 6-7 Monitored annual average PM₁₀ and exceedances of short term (24-hour) PM₁₀ objective (35 allowable exceedances) at automatic monitoring sites in the vicinity of the proposed development.

Site ID	Site Address	Site classification	Annual average PM ₁₀ concentration (µg/m ³)						Number of exceedances of 24-hour PM ₁₀ AQO (> 50 µg/m ³)					
			2017	2018	2019	2020	2021	2022	2017	2018	2019	2020	2021	2022
MAN1	Oxford Road	Kerbside	27	30	26	18	18	18	15	15	18	5	2	8
MAN3	Manchester Piccadilly	Urban Centre	20	21	20	15	15	17	3	2	7	1	2	4
TRE2	Trafford A56	Roadside	15	18	17	14	14	16	0	0	5	1	0	4

Table 6-8 Annual average PM_{2.5} at automatic monitoring sites in the vicinity of the proposed development.

Site ID	Site Address	Distance from proposed development (m)	Site type	Site classification	Annual average PM _{2.5} concentration (µg/m ³)					
					2017	2018	2019	2020	2021	2022
MAN3	Manchester Piccadilly	4300	Automatic	Urban Centre	8	11	12	8	9	10

Nearby point sources

6.3.11 Part A permitted installations are industrial facilities at which operations are regulated and monitored to control emissions of air pollutants. Despite these control measures, they can have a residual impact on air quality in the surrounding area. There are no Part A permitted installations, listed on the Environment Agency public register (Environment Agency, 2021), in the vicinity of the site. The nearest Part A installation is 2 km from the site so is unlikely to significantly impact air quality. In addition, there are no Part A1 or Part B permitted installations (MCC, 2023) that are within proximity to the site such that they are likely to have a significant impact on air quality.

6.3.12 Similarly, there are no sources of emissions likely to impact air quality at the site listed on the Pollutant Release and Transfer Register Database (Defra, 2012). The National Atmospheric Emissions Inventory (NAEI) also publishes the locations of industrial and commercial point sources compiled from a number of data sources (National Atmospheric Emissions Inventory, 2019). There are no point sources on the NAEI database within ~2 km of the site, therefore no point sources in this dataset are likely to significantly impact air quality on-site.

Background concentrations

6.3.13 2019 Defra modelled background concentrations in the grid square in which the site is within (385500, 394500) are presented in Table 6-9.

6.3.14 The 2019 background NO₂ concentration (17.21 µg/m³) is significantly less than the nearest urban background monitoring site (MA81NO, Figure 6-2), which recorded an annual average concentration of 23.1 µg/m³ (see Table 6-5). There are several possible reasons for this discrepancy. For example, MA81NO, on Peaceville Road, may be influenced by road emissions from the Kingsway (A5079) and boiler emissions from nearby houses. Alternatively, the Defra modelled may be underpredicting true background concentrations.

Table 6-9 Defra modelled background concentrations at the site in 2019

2019 modelled annual mean background concentration (µg/m³)			
NO ₂	NO _x	PM ₁₀	PM _{2.5}
17.21	24.13	12.49	8.30

6.3.15 Future baseline vehicle emissions are predicted to reduce in future years as the vehicle fleet shifts towards vehicles with lower tailpipe emissions.

6.3.16 Background concentrations are predicted to reduce in the future due to changes to the vehicle fleet, improvements in emissions abatement and wider policy measures. For example, the background concentrations at the site for the earliest predicted operating year (2025) are presented in Table 6-10.

Table 6-10 Defra modelled background concentrations at the site in 2025

2025 modelled annual mean background concentration (µg/m³)			
NO ₂	NO _x	PM ₁₀	PM _{2.5}
13.69	18.65	11.66	7.74

Identified Receptors and their sensitivity

6.3.17 The receptors identified through the baseline review are presented in

6.3.18 Table 6-11.

Table 6-11 Identified receptors and their sensitivity

Receptor	Sensitivity	Justification
Surrounding existing sensitive uses, including residential properties and schools	High	Air pollutant and dust emissions during demolition, construction and operation have the potential to impact the health and amenity of surrounding sensitive uses (primarily residential properties).

6.4 DEMOLITION AND CONSTRUCTION EFFECTS

Relevant aspects of the scheme

6.4.1 Construction dust impacts are considered for demolition, earthworks, construction and trackout.

Potential effects of the development and their significance

Construction dust effects

6.4.2 The IAQM guidance criteria used to assess the potential impacts from construction activities is detailed in Appendix 6A. The following steps explain the site-specific assessment in the context of the IAQM criteria.

6.4.3 The proposed development will be divided into three phases (A: Owens Park, B: Oak House and C: Woolton hall), therefore the risk of impacts due to construction dust has been considered separately for each phase. The Limes Building is only considered for demolition activities (phasing for demolition of the Limes Building will be confirmed at the reserved matters stage).

Step 1: Screen the need for a detailed assessment

6.4.4 In accordance with screening criteria in the IAQM guidance, an assessment is required as sensitive receptors are located within 350m of the site boundary. Receptors include residential housing to the west and south, student accommodation to the north and east, Manchester High School for Girls and several religious buildings, including South Manchester Synagogue and Holy Innocents’ Church. Therefore, screening indicates the need for a construction dust assessment.

Step 2A: Define the potential dust emission magnitude

6.4.5 Dust emission magnitudes for relevant construction activities are shown in Table 6-12.

Table 6-12 Dust emission magnitudes.

Activity	Phase	Dust emission magnitude	Justification
Demolition	A and B	Large	The existing buildings on the site will all be demolished. The total demolition volume is estimated to be approximately 94,000 m ³ for phase A and 69,000 m ³ for phase B, which is greater than the IAQM large criteria (> 50,000 m ³). In addition, some demolition will occur over 20m above ground level in phase A.
	C	Medium	The total demolition volume in phase C is estimated to be approximately 23,000 m ³ , which is within the IAQM medium criteria (20,000 m ³ – 50,000 m ³).
	Limes Building	Small	The total demolition volume is estimated to be approximately 5,500 m ³ , which is within the IAQM small criteria.
Earthworks	A, B and C	Large	Developable area exceeds the IAQM threshold for large dust emission magnitude (> 10,000 m ²) for all phases. Subsoil is variable clay, silt sand and gravel (UK Soil Observatory, 2023). Therefore, some soil smaller soil may be prone to suspension.
Construction	A and B	Large	It is anticipated that the total construction volume will exceed the IAQM threshold for large dust emission magnitude (> 100,000 m ³) in phases A and B.
	C	Medium	It is anticipated that the total construction volume will be within the IAQM threshold for medium dust emission magnitude (25,000 - 100,000 m ³) in phases C.

Activity	Phase	Dust emission magnitude	Justification
Trackout	A, B and C	Large	Construction traffic information is not available at this stage of the project. Based on the size of the other construction activities and as a worst case assumption, a large trackout dust emission magnitude is assumed.

Step 2B: Define the sensitivity of the area

6.4.6 The sensitivity of the surrounding area to potential construction impacts is detailed in Table 6-13. Unless otherwise stated the sensitivity applies to all phases.

Table 6-13 Area sensitivity to human health.

Potential impact	Sensitivity of surrounding area			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	Phases A, B and C: High	High	High	High
	Limes Building: Medium			
Human health	Low	Low	Low	Low

- 6.4.7 In determining the sensitivity of the surrounding area, the following were taken into consideration:
- Figure 6-3 shows a summary of receptors within 50m of the site boundary:
 - There are residential receptors within 20m of the demolition activities, in particular demolition of the buildings adjacent to Sheavyn House, such as Owens Park tower, has potential to impact sensitive receptors;
 - Within 20m of the site there are multiple residential receptors in the adjacent halls of residence. In addition, due to the phasing of the proposed development, users of the completed phases have the potential to be impacted by phases under construction;
 - There will be multiple high sensitivity residential properties within 20m of the roadside of the expected trackout route; and
 - There are also significant numbers of medium sensitivity receptors within 50m of the site and trackout route, including shops, places of work and religious buildings.
 - Taking the number of high sensitivity receptors in close vicinity to the site into account, the area sensitivity to dust soiling is determined to be high, in line with IAQM criteria presented in Table 6A-2.
 - Sensitivity to human health impacts also takes background PM₁₀ concentrations into account, Defra’s mapped background PM₁₀ concentration is 12.5 µg/m³ (see Table 6-9). Based on the criteria presented in Table 6A-3, the sensitivity of the area to health impacts is low due to the background PM₁₀ being below 24 µg/m³ and an estimated 10-100 high sensitivity receptors within 20m of the site.
 - There are no designated ecological sites within 50m of the site boundary therefore ecological impacts have been scoped out of the construction assessment.

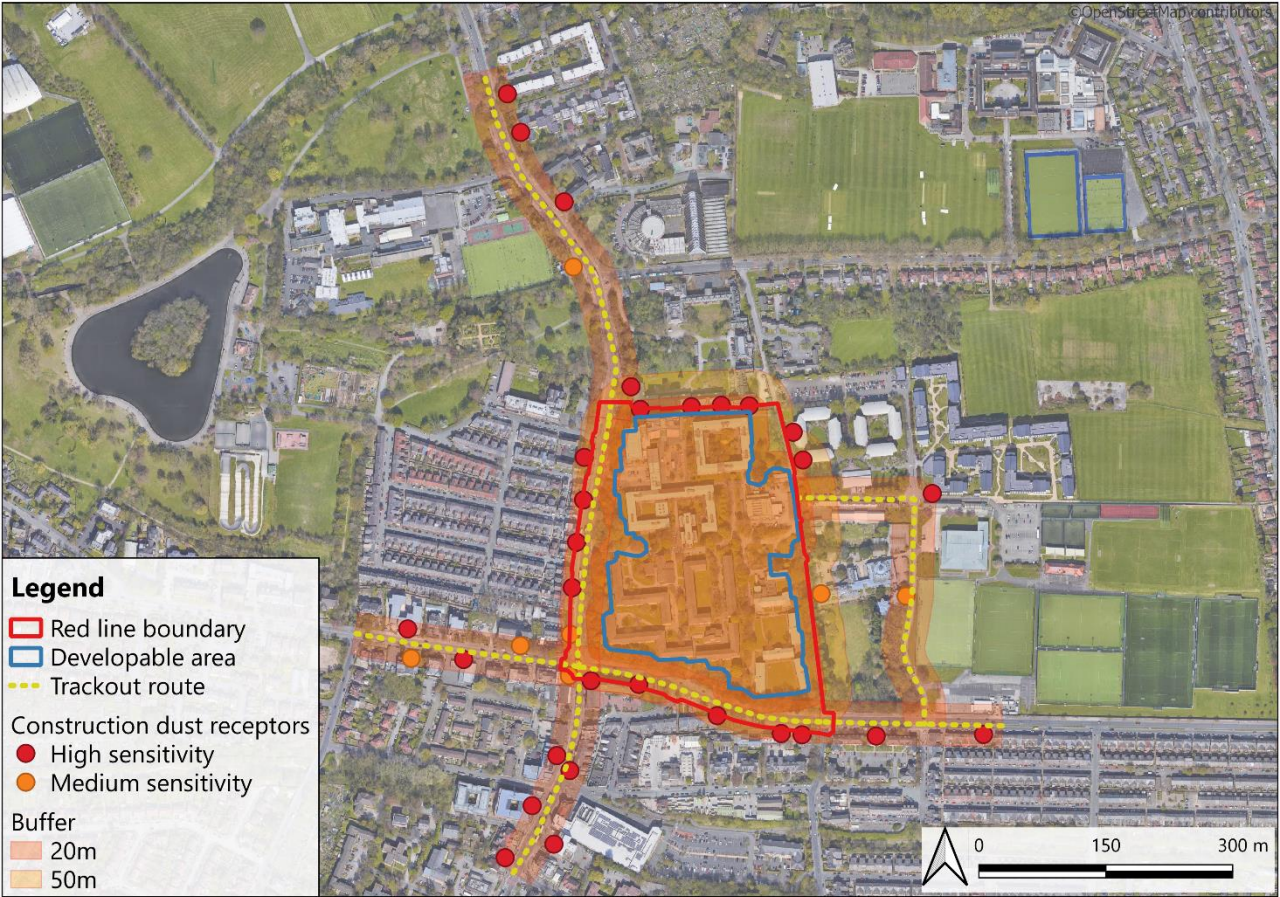


Figure 6-3 Receptors to construction dust impacts within 50m from the site.

Step 2C: Define the risks of impacts

- 6.4.8 The risk of dust impacts for relevant construction activities are summarised in Table 6-14. These results take into account both the potential dust emission magnitude and the sensitivity of the area. Risk of dust impacts from demolition and construction are considered separately for phases A, B and C, due to the different dust emission magnitudes. The Limes Building is only considered for demolition (phasing for demolition of the Limes Building will be confirmed at the reserved matters stage). Unless otherwise stated the risk of impact applies to all phases.
- 6.4.9 It should be noted that activities on site will be temporary in nature, and mitigation appropriate to the level of risk and in line with good industry practices will be implemented across the site to ensure any adverse effects are minimised. Appendix 6B sets out appropriate mitigation measures to ensure the impact from construction activities will not be significant.

Table 6-14 Summary of risk from dust impacts.

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Phase A and B: High Risk	High Risk	Phase A and B: High Risk	High Risk
	Phase C: Medium Risk		Phase C: Medium Risk	
	Limes Building: Low Risk			

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Human Health	Phase A and B: Medium Risk	Low Risk	Low Risk	Low Risk
	Phase C: Low Risk			
	Limes Building: Negligible			
Ecological	Negligible	Negligible	Negligible	Negligible

Climate change and adaptation

6.4.10 Long term UK CP18 climate change projections include predicted increases in mean summer and winter temperatures, as well as a decrease in mean summer precipitation. This may lead to warmer and dryer conditions in future years which could increase the likelihood of dust generation. It is considered however that the assessment carried out will remain fit for purpose.

Summary of effects

6.4.11 The effects on air quality during demolition and construction are presented in Table 6-15. In line with IAQM guidance, the significance of effects of demolition/construction dust and PM₁₀ emissions are only considered once mitigation measures are applied. The mitigation measures are considered an inherent part of the proposed development. Therefore, an effect significance pre-mitigation is not provided.

Table 6-15 Summary of effects during demolition and construction

Receptor	Sensitivity	Description of effect	Magnitude of change / impact	Effect significance
Surrounding sensitive uses, particularly residential properties, including adjacent university halls of residence	High	Loss of amenity due to dust deposition	High risk	N/A
Surrounding sensitive uses, particularly residential properties, including adjacent university halls of residence	High	Impacts on human health due to emission of PM during demolition and construction	Low risk	N/A

Intermediate year construction effects

6.4.12 Due to the phased nature of the demolition and construction of the proposed development, there is potential for users of completed phases of the proposed development to be impacted by the demolition and construction of the other phases. This has been considered when determining the sensitivity of the area and has therefore been included inherently in the assessment.

Supplementary mitigation measures

Table 6-16 Summary of demolition and construction supplementary mitigation measures for proposed development.

Adverse effect	Mitigation measure	Responsibility / Mechanism for implementation	Timing
Loss of amenity due to dust deposition	Suite of construction dust and PM mitigation measures, outlined in Appendix 6B.	Measures are included in the ODEMP which has been submitted as a standalone planning document and should be incorporated into an Air Quality and Dust Management Plan (AQDMP) for subsequent phases. The AQDMP will be secured via planning condition.	The AQDMP should be prepared prior to construction works commencing on-site. The measures should be implemented throughout the demolition and construction phases of the proposed development.
Impacts on human health due to emission of PM during construction	Suite of construction dust and PM mitigation measures, outlined in Appendix 6B.	Measures are included in the ODEMP which has been submitted as a standalone planning document and should be incorporated into in an Air Quality and Dust Management Plan (AQDMP) for subsequent phases. The AQDMP will be secured via planning condition.	The AQDMP should be prepared prior to construction works commencing on-site. The measures should be implemented throughout the demolition and construction of the proposed development.

6.5 OPERATIONAL EFFECTS

Relevant aspects of the scheme and designed-in mitigation

Combustion plant emissions

6.5.1 Whilst the energy strategy is not finalised at this stage, it is anticipated that air source heat pumps will be utilised. These will not give rise to any on-site air pollutant emissions. Therefore, the impact of the typical operational energy strategy on air quality will be not significant and effects will be negligible. It is recommended that the impact of any combustion plant that is proposed (e.g. emergency generators) is assessed at the reserved matters stage if necessary.

Traffic emissions

6.5.2 As there will be no additional car parking on-site (with the exception of a small amount of disabled parking), the project transport consultant has determined that there will be no material change in vehicle trips associated with the operation of the proposed development. Therefore, the IAQM screening criteria for detailed assessment will not be exceeded and therefore the impact of operational traffic associated with the proposed development can be screened out as not significant.

Exposure of future site occupants to poor air quality

6.5.3 As the site is adjacent to an AQMA, it is necessary to assess the exposure of future site occupants. There will be no change of land use on-site as the current and proposed development will be primarily student accommodation. It is not anticipated that the new buildings will be significantly closer to nearby roads than the existing buildings.

Potential effects of the development and their significance

Effect of the proposed development on the air quality of surrounding existing receptors

6.5.4 As the proposed development will not lead to a change in pollutant concentrations, the effect on the air quality of surrounding receptors will be negligible.

Exposure of future site occupants to poor air quality

- 6.5.5

Greater Manchester’s AQMA has been declared owing to exceedances of the annual mean air quality objective for NO₂. The Greater Manchester AQMA boundary is based upon modelled isopleths² that exceed 35µg/m³, which considering the annual mean objective is 40µg/m³, accounts for modelling uncertainties and can be regarded as a cautious approach. The modelled 35 µg/m³ isopleth upon which the AQMA is based extends to a maximum of 15m from the roadside along Wilmslow Road.
- 6.5.6

The existing perimeter planting, which is to be retained, occupies the area up to 20m from the roadside. Air pollutant concentrations reduce with distance from the roadside and this vegetation will play a role in preventing dispersion of pollutants onto the site. In addition, future air pollutant concentrations are predicted to decrease due to reductions in vehicle tailpipe emissions and background concentrations. Taking this into account, it is considered unlikely that the proposed development will lead to any air quality objective exceedances at proposed receptor locations. Therefore, there will be no significant impact with regards to on-site exposure and the effect will be negligible.

Climate change and adaptation

- 6.5.7

It is not anticipated that climate change and adaptation will have a significant impact on the operational assessment.

Summary of effects

Table 6-17 Summary of effects during operation

Receptor	Sensitivity	Description of effect	Magnitude of change / impact	Effect significance
Surrounding existing sensitive uses, including residential properties and schools.	High	Effects on human health due to changes in air quality as a result of the operation of the proposed development	Negligible	Negligible
Future site users	High	Exposure of residents introduced by the operation of the proposed development to air pollutants	Negligible	Negligible

² An isopleth is a contour line of pollutant concentration.

Supplementary mitigation measures

- 6.5.8

As no significant effects have been identified, no supplementary mitigation measures are recommended.

6.6 RESIDUAL EFFECTS AND CONCLUSIONS

- 6.6.1

The indicative demolition and construction phases of the proposed development will result in negligible residual effects on air quality, once mitigation has been implemented. A summary of the residual effects is presented in Table 6-18.

Table 6-18 Summary of residual effects during demolition and construction

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
Surrounding sensitive uses, particularly residential properties, including adjacent university halls of residence	Loss of amenity due to dust deposition	N/A	Suite of construction dust and PM mitigation measures outlined in Appendix 6B.	Negligible
Surrounding sensitive uses, particularly residential properties, including adjacent university halls of residence	Impacts on human health due to emission of PM during construction	N/A	Suite of construction dust and PM mitigation measures outlined in Appendix 6B.	Negligible

- 6.6.2

Operation of the proposed development will result in negligible residual effects on air quality, as presented in Table 6-19.

Table 6-19 Summary of residual effects during operation

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
Surrounding existing sensitive uses, including residential properties and schools.	Effects on human health due to changes in air quality due to the operation of the proposed development	Negligible	N/A	Negligible
Future site users	Exposure of residents introduced by the operation of the proposed development to air pollutants	Negligible	N/A	Negligible

6.7 FUTURE MONITORING OF SIGNIFICANT RESIDUAL ENVIRONMENTAL EFFECTS

6.7.1 Construction dust monitoring is recommended as one of the mitigation measures outlined in Appendix 6B. This is recommended as part of a wider suite of mitigation measures to ensure that residual effects are negligible.

6.8 REFERENCES

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6.9 GLOSSARY

Term	Definition
AQAL	Air Quality Assessment Level
AQAP	Air Quality Action Plan
AQMA	Air quality management area
AQS	Air Quality Strategy
ASR	Annual Status Report
AQDMP	Air Quality and Dust Management Plan
CLP	Construction Logistics Plan
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxides. This consists of nitrogen dioxide (NO ₂) and nitric oxide (NO)
NAEI	National Atmospheric Emissions Inventory
NPPF	National Planning Policy Framework
PM	Particulate matter. This is classified by size into PM ₁₀ and PM _{2.5} (i.e. PM ₁₀ has a diameter of less than 10 micrometres, PM _{2.5} less than 2.5 micrometres).
SPG	Supplementary Planning Guidance
TG22	Defra Local Air Quality Management Technical Guidance
WHO	World Health Organisation

7 NOISE AND VIBRATION

7.1 INTRODUCTION

- 7.1.1 This chapter of the ES assesses the likely environmental effects of the proposed development with respect to noise and vibration. This chapter also describes the methods used to assess the effects; the baseline conditions currently existing at the site and surrounding area; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been adopted.
- 7.1.2 An assessment of the suitability of the site for the proposed noise sensitive uses, including consideration of glazing, ventilation and overheating strategies with respect to noise, is provided in Appendix 7-F.
- 7.1.3 Interactive effects associated with noise and vibration have additionally been considered within the ES and can be found in Chapter 10 Interactive Effects.
- 7.1.4 A short glossary of acoustic terms is provided at the end of this chapter in section 7.9, with further details provided in Appendix 7-A.

7.2 METHODOLOGY AND ASSESSMENT CRITERIA

EIA Scoping

- 7.2.1 An Environmental Impact Assessment (EIA) Scoping report was submitted for comment to Manchester City Council (MCC) including the proposed approach to the assessment of potential noise and vibration effects from the proposed development. In summary, the proposed scope covered the undertaking of a baseline noise survey and the consideration of the potential effects of construction noise and vibration, as well as the definition of target noise levels for fixed plant installations (e.g., for ventilation or heating/cooling) and entertainment premises.
- 7.2.2 The Scoping opinion issued by MCC in response contained several comments relating to noise and vibration. These are presented in Table 7—1 together with responses on how these have been addressed, if required at this stage of the scheme.

Table 7—1 Summary of scoping opinion and responses relating to noise and vibration

Scoping opinion comment	Response
The applicant/consultant will need to provide a noise assessment for residential sound insulation, based on MCC criteria. The applicant and consultant will need to be aware that any plant associated with the residential properties as part of the development such as ASHP / GSHP/ ventilation etc will also need to be considered within these noise sources as well as any other fixed plant. In addition, other buildings such as commercial or office will also need to be considered as sensitive receptors with regard to the criteria and not just existing and proposed residential uses.	This chapter is accompanied by a site suitability assessment that includes indicative sound insulation requirements for the proposed student accommodation based on existing noise levels. As this is an outline planning application, the sound insulation requirements are not detailed/final, and do not factor in noise from proposed fixed plant as details of this are not yet known. Should consent be granted, it is proposed a planning condition is included requiring that final details of the sound insulation scheme are submitted prior to construction. Furthermore, as details of proposed fixed plant are not yet available, noise from this source has not been assessed in this chapter. Target noise levels for fixed plant have been defined at the nearest noise-sensitive receptors based on the results of the noise survey and MCC guidance. Should consent be granted, it is proposed that a planning condition is included requiring a noise assessment of the final fixed plant selections is submitted prior to construction.

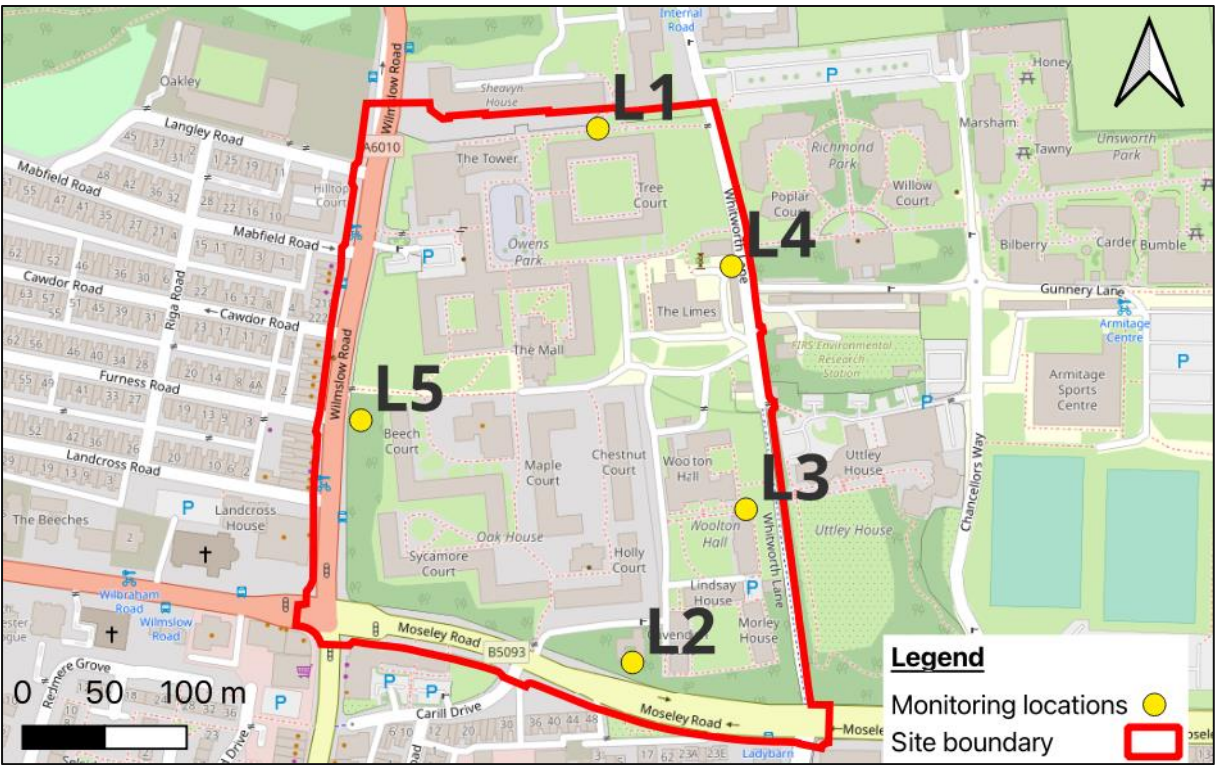
Scoping opinion comment	Response
The applicant/consultant will need to be aware that an AVO overheating assessment will be required and assessment / recommendations will be required to ensure the internal noise criteria will be met without residents relying on openable windows for ventilation. Assessment of any alternative scheme of ventilation will also be required and also assessment and recommendations with regard to insulation of any façade penetrations for air intake / extract for example.	This chapter is accompanied by a site suitability assessment that includes consideration of the requirements of ventilation and overheating with respect to noise. As this is an outline planning application, this will provide potential design solutions. Should consent be granted, it is proposed that a planning condition is included requiring that final details of the approach to ventilation/overheating are submitted prior to construction (it is expected that this would be part of the submission of sound insulation requirements discussed in the previous response).

- 7.2.3 In addition, the relevant officer from the MCC Environmental Protection Section was contacted by email on Thursday 11th May 2023 to request comments on the proposed baseline noise survey methodology as well as the overall approach to the assessment. Comments were received on 19th May 2023 requesting confirmation of the length of the noise survey, following which it clarified that it would be conducted between Friday 19th and Wednesday 24th May 2023.

Baseline study methodology

- 7.2.4 To characterise and quantify the existing noise environment around the site, a baseline noise survey was undertaken at locations selected to be representative of both the closest noise sensitive receptors to the site, and the proposed buildings within the site that will be most exposed to existing sources of noise, which are primarily the adjacent roads. Consequently, all monitoring locations are close to the boundary of the site where the interface with noise sensitive receptors and existing noise sources is located.
- 7.2.5 The noise monitoring locations are shown in Figure 7—1 together with the site boundary. It is noted there were technical problems at some locations which are discussed further below.

Figure 7—1 Baseline noise survey monitoring locations



- 7.2.6 The noise survey was conducted between Friday 19th and Wednesday 24th May 2023 and comprised three locations where continuous unattended monitoring was undertaken (L2, L3 and L5), supplemented by short-term attended monitoring during the morning of Friday 19th May 2023 at the L1 position. Note that originally there was a position L4 on the eastern side of the boundary between L1 and L3; however, this was found to be dominated by noise from local fixed plant, which would be removed as part of the proposed development, and therefore this measurement location was not used. Measurements were made at 5 minute intervals.
- 7.2.7 Monitoring was undertaken using Class 1 monitoring equipment at a height of 1.5 m above local ground level under free-field conditions (i.e., measuring free-field levels), except at L3 which was at a height of 6 m under façade conditions (i.e., measuring façade levels). All sound level meters were field calibrated prior to and following the measurements using a Class 1 acoustic calibrator. No significant change in sensitivity was noted. All microphones were fitted with a windshield. Further details of the equipment used for positions L3 and L5¹ together with the relevant laboratory calibration certificates are provided in Appendix 7-B.
- 7.2.8 Regarding weather during the survey period, following a review of local weather stations², there were relatively low winds (below 5 m/s) and minimal rainfall. On this basis, no noise data has been excluded due to adverse weather conditions.
- 7.2.9 As mentioned above, technical problems with the monitoring equipment occurred at the L1 position on the northern boundary, and the L2 position on the southern boundary. Upon review, the data from these locations was found to be potentially unreliable, and therefore was excluded from further consideration.
- 7.2.10 With respect to the southern boundary of the site, following a review of observations from the survey, traffic data published by the government³ and noise measurements undertaken for a previous application at the site⁴, it was confirmed that noise at both the western and southern boundaries are dominated by similar levels of road traffic noise. Therefore, the noise levels measured at L5 are also considered representative of the southern boundary. Regarding the northern boundary, a similar review exercise indicated that noise levels measured at L3 can be considered representative of those experienced at the northern boundary. Therefore, for the purpose of the assessment, the monitored levels from L5 and L3 have been referenced when considering the noise exposure at the southern and northern boundaries of the site respectively.
- 7.2.11 Due to the high volumes of road traffic using the roads surrounding the site, it is considered unlikely that the measured baseline noise levels will materially change prior to completion of the proposed development.

Assessment approach

- 7.2.12 As discussed at the beginning of section 7.2, the scope of the assessment includes consideration of the potential effects of construction noise and vibration, as well as the definition of target noise levels to be used in the design of fixed plant installations and entertainment premises within the proposed development.

7.1.1 _____

¹ other locations were affected by technical problems and therefore the data was disregarded.
² IMANCH115 (<https://www.wunderground.com/dashboard/pws/IMANCH115>); IMANCH125 (<https://www.wunderground.com/dashboard/pws/IMANCH125>); IMANCHES66 (<https://www.wunderground.com/dashboard/pws/IMANCHES66>)
³ Department for Transport Road traffic statistics: <https://www.gov.uk/government/collections/road-traffic-statistics>
⁴ MCC planning application reference 110184/FO/2015/S1

Construction noise and vibration

- 7.2.13 Regarding temporary noise and vibration arising from the construction of the proposed development, following a review of the information available at the time of writing, there is only sufficient detail to assess the demolition works as the construction programme and methodologies are not sufficiently developed. It is anticipated that the assessment of demolition will represent the worst-case in terms of the potential effects of noise and vibration from the overall construction process, and that any further assessment, if required, can be addressed in a Construction Environmental Management Plan (CEMP).
- 7.2.14 It is understood that the demolition of the existing buildings will be phased. The indicative phasing plan states that the northern half of the site will be demolished as part of Phase A between Q4 2023 and Q4 2024, while the southern half of the site remains occupied. The indicative plan then shows the subsequent construction works on the northern half of the site being completed by Q3 2027. Demolition of the southern half of the site is indicated as taking place as part of Phases B & C between Q3 2027 and Q1 2028. This means that the new accommodation in the northern half of the site may be occupied while demolition works on the southern half take place. See Chapter 4 of the ES for further details of the indicative construction phasing and programme, which would be updated as part of a future reserved matters stage.
- 7.2.15 Noise and vibration associated with the demolition works has been predicted at the relevant sensitive receptors (see section 7.4 of this chapter) based on the data and methods described in BS 5228 Parts 1⁵ and 2⁶ together with information provided in Chapter 4 of the ES and from further correspondence with the demolition consultant. Noise has been predicted for the following demolition activities:
- Building soft strip;
 - Demolition of buildings and foundations, crushing of arisings; and
 - Filling of voids and site levelling.
- 7.2.16 The predictions have been based on the shortest distance between the activity and the sensitive receptors to provide a worst-case assessment.
- 7.2.17 Vibration has been predicted for the vibratory rolling associated with the filling of voids and site levelling activity. Of the plant assumed for the demolition activities, vibratory rolling is the only one for which a prediction methodology is included in BS 5228 Part 2; this has been used together with industry guidance⁷ to convert the result to the vibration dose value (VDV) metric, as well as estimate vibration levels on the upper floors of buildings. Compaction has been assumed to take place across an area of approximately 1,000 m², with the sensitive receptors adjacent to the centre of one of the sides of this area of work at the stated distance to provide a worst-case assessment.
- 7.2.18 Further details of the plant assumptions for the prediction of noise and vibration from the demolition activities, including their usage per day, is included in Appendix 7-C.

Target noise levels for fixed plant noise and entertainment noise

- 7.2.19 In terms of noise from fixed plant installations and entertainment venues that may be part of the proposed development, there is not sufficient detail with which to undertake predictions of noise at the time of writing.

⁵ BSI Standards Limited (2014), BS 5228-1:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites, Part 1 Noise
⁶ BSI Standards Limited (2014), BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites, Part 2 Vibration
⁷ The Association of Noise Consultants (2012), ANC Guidelines: Measurement & Assessment of Groundborne Noise & Vibration

- 7.2.20 Therefore, target noise levels have been defined at the relevant sensitive receptors based on the relevant policy and guidance (see section 7.3 of this chapter) and the results of the baseline noise survey. These will be referenced during the detailed design of the proposed development to ensure that any significant noise effects from fixed plant or entertainment noise will be avoided. As such, no further assessment is required at this outline planning stage.
- 7.2.21 Target noise levels have been defined for the relevant periods of interest, i.e., the periods during which the fixed plant and the entertainment premises are anticipated to be in operation. It has been assumed that fixed plant installations could be in operation at any time of the day, and therefore the results of the baseline noise survey have been analysed to identify a typical background sound level (dB L_{A90,5min}) for the standard day (07:00-23:00) and night (23:00-07:00) periods, with the target noise levels derived from these values.
- 7.2.22 For entertainment premises, it is understood that (based on the hours of use of the existing premises on the site) this would be likely to operate on weekdays between 13:00 and 00:00, and on weekends between 12:00 and 00:00. The results of the baseline noise survey have been analysed to identify a typical background sound level for these periods in each 1/1 octave band between 63 Hz and 4000 Hz (dB L_{90,5mins}), with the target noise levels derived from these values.

Assessment of effects

- 7.2.23 The potential effects of noise and vibration are assessed using different methods based on the type of source being considered and the relevant standards and guidance, as advised by national noise policy (see section 7.3 of this chapter). However, it typically involves the definition of a level above which adverse effects are expected, termed the lowest observed adverse effect level (LOAEL), and a level above which significant adverse effects are possible, referred to as the significant observed adverse effect level (SOAEL). These terms are discussed further in section 7.3 of this chapter. Indication of a significant effect usually involves the exceedance of the relevant SOAEL together with other factors, such as the duration of the effect or the change in noise level, depending on the source being considered.

Construction noise and vibration

- 7.2.24 The potential significance of construction noise and vibration at the relevant sensitive receptors has been assessed based on the method described in Annex E of BS 5228 Part 1 for noise and the current industry best practice for vibration⁸, expressed in terms of LOAEL and SOAEL thresholds, together with the duration of any SOAEL exceedance. These details are presented in Table 7—2 for noise and Table 7—3 for vibration.

Table 7—2 Effect level thresholds and significance criteria for construction noise

Effect level	Time period	Threshold value (dB L _{Aeq,T} dB) ²
LOAEL	Working day	65
SOAEL ¹	Working day	75
Identification of effect significance and other notes: ¹ A significant effect is indicated if the programme of works indicates that the SOAEL threshold value is likely to be exceeded for a period of at least one month. ² Values apply to a location one metre from a residential building façade containing a window, including the effect of the acoustic reflection from that façade. Usually referred to as a façade level.		

7.1.1 _____

⁸ High Speed Two (HS2) Limited (2017), High Speed Two Phase One Information Paper E23: Control of construction noise and vibration

Table 7—3 Effect level thresholds and significance criteria for construction vibration

Effect level	Time period	Threshold value (VDV m/s ^{1.75}) ²
LOAEL	Working day	0.2
SOAEL ¹	Working day	0.8
Identification of effect significance and other notes: ¹ A significant effect is indicated if the programme of works indicates that the SOAEL threshold value is likely to be exceeded for two or more consecutive days. ² Values apply to a location on the floor inside a building, near but not at the centre of any habitable room.		

- 7.2.25 The criteria defined in Table 7—2 and Table 7—3 relate primarily to residential receptors, which are of high sensitivity. Therefore, they have also been used when assessing the potential effects of construction noise and vibration on any other types of sensitive receptors, which is considered to be a cautious approach. Where predicted construction noise or vibration levels are above the LOAEL but below the SOAEL, then adverse (non-significant) effects are indicated.
- 7.2.26 To maintain consistency with the standard descriptors of effect significance typically used in EIA, the effect level thresholds and significance criteria have been equated to the “level” of significance in Table 7—4 for noise and Table 7—5 for vibration. Note that for construction noise and vibration, all effects are considered to be adverse.

Table 7—4 EIA descriptors significance level for construction noise

Relationship of predicted construction noise level to effect level	Duration of construction noise	Level of significance (EIA)	Indication of significant effect
≤ LOAEL	N/A	Negligible	No
Between LOAEL and SOAEL	N/A	Minor	No
> SOAEL	< One month	Moderate	No
> SOAEL	≥ One month	Major	Yes

Table 7—5 EIA descriptors of significance level for construction vibration

Relationship of predicted construction vibration level to effect level	Duration of construction vibration	Level of significance (EIA)	Indication of significant effect
≤ LOAEL	N/A	Negligible	No
Between LOAEL and SOAEL	N/A	Minor	No
> SOAEL	< 2 or more consecutive days	Moderate	No
> SOAEL	≥ 2 or more consecutive days	Major	Yes

7.3 Legislation and policy which has influenced assessment or mitigation

National policy and guidance

National Planning Policy Framework (2021)⁹

- 7.3.2 The potential impacts of noise are addressed in the following paragraphs of the National Planning Policy Framework (NPPF):

⁹ Ministry of Housing, Communities & Local Government (2021), National Planning Policy Framework.

- Paragraph 174e: *‘Planning policies and decisions should contribute to and enhance the natural and local environment by: ...

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.’*
 - Paragraph 185: *‘Planning policies and decisions should also ensure that new development is appropriate for its location taking into 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 impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life; and

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’.*
- 7.3.3 Paragraph 185a includes a direct reference to the Noise Policy Statement for England for further information regarding the potentially adverse and significant adverse effects of noise.
- Noise Policy Statement for England (2010)¹⁰
- 7.3.4 The overarching Government policy on noise is set out in the NPSE. It seeks to clarify the underlying principles and aims in past and existing policy documents, legislation and guidance in relation to all forms of noise including environmental noise, neighbour noise and neighbourhood noise (but not noise in the workplace).
- 7.3.5 It uses the established concepts from toxicology of the No Observed Effect Level (NOEL) and the Lowest Observed Adverse Effect Level (LOAEL). As set out in the explanatory notes, the NPSE extends these by introducing Significant Observed Adverse Effect Level (SOAEL). This is the level above which significant adverse effects on health and quality of life occur.
- 7.3.6 The explanatory note to the NPSE states that it is not possible to identify a single objective value to define SOAEL for noise that is applicable to all sources of noise in all situations. It is likely to be different for different noise sources, for different receptors and at different times. The NPSE recognises that *‘further research is required to increase understanding of what may constitute a significant adverse impact on health and quality of life from noise. However not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.’* Consequently, the practitioner must determine the appropriate threshold values to be adopted for the sources and situations being assessed, based on the available evidence.
- 7.3.7 The NPSE’s vision is to:
- ‘Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.*
- This long-term vision is supported by the following aims:*

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¹⁰ Department for Environment, Food & Rural Affairs (DEFRA) (2010), Noise Policy Statement for England.
¹¹ “Avoid” here does not mean a significant adverse effect cannot ever exist. Instead, it means make every effort so that significant adverse impacts do not occur. The hierarchy set out in the PPG:N confirms this to be the case – see Table 12.1 of this Chapter. The reason is that the NPSE covers all sources and for historical legal reasons, there are certain circumstances (e.g., statutory nuisance legislation) where a significant adverse impact is lawfully allowed to occur.

- Avoid¹¹ significant adverse impacts on health and quality of life;*
- Mitigate and minimise adverse impacts on health and quality of life; and*
- Where possible, contribute to the improvement of health and quality of life.*

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.’

- 7.3.8 Within the NPSE, the phrase *‘within the context of Government policy on sustainable development’* is used. This means that noise must not be treated in isolation. Instead, when implementing the aims of the policy, consideration should be given to the economic and social benefit of the activity causing the noise as well as the other environmental effects of the development.
- 7.3.9 The second aim of the NPSE refers to noise impacts that lie somewhere between LOAEL and SOAEL. The NPSE asserts that, while this means that all reasonable steps should be taken to mitigate and minimise adverse effects, this does not mean that such adverse effects cannot occur.
- Planning Practice Guidance for Noise (2019)¹²
- 7.3.10 Further government guidance on the consideration of noise for planning has been published as the Planning Practice Guidance for Noise (PPG:N), last revised in July 2019. The PPG:N supports the NPPF by providing a range of advice and includes a noise exposure hierarchy table, and again makes reference to the NPSE.
- 7.3.11 The hierarchy table (reproduced in Appendix 7-D), provides descriptive (i.e., non-numerical) guidance on the potential effects of various degrees of noise exposure with reference to the effect levels referred to in the NPSE, i.e., where noise is above or below the NOEL, LOAEL and SOAEL, as well as featuring the additional effect level of No Observed Adverse Effect Level (NOAEL) and a description of unacceptable adverse effects that should be prevented. The table confirms that adverse effects (between LOAEL and SOAEL, where noise starts to cause small changes in behaviour or attitude) should be mitigated and reduced to a minimum. Increasing noise exposure will cause the SOAEL boundary to be crossed, with there being two levels of adverse effect above it:
- A significant observed adverse effect – noise causes a material change in behaviour, e.g., keeping windows closed or avoiding certain activities at certain times. The planning process should be used to avoid this effect occurring, for example through choice of sites and use of appropriate mitigation. It is undesirable for such exposure to be caused, but as mentioned in footnote 11, there are circumstances when such effects can occur. Decisions must take account of the economic and social benefit of the activity causing or affected by the noise caused; and
 - An unacceptable adverse effect – noise exposure would cause extensive and sustained adverse changes in behaviour and / or health without the ability to mitigate the effects of the noise. Under these circumstances, the impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise this situation must be prevented from occurring.

Local policy and guidance

Manchester Core Strategy 2012 to 2027 (MCC, 2012)¹³

- 7.3.12 MCC’s local policies regarding planning are defined within the Core Strategy. In relation to noise, Policy DM 1 of the Core Strategy which deals with development management, states the following:

¹² Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government (2019), Planning Practice Guidance: Noise. <https://www.gov.uk/guidance/noise--2>
¹³ Manchester City Council, 2012, Manchester’s Local Development Framework – Core Strategy and Development Plan Document

“All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:

- Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise.”*

7.3.13 In relation to ‘Leisure and the Evening Economy’, Policy C 10 states the following:

“New development and redevelopment that supports the evening economy, contributes to the vitality of district centres and supports a balanced and socially inclusive evening/night-time economy will be permitted, subject to the following considerations:

- Residential amenity – the proposed use should not create an unacceptable impact on neighbouring uses in terms of noise, traffic and disturbance”.*

7.3.14 Regarding ‘Purpose Building Student Accommodation’, Policy H 12 states the following:

“The provision of new purpose built student accommodation will be supported where the development satisfies the criteria below

- Consideration should be given to the design and layout of the student accommodation and siting of individual uses within the overall development in relation to adjacent neighbouring uses. The aim is to ensure that there is no unacceptable effect on residential amenity in the surrounding area through increased noise, disturbance or impact on the streetscene either from the proposed development itself or when combined with existing accommodation.”*

Planning and Noise: Technical Guidance (MCC, 2022)¹⁴

7.3.15 Further guidance on MCC’s approach to the consideration of noise in a planning context is provided within its technical guidance document “Planning and Noise”. Regarding construction noise and vibration, the guidance contains no specific requirements, but suggests that any assessment should be based on BS 5228 Parts 1 and 2.

7.3.16 Regarding noise from fixed plant and equipment, the guidance states in section 3.7.1.5 that:

‘Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location’.

7.3.17 In relation to planning applications for new entertainment venues that are structurally detached from other building uses, the guidance states in section 3.7.1.2 that:

‘Entertainment noise (LAeq,5min) should be controlled to 5dB below the typical background noise level (LA90) in each octave band at the nearest noise sensitive location’.

7.3.18 Appendix A of the guidance includes a method for calculating the “typical” background sound level referred to in the previous paragraphs.

Other relevant policy and guidance

7.3.19 Other guidance, such as British Standards, has been referred to primarily in terms of suitable methods for the prediction of noise and vibration and the definition of suitable thresholds to indicate significant effects. These are referenced where required in section 7.2 of this chapter.

7.1.1 _____

¹⁴Manchester City Council, 2022, Planning and Noise Technical Guidance

Assessment limitations (technical deficiencies or lack of knowledge)

- 7.3.20 Demolition noise and vibration has not been predicted and assessed at every potential sensitive receptor (i.e., every individual property). The assessment has been based on the receptors nearest to each of the four sides of the site, therefore representing a worst-case.
- 7.3.21 The assumptions used for demolition plant and methodology are estimates and are subject to modification, but they are considered to allow assessment of the reasonable worst-case demolition effects.
- 7.3.22 As previously discussed, sufficient detail with which to undertake predictions of noise from fixed plant installations and entertainment premises is not available. Therefore, conservative target noise levels have been defined that will be referenced in the detailed design of the proposed development to ensure that any significant noise effects from these elements are avoided.

7.4 BASELINE CONDITIONS

Current baseline

- 7.4.1 The baseline noise environment, as observed during the noise survey, was dominated by road traffic noise, with the A6010 Wimslow Road dominant on the north and west sides of the site, the B5093 Mosely Road at the south of the site, and contributions from both roads at the east of the site. Other noise sources noted included occasional aircraft overhead and fixed plant noise.
- 7.4.2 The results of the noise measurements at locations L3 and L5 are presented as time history graphs in Appendix 7-E. The data has also been analysed to identify the typical background levels for the relevant periods discussed in section 7.2 of this chapter based on the method detailed in Appendix A of the MCC Planning and Noise Technical Guidance document. The typical background noise levels relating to the assumed operating hours of any fixed plant are presented in Table 7—6.

Table 7—6 Typical background sound levels at monitoring locations for day and night periods

Location	Period	Typical background sound level ¹ (dB LA90,5min free-field)
L3	Day	37
	Night	33
L5	Day	46
	Night	38
Note: ¹ Derived based on method detailed in Appendix A of the MCC Planning and Noise Technical Guidance		

7.4.3 The typical background noise levels relating to the likely operating hours of any entertainment premises are presented in Table 7—7.

Table 7—7 Typical background sound levels at monitoring locations for entertainment premises opening hours period

Location	Typical background sound level at 1/1 octave band centre frequency, Hz (dB L90,5min free-field)							
	63	125	250	500	1000	2000	4000	8000
L3	46	37	35	33	33	30	29	32
L5	61	51	49	47	47	45	43	46

Future baseline

7.4.4 In the absence of the proposed development, it is expected that the baseline noise environment would continue to be dominated by road traffic noise from the A6010 Wimslow Road and B5094 Mosely Road.

Identified receptors

7.4.5 The site has existing residential accommodation in proximity to the boundary on all sides, both private dwellings and student residences. Rather than identify specific addresses, the distance between the site boundary and the closest sensitive receptor on each of the four sides of the site has been calculated and referenced in the assessment, on the basis that they represent the worst-affected receptors opposite the site on each side. In addition, the distance for an on-site receptor has been calculated to take account of the southern half of the site remaining occupied while the northern half is demolished, and the new accommodation on the northern half of the site being occupied while the southern half is demolished, as discussed in section 7.2 of this chapter. These receptors are listed in Table 7—8.

Table 7—8 Identified receptors

Receptor	Distance to site boundary/works	Representative of properties including
North	15 m	Sheavyn House
East/South	40 m	Richmond Park, Utterly House / Properties on Mosely Road
West	45 m	Properties on Wilmslow Road
On-site (north/south)	20 m	Maple Court (southern half of site), new accommodation buildings (north half of site)

7.5 CONSTRUCTION EFFECTS

Relevant aspects of the scheme

7.5.1 As discussed in section 7.2 of this chapter, the assessment considers the following activities with respect to noise from the demolition works associated with the overall construction process:

- Building soft strip;
- Demolition of building and foundations, crushing of arisings; and
- Filling of voids and site levelling.

7.5.2 Regarding vibration, the assessment considers vibratory rolling associated with the filling of voids and site levelling activity.

Potential effects of the development and their significance

Construction noise (demolition works only)

7.5.3 The predicted noise levels for the demolition works at each receptor and the subsequent assessment against the relevant LOAEL and SOAEL thresholds detailed in section 7.2 of this chapter are presented in Table 7—9.

Table 7—9 Predictions of demolition noise and comparison to LOAEL/SOAEL thresholds

Receptor	Predicted noise level for demolition activity (dB L _{Aeq,T} façade)			Exceedances of LOAEL?	Exceedances of SOAEL?
	Soft strip	Demolition	Filling & levelling		
North	73	85	84	Yes	Yes (in bold)

East/South	64	77	75	Yes	Yes (in bold)
West	63	76	74	Yes	Yes (in bold)
On-site (north/south)	70	83	82	Yes	Yes (in bold)

7.5.4 As can be seen in Table 7—9, several of the predicted worst-case demolition noise levels exceed the SOAEL, particularly in the case of the demolition activity itself. As discussed in section 7.2 of this chapter, the final assessment of significance is based on the SOAEL being exceeded for a period of at least one month. At the time of writing, the works programme is not sufficiently developed to calculate this.

7.5.5 As the noise levels represent the worst-case in terms of distance to receptors, it is reasonable to assume that they would occur for a relatively short time and be lower for most of the time when the works are further away. However, based on the available information, it is considered likely that demolition noise will result in significant adverse effects at the closest receptors to the site. This equates to a major adverse level of significance (see Table 7—4).

Construction vibration (demolition works only)

7.5.6 The predicted vibration levels arising from the use of a vibratory roller at each receptor and the subsequent assessment against the relevant LOAEL and SOAEL thresholds detailed in section 7.2 of this chapter are presented in Table 7—10.

Table 7—10 Predictions of vibration from vibratory compaction and comparison to LOAEL/SOAEL thresholds

Receptor	Predicted vibration level for vibratory roller (VDV m/s ^{1.75})		Exceedances of LOAEL?	Exceedances of SOAEL?
	Ground floor	Upper floors*		
North	0.19	0.47	Yes (upper only)	No
East/South	0.14	0.35	Yes (upper only)	No
West	0.13	0.32	Yes (upper only)	No
On-site (north/south)	0.11	0.28	Yes (upper only)	No
* values include a multiplication factor of 2.5 to account for possible amplification of vibration on upper floors of buildings.				

7.5.7 As can be seen in Table 7—10, none of the predicted worst-case vibration levels exceed the SOAEL, although the upper floor values do exceed the LOAEL. This indicates that, while some adverse effects from use of a vibratory roller may occur at the closest receptors, no significant effects are likely, although vibration may be perceptible from time to time. This equates to a minor adverse level of significance (see Table 7—5).

Climate change and adaptation

7.5.8 Climate change has minimal direct effects on noise and vibration as a physical property; however, it can affect those things that generate noise and vibration.

7.5.9 Demolition works associated with the proposed development are expected to take until Q1 2028 to complete. Although climate forecasts show that Manchester is expected to experience slightly increased temperatures, wetter winters and drier summers, no significant changes would be likely during the period of demolition and therefore the current conditions are considered representative of those during the demolition works.

7.5.10 On this basis, it is considered unlikely that climate change would lead to any changes in the demolition methodology or duration that would result in any significant changes to the likely effects of demolition noise and vibration identified previously.

Summary of effects

Table 7—11 Summary of effects during construction (demolition works only)

Receptor	Description of effect	Effect significance
North	Noise from demolition activities, temporary.	Significant: major adverse.
East/South		
West		
On-site (south)		
North	Vibration from demolition activities, temporary.	Not significant: minor adverse.
East/South		
West		
On-site (south)		

Intermediate year construction effects

7.5.11 As discussed previously, the predictions and assessment of demolition noise and vibration include an on-site receptor to both that the southern half of the site will continue to be occupied while demolition takes place on the northern half, and that the new accommodation on the northern half of the site may be occupied while demolition takes place on the southern half, and therefore take intermediate year construction effects into account.

Supplementary mitigation measures

7.5.12 Table 7—12 describes the mitigation measures which will be adopted to avoid significant adverse effects and any additional measures which will be employed that will further reduce non-significant effects.

Table 7—12 Summary of demolition and construction supplementary mitigation measures for proposed development.

Adverse effect	Mitigation measure	Responsibility / Mechanism for implementation	Timing
Construction: noise and vibration from demolition works	An Outline Demolition Environmental Management Plan (ODEMP) has been produced as part of the outline planning documentation which includes details of measures to mitigate and manage noise from the demolition works based on the concept of best practicable means (BPM). Mitigation measures are to include the selection of plant and methods producing lower levels of noise, and the use of localised screening and enclosures around noisy plant and activities. It is anticipated that implementation of such measures would reduce noise levels by up to 10 dB. An overarching Construction Environmental Management Plan (CEMP) will also be produced containing similar details on the other elements of the construction process.	Applicant to submit ODEMP and CEMP to MCC for approval. Demolition Contractor to implement mitigation measures detailed in ODEMP.	ODEMP issued with outline planning application. CEMP will be prepared and agreed with MCC prior to commencement of the construction (new build) works on site.

7.6 OPERATIONAL EFFECTS

Target noise levels for fixed plant and entertainment premises

7.6.1 As discussed in section 7.2 of this chapter, predictions of noise from fixed plant installations and entertainment venues cannot be undertaken at this time due to limited information being available at the outline planning stage. Instead, target noise levels have been defined at the relevant sensitive receptors based on MCC guidance (i.e., 5 dB below the typical background sound levels for plant) and the results of the baseline noise survey as presented in Table 7—6 and Table 7—7. As for the consideration of demolition noise, the relevant receptors are those closest to the site on each of the four sides (see section 7.4 of this chapter).

7.6.2 Target noise levels for fixed plant installations are presented in Table 7—13.

Table 7—13 Target noise levels for fixed plant installations at receptors

Receptor	Period	Target noise level for fixed plant installations (dB LA90,5min free-field)
North/East	Day	32
	Night	28
South/West	Day	41
	Night	33

7.6.3 Target noise levels for entertainment premises are presented in Table 7—14.

Table 7—14 Target noise levels for entertainment premises at receptors

Receptor	Target noise level for entertainment premises at 1/1 octave band centre frequency, Hz (dB L _{90,5min} free-field)							
	63	125	250	500	1000	2000	4000	8000
North/East	41	32	30	28	28	25	24	27
South/West	56	46	44	42	42	40	38	41

7.6.4 The target noise levels will be referenced in the detailed design of the proposed development to confirm that any significant noise effects from fixed plant or entertainment noise will be avoided through appropriate mitigation measures.

7.7 RESIDUAL EFFECTS AND CONCLUSIONS

7.7.1 Table 7—14 summarises the likely residual effects of the proposed development.

Table 7—15 Summary of residual effects during demolition and construction

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
North	Construction: noise from demolition works, temporary.	Significant: major adverse.	Production of ODEMP and implementation of mitigation measures during works.	Not significant: minor adverse.
East/South				
West				
On-site (south)				
North	Construction: vibration from demolition works, temporary.	Not significant.: minor adverse.	Production of ODEMP and implementation of mitigation measures during works.	Not significant: minor adverse.
East/South				
West				
On-site (south)				

7.7.2 Whilst there is insufficient information to permit an assessment of noise levels arising from fixed plant and entertainment noise, information has been used to determine target levels for these sources which will be considered during the detailed design (reserved matters) phase, when further details are available. Achievement of the relevant target noise levels at the receptors would avoid any significant adverse effects arising from these sources.

7.8 REFERENCES

- BSI Standards Limited (2014), BS 5228-1:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites, Part 1 Noise;
- BSI Standards Limited (2014), BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites, Part 2 Vibration; and
- Department for Environment, Food & Rural Affairs (DEFRA) (2010), Noise Policy Statement for England.
- Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (2019), Planning Practice Guidance: Noise.

- High Speed Two (HS2) Limited (2017), High Speed Two Phase One Information Paper E23: Control of construction noise and vibration.
- Manchester City Council, 2012, Manchester’s Local Development Framework – Core Strategy and Development Plan Document
- Manchester City Council, 2022, Planning and Noise Technical Guidance
- Ministry of Housing, Communities & Local Government (2021), National Planning Policy Framework.
- The Association of Noise Consultants (2012), ANC Guidelines: Measurement & Assessment of Groundborne Noise & Vibration;

7.9 GLOSSARY

Term	Definition
Background sound level	The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval. Expressed as LA90,T and generally considered to be the average minimum noise level.
Façade Level	The sound level at a position 1 m in front of a reflecting façade of a building. The façade noise level is assumed to be 3 dB(A) higher than the level measured or predicted at the same position but without the influence of the reflecting façade.
Free-field Level	The sound level in an open area well away from any buildings or other sound reflecting surfaces other than the ground. Generally, the minimum distance from building facades required for free-field measurements is 3.5 m.
L _{Aeq,T}	The equivalent continuous A-weighted sound or noise level over the time period (T). This is the A-weighted sound pressure level of a continuous, steady sound that, over the given time period (T), contains the same sound energy as the actual fluctuating sound over the same time period.
L _{A90,T}	This is the ‘A’ weighted noise level exceeded for 90% of the measurement period, T. This is often described the background sound or noise level, and used to quantify the underlying level of sound which is usually governed by continuous or semi-continuous sounds.
Vibration dose value (VDV)	A measure of the amount of vibration that is experienced over a specified period. It is used to determine the likelihood of adverse comments regarding vibration. Mathematically it is defined as the integral over time of the fourth power of the frequency-weighted, time varying vibration acceleration magnitude multiplied by the duration, all to the fourth root. Its units are mm ^{-1.75} .

7.10 LIST OF APPENDICES (ES VOLUME III)

Reference	Title
Appendix 7-A	Glossary of Acoustic Terms
Appendix 7-B	Noise Survey Equipment Details
Appendix 7-C	Construction Noise and Vibration Prediction Data
Appendix 7-D	PPG:N Noise Exposure Hierarchy Table
Appendix 7-E	Noise Survey Results
Appendix 7-F	Site Suitability Assessment

7.11 NON-TECHNICAL SUMMARY

Introduction

- 7.11.1 The noise and vibration chapter has predicted and assessed the potential effects of the demolition works associated with the proposed development, which are anticipated to represent the worst-case in terms of the potential effects of noise and vibration from the overall construction process. It also sets out target noise levels for fixed plant installations and entertainment premises to be referenced in the design to avoid significant adverse effects.
- 7.11.2 As well as comments received via the EIA Scoping opinion, direct liaison with the MCC Environmental Protection Section was undertaken to confirm the approach to the baseline noise survey and assessment methodology.
- 7.11.3 A baseline noise survey was undertaken at the site in May 2023 in order to obtain noise data to inform the assessment and derive the target levels for fixed plant and entertainment noise.

Demolition and construction effects and mitigation

- 7.11.4 While based on preliminary data, significant effects from the noise associated with the demolition works have been predicted at the nearest noise sensitive receptors around the site, with a major adverse level of significance being indicated. Mitigation measures will be confirmed via an Outline Demolition Environmental Management Plan (ODEMP) and an overarching Construction Environmental Management Plan (CEMP). Measures will include the selection of quieter plant and methods as far as is practicable, and the use of screening and enclosures to reduce noise levels at the receptors.
- 7.11.5 Vibration arising from vibratory ground compaction has also been predicted, but no significant effects have been identified with a minor adverse level of significance being indicated.

Operational effects and mitigation

- 7.11.6 Target noise levels have been defined for fixed plant installations and entertainment premises that will be part of the proposed development. Achievement of these target levels would avoid significant adverse effects.

Residual effects and conclusions

- 7.11.7 With the mitigation measures to be included in the ODEMP and CEMP in place, no significant residual effects from construction noise and vibration associated with the demolition works are expected, with only a minor adverse level of significance being indicated for both.

8 ECOLOGY AND BIODIVERSITY

8.1 INTRODUCTION

- 8.1.1
- This chapter of the ES assesses the likely environmental effects of the Parameter Plans of the proposed development with respect to Ecology. This chapter also describes the methods used to assess the effects; the baseline conditions currently existing at the site and surrounding area; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been adopted.
- 8.1.2
- The ecological baseline presented in this chapter is based on an extended habitat survey of the site, bat surveys and a desk study of biological records for the site and in the surrounding area. From these, important ecological features (e.g. sites, species and habitats) have been identified. The ecology survey reports are available in Appendices 8-A and 8-B.
- 8.1.3
- Potential impacts and effects have subsequently been assessed for each important ecological feature within the Zone of Influence (Zol).
- 8.1.4
- Interactive effects associated with ecology have additionally been considered within the ES and can be found in Chapter 10 Interactive Effects.

8.2 METHODOLOGY AND ASSESSMENT CRITERIA

EIA Scoping

Baseline study methodology

- 8.2.1
- A brief summary of the methodology for collecting baseline data is provided in this section. Further details are provided in the ecological survey reports presented in Appendices 8-A and 8-B.

Current and assessment baseline

- 8.2.2
- Ecological baseline conditions are those existing in the absence of the proposed activities associated with the proposed development. The assessment baseline may differ from the existing (or current) baseline at the time of collecting the ecological data as conditions on the site may change and/or other developments located in the surrounding area may materially affect the assessment baseline.
- 8.2.3
- The assessment baseline is defined by the conditions on the site and in the surrounding area as they are at the date of writing this report. It was considered that there had been no material changes of ecological note to the site condition since the initial habitat survey in November 2022.

Desk study

- 8.2.4
- A desk study was carried out using a combination of externally commissioned data records and internet-based sources of information. This included examining aerial photographs to assist in understanding the local context of the site, in particular, to identify connectivity with surrounding habitat. Additionally, previous reports of the site were reviewed and considered for this assessment. The reports included:
- Extended Phase 1 Habitat Survey (BPD, 2015);
 - Bat Survey Report (BDP, 2015), and;
 - Environmental Statement (BDP, 2015).

- 8.2.5
- Internationally protected sites, statutory sites, non-statutory sites and records of protected species within 2 km of the site as well as records of ancient woodland and Habitats of Principal Importance (HPIs) within 2 km of the site were identified using the following sources:
- Multi-Agency Geographical Information for the Countryside (MAGIC) website; and
 - Greater Manchester Local Record Centre (GMLRC).

Field survey

- 8.2.6
- An extended habitat survey to identify the type and distribution of habitats on site was conducted on 3rd November 2022, following the methodology set out by using the UK Habitat Classification System survey (UKHab) (Butcher *et al.* 2020). Additionally, a habitat condition assessment was carried out on 7th June 2023 to determine the condition of the habitats present on site to support a biodiversity net gain assessment for the planning application, and to revisit the identified habitats at the optimum survey period.
- 8.2.7
- The survey was extended, in accordance with Institute of Environment Assessment (IEA, 1995), to identify the potential presence of protected species, and identify habitats on site that are suitable to support protected species or species of conservation concern. The habitats present on site, and any target notes of important ecological features identified are shown in Figure 8-1.
- 8.2.8
- A Preliminary Roost Assessment (PRA) of the external structures of the buildings on site, was also undertaken on 3rd November 2022, where access could be gained, to look for bats or secondary evidence of bats and to record the presence of potential roosting features (PRF) in accordance with good practice guidance (Collins, 2016). The buildings were then categorised based on their potential (negligible, low, moderate, high or confirmed) to support bats.
- 8.2.9
- Following the results of the building assessment for bats, additional emergence/ return to roost surveys were undertaken on 22 buildings across the site, which were identified to have some level of potential to support roosting bats. These surveys are being carried out through June and July 2023 in accordance with best practice guidance available at the time (Collins, 2016). This report presents the results of the surveys carried out to date, with the remaining surveys being undertaken in July 2023 and to be submitted to planning in a full bat survey report once complete. The majority of the bat surveys were complete by the time of submission, with a good picture of bat roosting activity across the site collated prior to the submission of this document. Any incidental passes were also recorded to give an indication of general bat activity on the site.

Building names

Please note that building nomenclature in this chapter relates to existing buildings on-site and the referencing allocated to buildings within the site when the Preliminary Ecological Appraisal (PEA) was conducted. Therefore, the building references do not refer to proposed buildings within the proposed development unless specified. References to buildings relate to those presented in Appendix 8-A.

Assessment approach

- 8.2.10
- This assessment of potential impacts and effects on ecology has been undertaken in line with the Chartered Institute of Ecology and Environmental Management's (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018).

Assessment of effects

Scope of the Assessment

The study area and zone of influence

- 8.2.11 The 'study area' includes all land within the site boundary. An additional 'study buffer' is also included, where appropriate, around the ecological feature being investigated. The study area can therefore vary according to the target species or species group being surveyed. Details of the study area and study buffer are provided in this section for each survey type. In this section, and throughout this chapter, 'the site' refers to the site to which the proposed development relates. Other sites for designated areas or other developments are specifically named.
- 8.2.12 The extended habitat survey area covered all accessible land within the site boundary. The ecological desk study included a search for records of protected species, habitats and species of conservation concern, and sites designated for nature conservation, within the site and with the following additional buffers:
- 2 km desk study buffer for internationally protected and nationally designated sites;
 - 2 km desk study buffer for protected and priority species; and
 - 2 km desk study buffer for non-statutory sites, ancient woodland, and habitats of principal importance (HPI).
- 8.2.13 The ZoI for ecology is defined as the *"area over which ecological features may be subject to significant effects as a result of the proposed project and associated activities"* (CIEEM, 2016). The ZoI may extend beyond the site boundary and is dependent on the receptor's sensitivity to environmental change, how mobile a receptor is, and whether there are any hydrological or airborne links between planned activities and the features. The previously defined buffer distances are deemed suitable for the species or habitats present or with potential to be present on the site (see Appendix 8-A).

Methodology for establishing the baseline conditions

Importance of ecological features

- 8.2.14 Under CIEEM (2018) guidelines, ecological receptors (or features) are referred to in terms of their value, rather than their sensitivity. The relative value of ecological features, established through the desk study, extended habitat survey and species-specific surveys, are based on the following geographic scale.
- International;
 - National;
 - Regional;
 - County;
 - Local; and
 - Site (negligible).
- 8.2.15 Designated sites have already been assessed for their nature conservation value. For example, sites important at the European level include those designated as Special Areas of Conservation (SACs) which are protected under the Conservation of Habitats and Species Regulations 2017 and sites important at the national level include those designated as Sites of Special Scientific Interest (SSSIs) under the Wildlife and Countryside Act 1981 (as amended). Examples of designated sites that are of importance at a county/metropolitan level include Local Nature Reserves (LNR) or sites of Importance to Nature Conservation (SINCs) of Metropolitan Importance, while those of importance at a local level includes SINCs of Borough or Local Importance.

- 8.2.16 Some habitats and species located outside of designated sites also have a geographic frame of reference which has been used as an objective starting point for identifying their importance, such as those:
- Considered to be priorities for conservation in England and Wales;
 - Listed as habitats and species of principal importance under the Natural Environment and Rural Communities Act 2006 (NERC); and/or
 - Listed as being of local importance in local Biodiversity Action Plans (BAPs).
- 8.2.17 However, the final value of habitats and species outside of designated sites has been determined by considering a number of additional criteria, for example local rarity, diversity, or function as a habitat corridor (CIEEM, 2018 based on Ratcliffe 1977).

Scope of the assessment

- 8.2.18 Following the baseline evaluation of the importance of ecological features described in section 8.4, only those assessed as being of local or higher importance are considered within the impact assessment along with all legally protected species in order to ensure statutory compliance.
- 8.2.19 Likewise, the impact assessment only considers the potentially 'significant' effects of the proposed development on ecology and nature conservation (CIEEM, 2018). Impacts on important ecological features are considered during both the demolition and construction and operational phases of the proposed development.

Assessment of significant effects

- 8.2.20 The assessment of likely significant effects presents an assessment for all ecological features that have been scoped in because they are of nature conservation importance or are legally protected and there is a reasonable potential for there to be a significant effect.
- 8.2.21 At this stage, the assessment considers the impacts and effects of the proposed development as identified within the proposed Parameter Plans, and incorporating known embedded mitigation, but without the implementation of supplementary mitigation measures.

Mitigation measures and assessment of residual effects

- 8.2.22 Where potential effects exist, supplementary mitigation measures are provided where known. An assessment of the significance of any residual effects after mitigation is then made.

Characterising ecological impacts

- 8.2.23 Impacts on ecological features (adverse or beneficial) can be direct or indirect. These impacts have been characterised based on the following parameters set out in the CIEEM guidelines:
- Extent (the spatial or geographical area over which the impact may occur);
 - Magnitude (size, amount, intensity or volume of the impact);
 - Duration (defined in absolute terms and where relevant in relation to the species/habitat being assessed i.e. a species lifecycle or the period over which habitat succession may occur);
 - Reversibility (based on whether recovery is likely within a reasonable timeframe); and
 - Frequency and timing (the number of times the impact is repeated and whether the timing of an impact coincides with important seasons or life cycle stages).

Determining significance

- 8.2.24 The following definitions are used for the terms ‘impact’ and ‘effect’ (CIEEM, 2018):
- Impact – Actions resulting in changes to an ecological feature. For example, the construction activities of a development resulting in removal of a hedgerow; and
 - Effect – Outcome to an ecological feature from an impact. For example, the effects on a dormouse population from the loss of a hedgerow.
- 8.2.25 Effects can be significant at a wide range of geographical scales. CIEEM defines a significant effect to be:
- ‘an effect that either supports or undermines biodiversity conservation objectives for important ecological features or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity).*
- 8.2.26 Ecologically significant effects include impacts on the integrity of a designated site or the conservation status of a habitat or species within a given geographical area. If an impact is not likely to have an adverse or beneficial effect on the conservation status of a species or habitat or stop recovering species or habitats from reaching favourable conservation status, then it is not considered to be a significant effect.
- 8.2.27 For species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area. The known distribution, abundance and likely trends and variations in population size are considered.
- 8.2.28 Conservation status of natural habitats is the sum of influences acting on a natural habitat, and its typical species, that may affect its long-term natural distribution, structure and functions, as well as the long-term survival of its typical species within a given geographical area.
- 8.2.29 This chapter determines significance at geographical scales in accordance with the CIEEM 2018 guidelines. As set out in Chapter 05 Methodology of this ES, the significance of effect is also considered as being negligible, minor, moderate or major. Moderate and major effects are considered to be significant at the geographical level specified in this assessment. Minor or negligible effects are considered not significant.

8.3 Legislation and policy which has influenced assessment or mitigation

International legislation, agreements and conventions

United Nations Convention on Biological Biodiversity (1992)

- 8.3.2 The UN Convention on Biological Diversity (CBD) focuses on the conservation of all species and ecosystems. It requires the development of national strategies, plans or programmes for the conservation and sustainable use of biodiversity. The ‘UK Post-2010 Biodiversity Framework’ (JNCC *et al.*, 2012), is the result of a change in strategic thinking following the publication of the CBD’s ‘Strategic Plan for Biodiversity 2011–2020’ (CBD, 2010).
- 8.3.3 ‘Biodiversity 2020: A strategy for England’s wildlife and ecosystem services’ (DEFRA, 2011) underpins the UK Post-2010 Biodiversity Framework. Relevant key targets include:
- No net loss of priority habitats and an increase in the overall extent of priority habitats; and
 - Overall improvement in the status of our wildlife and prevention of further human-induced extinctions of known threatened species.

- 8.3.4 European Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora (the Habitats Directive) (European Council, 1992) requires Member States to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest (i.e. those listed in Annexes I, II, IV and/or V of the Directive). Member States are also required to contribute to a coherent European ecological network of protected sites by designating SACs for the natural habitat types listed in Annex I and habitats of the species listed in Annex II. In England, the Directive is implemented through the Conservation of Habitats and Species Regulations 2017 (discussed in the national legislation section).

European Council Directive 2009/147/EC on the Conservation of Wild Birds (the Birds Directive) (2009)

- 8.3.5 The European Union (EU) Birds Directive (EU, 2009) requires Member States to take the requisite measures to maintain the population of all species of naturally occurring wild birds in the States’ European territory at a level that corresponds to various requirements. Member States shall take special conservation measures concerning the habitat of species mentioned in Annex I of the Directive, and shall take similar measures for regularly occurring migratory species that are not listed in Annex I. Under the Directive, the most suitable areas for the conservation of these species (whether on land or at sea) are classified as Special Protection Areas (SPAs). In England and Wales the Directive is implemented under the WCA 1981 (as amended) and the Conservation of Habitats and Species Regulations 2010 (as amended), as well as other legislation related to the uses of land and sea.

National legislation

Conservation of Habitats and Species Regulations (2017)

- 8.3.6 The Habitat Regulations transpose the EU Habitats Directive and EU Birds Directive in the UK and provide for the designation and protection of European sites and the protection of European protected species (EPS). For those animal species listed in Schedule 2, it is an offence to deliberately capture, kill, or disturb/take/destroy the eggs of an EPS. Additionally, it is an offence to damage or destroy a breeding site or resting place of an EPS.
- 8.3.7 It is also an offence under the Habitat Regulations to deliberately pick, collect, cut, uproot or destroy a wild plant listed in Schedule 5. However, these actions can be made lawful through the granting of licences by the appropriate authorities (Natural England (NE) in England) where deemed appropriate.

Wildlife & Countryside Act (1981 as amended)

- 8.3.8 The Wildlife & Countryside Act (WCA) is the principal mechanism for the legislative protection of wildlife in Great Britain and provides for the designation, protection and management of SSSIs and for the establishment of National Nature Reserves (NNRs) in England and Wales for their flora, fauna or geological interests.
- 8.3.9 Under the Act, it is an offence to: “*intentionally kill, injure or take any wild animal listed on Schedule 5; intentionally or recklessly damage, destroy or obstruct access to any structure or place used by a Schedule 5 species for shelter or protection; or to disturb them while using such a place*”.
- 8.3.10 WCA also provides for the legal protection of wild birds. All nesting birds, including their nests, eggs and young, are protected from killing, injury, taking or selling with additional protection offered to species listed on Schedule 1. For these species, adult birds and their young are protected from intentional or reckless disturbance while at or near the nest. It is an offence to intentionally pick, uproot or destroy any wild plant included in Schedule 8.
- 8.3.11 The Act is also the principal mechanism for preventing the spread of non-native plant and animal species listed under Schedule 9, such as Japanese knotweed, which may be detrimental to native wildlife.

Countryside and Rights of Way Act (2000)

- 8.3.12 The Countryside and Rights of Way Act (CRoW) amended and strengthened the protection given to certain species under the WCA and introduced the offence of “reckless” actions with regards to these species.

Natural Environment & Rural Communities (NERC) Act (2006)

- 8.3.13
- Section 40 of the NERC Act 2006 places a duty on all public authorities in England to have regard, in the exercise of their functions, to the purpose of conserving biodiversity. A list of habitats and species of principal importance in England, drawn up under Section 41 (S.41), is used to guide local and regional authorities in implementing their biodiversity duty.

The Environment Act 2021

- 8.3.14
- In 2021 the Environment Act gained Royal Assent, providing a new legislative framework for developments to consider in respect of potential environmental impacts and opportunities. Within the Environment Act there is a call for all developments to deliver a 10% net gain for biodiversity using an approved metric approach. This is due to become mandatory from late 2023.

National policy and guidance

National Planning Policy Framework (MHCLG, 2021)

- 8.3.15
- The revised National Planning Policy Framework (NPPF), published in July 2018 and updated in February 2019 and 20 July 2021, sets out the Government’s planning policies for England and how these should be applied. The revised NPPF continues to stress the importance of the local authority contribution to improving and protecting the environment through development of a systematic approach to enhancing biodiversity, minimising waste and pollution, and mitigation/adaptation to climate change impacts.
- 8.3.16
- Chapter 15 requires that local planning authorities, when considering planning applications, should aim to conserve and enhance biodiversity by applying the following principles:
- *‘Planning policies and decisions should contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes and sites of biodiversity, (in a manner commensurate with their statutory status or identified quality)... and minimising impacts and providing net gains for biodiversity by establishing coherent ecological networks that are more resilient to current and future pressures’;*
 - *‘To protect and enhance biodiversity and geodiversity, plans should identify and map components of local wildlife-rich habitats and wider ecological networks including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them... and promote the conservation, restoration, and re-creation 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’;*
 - *‘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’;*
 - *‘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 and a suitable compensation strategy exists’;* and
 - *‘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’.*

Planning Practice Guidance 2014 (MHCLG, updated 2019)

- 8.3.17
- Planning Practice Guidance (PPG) states that:

- “The NPPF 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”;
- “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.”;
- “Where a development cannot satisfy the requirements of the ‘mitigation hierarchy’, planning permission should be refused as per paragraph 118 of the NPPF.”; and
- “Sufficient green infrastructure should be designed into a development to make the proposal sustainable. If this green infrastructure helps to mitigate any significant harm to biodiversity (among other benefits) then this should be taken into account in deciding whether compensation may also be needed.”

Office of the Deputy Prime Minister (ODPM) Circular 06/2005, (ODPM, 2005)

- 8.3.18
- This circular provides further guidance with regards to statutory obligations relating to biodiversity within the planning system. It sets out the considerations to be taken into account when planning decisions may have a significant effect on protected sites and species.

A Green Future: Our 25 Year Plan to Improve the Environment (Defra, 2018)

- 8.3.19
- The 25 Year Environment Plan, published in January 2018, sets out the UK’s goals for improving the environment within a generation and leaving it in a better state than at the start of the plan by creating richer habitats for wildlife, improving air and water quality and reducing our contribution to plastic waste in the world’s oceans. Key activities to progress the goals of the plan include proposed Agriculture, Environment and Fisheries Bills to overhaul the current system including consultation on mandatory biodiversity net gain mandatory for new developments.

Regional policy and guidance

Biodiversity Strategy 2022-2030 (Manchester City Council (MCC), 2022)

- 8.3.20
- Objective 1 - Managing and understanding biodiversity. Key Priorities:
- ‘A Nature Recovery Network Strategy, which is contextualised for the urban character of Manchester, must be developed for Greater Manchester. This should guide the focus of all future habitat management work’.
 - ‘All priority wildlife sites must be in active management by 2030’.
 - ‘Key indicator species must be identified and action plans for each key indicator species written. These action plans should sit alongside the Nature Recovery Network Strategy to guide any habitat management work across the Recovery Network. Key indicator species will also need to be recorded regularly to measure our impact’.
- 8.3.21
- Objective 2 - Involving people. Key Priorities:
- ‘We must find creative ways to connect and involve new audiences with nature and the natural environment in Manchester’.
 - ‘The Manchester Biodiversity Action Group (MBAG) must support and empower local communities to take meaningful action for nature in the city’.

- *'Land managers and practitioners in the city must be provided with the necessary knowledge and skills to protect and recover biodiversity'.*
- 8.3.22 Objective 3 – Planning, policy and partnerships. Key Priorities:
- *'Biodiversity should be embedded into Manchester City Council's policies to help protect and enhance nature'.*
 - *'Strong working relationships must be established with partners delivering against climate change, health and wellbeing, and air quality to ensure new and effective collaboration in the city'.*
 - *'Long-term funding opportunities for the recovery of nature in Manchester must be identified, particularly through the planning and development process'.*

Manchester Green and Blue infrastructure strategy Implementation Plan refresh 2021-2025 (MCC, 2022)

- 8.3.23 The implementation plan has set objectives to increase value for green infrastructure in Manchester City. Objective 1 targets improving GI quality and function, focusing on: river valleys and canals, parks, trees and woodlands, gardens, other land, healthier and resilient communities and protecting and enhancing ecology.
- Nature of Manchester (MCC, 2021)
- 8.3.24 *"In 2017, the City of Manchester became one of the 22 'Citylab' study cities being undertaken across Europe as part of the European Commission Joint Research Centre (JRC)-funded EnRoute Project."*
- 8.3.25 Indicators have been outlined for respective environmental concerns. Indicator 10 is Habitats for wildlife (biodiversity). Fallowfield is referenced as ward number 19 and is measured under the ward-level assessment as having medium level benefits.
- 8.3.26 The report also evaluates the different types of nature-based solutions that can contribute to addressing a particular challenge. These include: Public green spaces, trees and woodlands, gardens, rivers, canals and lakes, growing spaces, eg. allotments, sustainable urban drainage systems eg. ponds, rain gardens, ditches and swales, and green roofs and green walls.
- My Wild City (Lancashire Wildlife Trust (LANCSWT), 2020)
- 8.3.27 The My Wild City project is a four-year partnership between Manchester City Council and the Wildlife Trust and aims to develop a strong new mandate for biodiversity in the city. The project will bring a citywide focus to the idea of a people's nature recovery network and includes developing around 75 new species action plans across five broad habitat areas in the city. This expands on the regional Greater Manchester Local Nature Recovery Strategy work pilot undertaken by Natural England and applies the concept at a local level.

Local policy and guidance

Manchester Climate Change Framework 2020-25 (Manchester Climate Change Partnership and Agency, 2020)

- 8.3.28 Green Infrastructure and nature-based solutions: integrate nature-based solutions into the city's communities to manage flood risk, increase biodiversity and improve health and wellbeing.
- Manchester City Council Core Strategy 2012-2027 (MCC, 2012)
- 8.3.29 Policy EN 9 Green Infrastructure – *'New development will be expected to maintain existing green infrastructure in terms of its quantity, quality and multiple function. The multi-functionality of key open spaces and linkages, including biodiversity, recreation and walking/cycling routes, will be supported and enhanced and connections between them reinforced'.*

- 8.3.30 Policy EN 10- Safeguarding Open Space, Sport and Recreation Facilities: *'Proposals will be supported that: provide innovative solutions to improving the network of existing open spaces, increase accessibility to green corridors, and enhance biodiversity'.*
- 8.3.31 Policy EN 14- Flood Risk: *'The City of Manchester contains many sections of rivers which are culverted or 'hidden'; where these are indicated in the strategic flood risk assessment (SFRA) beneath a proposed development site, further investigation will be required and the development proposal should take this into account; where feasible and appropriate development should seek to open up culverted/hidden rivers to reduce the associated flood risk and danger of collapse, taking advantage of opportunities to enhance biodiversity and Green Infrastructure'.*
- 8.3.32 Policy EN 15- Biodiversity and Geological Conservation: *'The Council will seek to maintain or enhance sites of biodiversity and geological value throughout the City. Development should wherever possible seek to maintain, enhance or restore existing geology'.*
- Great Manchester Combined Authority Biodiversity Net Gain – Guidance for Greater Manchester (Footprint Ecology & WSP, 2021)
- 8.3.33 This guidance sets the biodiversity net gain context within Greater Manchester. It provides an overview of the relevant national legislation and policy, a description on how to build biodiversity net gain into the development process, and how to assess the change in biodiversity. This guidance is targeted to developers and potential offset providers to run biodiversity assessments in a consistent way across Greater Manchester. The document also enables the consistent verification of biodiversity assessments by local planning authorities and the Greater Manchester Ecology Unit (GMEU).
- Greater Manchester Strategy 2021-2031 (Greater Manchester Combined Authority (GMCA), 2021)
- 8.3.34 This strategy sets out a route to deliver benefits to people, places and the planet. The strategy seeks to make Greater Manchester one of the most resilient places where the role of the natural environment is recognised, and nature-based solutions are utilised to reduce flood risk or creating better green spaces for nature, biodiversity and people.
- 5-Year Environment Plan for Greater Manchester 2019-2024 (GMCA, 2019)
- 8.3.35 This plan sets out the challenges that Greater Manchester is currently facing. The plan aims to protect, maintain and enhance the natural environment, mitigate climate change, improve air quality, increase sustainable consumption and production and become more resilient and adaptative to climate change.
- Greater Manchester Resilience Strategy 2020-2030 (GMCA, 2021)
- 8.3.36 This strategy describes five priority areas to guide their work through to 2030 and sets out key themes within these priorities. Priority number four 'Place' includes strategy on protecting and promoting the resilience value of the natural environment. The strategy will be accompanied by an action plan.

Assessment limitations (technical deficiencies or lack of knowledge)

- 8.3.37 The internal courtyard areas of the site were not accessible and hence the trees, and elevations of the buildings, within these areas were not inspected. Aerial imagery was used to assess the likelihood of habitats present in the internal courtyard areas. This is not considered to be a significant constraint to the outcome and advice contained within this chapter.

8.4 BASELINE CONDITIONS

Current baseline

- 8.4.1
- Evaluation of the ecological baseline conditions is based on the desk study and field survey results which are summarised in this section and presented in detail in Appendix 8-A.
- 8.4.2
- A full site description is provided in Chapter 2 Development Description. The site comprises Owens Park (northern section), the Limes building (central east section), the Oak House (south-west section) and Woolton Hall (south-east section).
- 8.4.3
- The proposed development will deliver new student accommodation buildings for the University of Manchester (UoM) and involves the demolition of the existing buildings on the site. The site mainly comprises buildings, hardstanding, other neutral grassland bordering and between buildings, patches of broadleaved woodland, scattered broadleaved trees, hedgerows, line of trees. Additionally there is an off-site pond 65m to the north of the site (OS central grid reference - SJ 85740 94377), which is also considered as part of the assessment of potential impacts in this chapter.

Statutory designated sites

- 8.4.4
- No statutory designated sites were identified on or within 2km of the site boundary.

Non-statutory designated sites

- 8.4.5
- One non-statutory designated site was identified within 2km of the site. The Fallowfield Loop, a disused railway cutting is designated as a Regionally Important Geological Site (RIGS), located 154m to the south of the site. RIGS are areas of high geodiversity interest designated through locally developed criteria.

Habitats of Principal Importance

- 8.4.6
- The desk study identified six parcels of Habitat of Principal Importance (HPI), also known as priority habitat types, within the site boundary. These six HPI's are all parcels of deciduous woodland, found in the northern and southern areas of the site.
- 8.4.7
- An additional 110 parcels of deciduous woodland priority habitat were identified within 2km of the site boundary. Further to this, five parcels of the priority habitat traditional orchards were identified within 2km of the site, with the closest located approximately 210m west of the site. In addition, one parcel of wood pasture and parkland Biodiversity Action Plan (BAP) priority habitat was identified approximately 1.8km north-east and one parcel of the priority habitat open mosaic habitat on previously developed land is located approximately 290m south of the site.

Habitats on site

- 8.4.8
- The extended habitat survey of the site identified that the site is dominated by buildings and associated hard standing. The semi-natural vegetation present included:

•

Broadleaved woodland;

•

Other neutral grassland;

•

Other neutral grassland – ruderal, ephemeral;

•

Scattered broadleaved trees; and,

•

Line of trees.
- 8.4.9
- Other habitats recorded on site included:

- Introduced shrub;

•

Raised planting beds;

•

Bare ground under hedgerows; and,

•

Hedgerows;

- 8.4.10
- The areas of highest ecological value within the site boundary include the woodland areas, indicated as ‘other broadleaved woodland’ in Figure 8-1. The woodland areas were found alongside the boundaries to the south, south-east and west of the site (TN11). The woodland areas comprised mixed and yew woodlands, with species including non-native and native trees. The extended habitat survey of the site confirmed one area of HPI deciduous woodland in the south-eastern part of the site. The other parcels of HPI deciduous woodland identified by the desk study did not meet HPI standards during the habitat survey and therefore it is considered that only one area of HPI woodland is located on site.
- 8.4.11
- In addition, a dense understorey in a section of the woodland was recorded, however there has been some clearance of trees along the road edge together with the understorey, that has opened up some areas. Species include hazel *Corylus avellana*, field maple *Acer campestre*, holly *Ilex aquifolium*, ivy *Hedera helix*, elder *Sambucus nigra* and sycamore *Acer pseudoplatanus* saplings.
- 8.4.12
- A large number of non-native shrubs were identified throughout including laurel *Prunus* sp, Japanese barberry *Burberis thunbergii*, *Cotoneaster* spp, fatsia *Fatsia japonica*, Mexican orange blossom *Choisya ternata*, snowberry *Symphoricarpos albus*, and sumac *Rhus* sp. The understorey was sparse at the time of the survey with some ivy, willowherb *Chamaenerion* sp., and nettle *Urtica dioica* present. Several mature London plane *Platanus x hispanica* trees were also identified towards the main entrance to the south.
- 8.4.13
- The distribution of all habitats recorded during the extended habitat survey is shown in Figure 8-1 and summarised in Table 8-1 which also determines the importance of each for nature conservation. The full habitat survey results are presented in Appendix 8-A.

Invasive non-native species

- 8.4.14
- The listed Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) plants identified during the extended habitat survey include:

•

Japanese knotweed *Fallopia japonica*; and

•

Montbretia *Crocasmia x crocosmiiflora*.
- 8.4.15
- There was evidence of Japanese knotweed within the bordered area east of building B21. It is understood that Japanese knotweed is present within the wider campus and there is an eradication programme in place by the university to remove Japanese knotweed across its estate.
- 8.4.16
- In addition, montbretia was also recorded in introduced shrub borders. It is recommended that an eradication programme is implemented, under the advice of a specialist contractor, to ensure the appropriate removal of this species.

Table 8-1 Habitats on or adjacent to the site

Habitat	Likely Importance	Description and Justification
Broadleaved woodland	Local	The mixed and yew woodlands comprise non-native and native species of trees, such as sycamore <i>Acer pseudoplatanus</i>, horse chestnut <i>Aesculus hippocastanum</i>, willow <i>Salix</i> sp., lime <i>Tilia</i> sp., poplar <i>Populus</i> sp., pedunculate oak <i>Quercus robur</i>, ash <i>Fraxinus excelsior</i>, alder <i>Alnus</i> sp., silver birch <i>Betula pendula</i>, beech <i>Fagus sylvatica</i>, Scot's pine <i>Pinus sylvestris</i> and yew <i>Taxus baccata</i>. Ash dieback was noted throughout the majority of the larger ash trees. Occasional apple <i>Malus</i> spp and laurel <i>Prunus</i> sp. were recorded along the western edge. The south-east area of the woodland within the site is considered to meet the criteria of mixed deciduous woodland and hence is a HPI listed under Section 41 of the NERC Act. Additionally, there are two small blocks of this priority woodland habitat off-site, located to the north and the east of the site. The woodlands identified as HPI within the site have been assessed as Local importance in context of the proposed development. The habitat is categorised as habitat of principal importance, however this habitat is common and widespread in the local area and is therefore considered to be of local importance in the context of the site.
Other neutral grassland; and Other neutral grassland – ruderal, ephemeral	Site	There are several areas of species-poor regularly mown amenity grassland. These habitats are locally abundant, with areas of higher quality also locally; therefore, are considered to be of Site importance.
Introduced shrub	Negligible	Small planting areas found throughout the site surrounded by other neutral grassland that include non-native scrub species such as variegated laurel <i>Lusitanica variegata</i>, <i>Berberis japonica</i>, <i>Cotoneaster</i> spp., <i>Hebe</i> sp., <i>Fatsia japonica</i>, <i>Choisya ternata</i>, snowberry, <i>Rhus</i> sp., privet, <i>Pyracantha</i>, montbretia <i>Crocasmia x crocosmiflora</i>. Individual trees are also often present through the scrub. <i>Cotoneaster</i> spp. were recorded on site. It is an offence to spread <i>Cotoneaster</i> species in the wild that are listed in Schedule 9, which could occur if the plant is not removed properly. It is proposed the total removal of the plant including roots at the correct time of year (i.e. when not fruiting, as these are the spreaders) and destruction on site via a chipper or burning. Alternatively, a botanical survey could be undertaken to assess if the <i>Cotoneaster</i> species are Schedule 9 listed plants. If the botanical survey was to confirm that this is not an invasive species, further action would not be required. There was evidence of Japanese knotweed <i>Fallopia japonica</i> stands within the bordered area to the east of B21. It is understood that Japanese Knotweed is present within the wider campus and eradication has/is being undertaken. Therefore, Introduced shrub is considered to be of Site importance.
Hedgerows (non-native)	Site	There are a number of well-maintained ornamental, low level hedgerows (<1m in height) across the site, interspersed with the ornamental planting. Species included privet <i>Ligustrum vulgare</i>, snowberry and laurel. The hedgerows are of low ecological value due to the non-native species that comprise them and the limited connectivity with other linear features. Therefore, they are of Site importance.
Hedgerows (native)	Local	There are a number of native species-poor hedgerows, all of single to two species composition (beech and/or hornbeam <i>Carpinus betulus</i>). The ecological value of these hedgerows is currently undermined by excessive trimming, although will provide nesting opportunities for common species of birds. All hedgerows consisting predominantly (i.e. 80% or more cover) of at least one woody UK native species, such as beech, are considered to meet the requirements for priority habitat, therefore, they are of Local importance.

Habitat	Likely Importance	Description and Justification
Scattered broadleaved trees	Site	A total of 339 scattered broadleaved trees were recorded on site, 322 of which will be retained as part of the proposed development. The tree species comprise native and non-native species, including Beech, sycamore <i>Acer pseudoplatanus</i>, lime <i>Tilia x europaea</i>, yew <i>Taxus baccata</i>, <i>Prunus</i> sp., Scot's pine <i>Pinus sylvestris</i>, <i>Eucalyptus</i> sp., hornbeam, cedar <i>Cedrus libani</i>, whitebeam <i>Sorbus aria</i>, <i>Quercus</i> sp., holly <i>Ilex aquifolium</i>, <i>Malus</i> sp., hawthorn <i>Crataegus monogyna</i>, <i>Betula</i> sp., and ash <i>Fraxinus excelsior</i>. Therefore, Scattered broadleaved trees are of Site importance.
Line of trees	Local	There is a row of planted hornbeam, <i>Prunus</i> sp., and <i>Salix</i> sp. in front of the wall to the north of the site. Additionally, there is a mature tree line of large common lime <i>Tilia x europaea</i> located along fence line between Owens Park and Ashburne Hall, and a line of whitebeam <i>Sorbus aria</i> running along a brick wall to the east of the site, near Tree Court. Therefore, these trees are of Local importance.
Buildings	Site (with bat roosts) Negligible (unless roosting bats or breeding birds present)	There is a total of 29 main buildings on site, with a further seven buildings consisting of garages, substations, and bike sheds/shelters. The Owen's Park (B7 to 14a) buildings are of more recent construction of brick (some with concrete support structures) with either flat or shallow pitched metal roofs. The majority have numerous weep holes above the windows and potential gaps beneath the fascia boards/soffits that could offer roosting opportunities. They have negligible to high potential to support bats. The buildings at Oak House (B15 to B21) are of more recent construction of brick with a shallow pitched tiled roof with small soffits or fascia boards. The majority have numerous weep holes above the windows and potential gaps beneath the fascia boards/soffits that could offer roosting opportunities. They have negligible to high potential to support bats. The buildings at Woolton Hall (B22 to B27) are of brick construction with a pitched metal roof and large timber soffits. They have ornate ventilation slits on some of the gable ends that could allow access into any roof voids that may be present. Detailed building descriptions and bat roost potential with a summary of the results of the external building survey are provided in Appendix 8-A. The locations of the buildings are illustrated in Figure 8-1. Therefore, buildings without bat roost potential are of Negligible importance, and the buildings with bat roosts are of Site importance.
Raised planting beds	Negligible	Areas of raised beds and flower borders including scattered trees and/ or scattered shrub predominantly ornamental species, located around building B21. These are low ecological value and therefore, these are to be considered are of Site importance.
Bare ground under hedgerows/ hardstanding	Negligible	Comprises mainly hardstanding surfaces such as a road and pavement around the building as well as small areas of parking located around the existing buildings.



Figure 8-1 Habitats recorded within site boundary

Protected and priority species

- 8.4.17

A description of the species identified during the ecological surveys and the nature conservation importance of the populations of these species within the site boundary is provided in the following sections. A full description of survey methods and results are provided in Appendices 8-A and 8-B.

Bats - foraging and commuting
- 8.4.18

The desk study returned records for several bat species within 2km of the site including common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *P. pygmaeus* which are often associated with built environments. Other species records include Daubenton’s bat *Myotis daubentonii* and noctule *Nyctalus noctula*.
- 8.4.19

At least four species of bat, common pipistrelle, soprano pipistrelle, myotis species (*Myotis spp.*) and noctule were recorded during the dusk emergence and dawn re-entry bat surveys. The most common species encountered during the surveys was common pipistrelle.

Bats - roosting
- 8.4.20

The desk study returned three records of common pipistrelle bat roosts within the site boundary all dated to previous site surveys undertaken in 2015. Two of these bat roosts were identified during bat activity surveys carried out in 2015 and comprised a maternity roost of 44 common pipistrelle bats within Little Court and Green Court (B11 and B12 respectively), and a day roost of two common pipistrelle bats within Tree Court (B10), all located within the Owens Park area of the site.
- 8.4.21

During the Preliminary Roost Assessment carried out as part of the PEA in November 2022, a total of six trees were identified to have low potential to support roosting bats, these include two sycamore, a eucalyptus, a beech, and two horse chestnut mature trees. As per best practice (Collins, 2016), no further surveys of the trees are required due to the low roosting potential recorded. The locations of the trees are illustrated in Figure 8-1.
- 8.4.22

Of the 29 buildings surveyed on site, 22 were considered to have potential to support crevice dwelling bats. Six of the buildings were considered to have low potential, two moderate potential, and 14 were assigned high potential for roosts with the potential to support maternity roosts due to the building structures and the habitats present on site. The remaining buildings were considered to have negligible potential to support roosting bats due to their construction type and the lack of features suitable to support roosting bats at the time of the survey. Full details of the survey methodologies and results can be found in Appendix 8-A.
- 8.4.23

During the bat activity surveys carried out between 17th May and 14th July 2023, roosts were identified in four buildings, three of them (B10, B11 and B12) were the same as those previously recorded in the 2015 surveys. Three additional bat roosts were recorded, one in B10, one in building B19 and one recorded incidentally in building B25 whilst surveying building B27. A summary of the roosts recorded and their conservation significance in accordance with best practice guidance (Mitchell-Jones, 2004), are summarised in Table 8-2.
- 8.4.24

All roosts were identified to be utilised by common and soprano pipistrelle bats, with common pipistrelles being the main species. It is anticipated that there is a network of maternity roosting sites across the campus that a colony of common pipistrelle bats are using. These are centralised around buildings B10, B11 and B12, but with additional roosting space also used in B19. Given the varying climatic conditions experienced across June and July 2023 (with June being the hottest June on record), it is not surprising that the maternity roosts have moved around buildings and the campus to adapt to varying temperatures. Further details of the surveys undertaken and roosts identified in buildings B10, B11, B12, B19 and B25 can be found in the Bat Survey Report included in Appendix 8-B.

Table 8-2 Summary of bat roosts recorded

Building	No. total bats recorded (visits 1, 2 and 3)	Confirmed roost features	Location and aspect of confirmed roost features	Bat roosts	Conservation significance
B10 (Owens Park)	21 common pipistrelle	7 roost features	Soffit box south-west corner; South and west sides; South west side (courtyard) from roof near the skylight; Behind drainage from loose chalking; Centre east side;	Common pipistrelle day roosts (considered linked/ potential satellite roost to the B11 maternity roost)	Moderate conservation significance
B10 (Owens Park)	2 soprano pipistrelle		South-east side from fascia board; North end of building at south-east side from fascia board (soprano and common pipistrelle)	Soprano pipistrelle day roost	Low conservation significance
B11 (Owens Hall)	33 common pipistrelle	7 roost features	Fascia board – North; South end of west side; East end of south side; Centre of south side; Internal courtyard on north west side from fascia board	Common pipistrelle maternity roost	High conservation significance
B12 (Owens Hall)	21 common pipistrelle	4 roost features	Southwest corner fascia around balcony; East and north side; North side below the guttering; North of the building facing south	Common pipistrelle day roosts (considered linked/ potential satellite roost to the B11 maternity roost)	Moderate conservation significance
B19 (Oak House)	20 common pipistrelle (visit 3 and 4)	1 roost feature	Top left window of the security light, south east corner of building	Common pipistrelle day roosts (considered linked/ potential satellite roost to the B11 maternity roost)	Moderate conservation significance
B25 (Woolton Hall)	1 common pipistrelle (visit 2)	1 roost feature	South side of building into ornate vent	Common pipistrelle transitional/ occasional day roost	Low conservation significance

- 8.4.25

The locations of the buildings with confirmed bat roosts and the photographs of the features for buildings B10, B11, B12, B19 and B25 are shown in Appendix 8-B.
- 8.4.26

The roosts have been identified as not having the potential to support hibernating bats due to the variation of temperature within the buildings, the lack of humid cold spaces (the buildings are mostly sealed student accommodation which cannot be humid for health and safety) and the structure of the roofing/lack of cellars or basements.
- 8.4.27

It is an offence to kill or injure bats, or to disturb, damage or destroy their roosts under the Conservation of Habitats and Species Regulations (2017) (as amended), as well as disturb bats whilst in their roosts and obstruct roosts under the Wildlife and Countryside Act (WCA) 1981 (as amended). Mitigation measures, under licence from Natural England, are recommended in this section so that the proposed new buildings are compliant with the relevant legislation and policy with respect to bats.

Breeding birds

- 8.4.28
- In the desk study, six species of principal importance (UK BAP) were identified within a 2 km search radius. These species are also under S41 of the NERC Act. One of these species, the bullfinch *Pyrrhula pyrhulla*, was incidentally recorded on site during the bat activity surveys.
- 8.4.29
- Birds are likely to utilise the buildings, hedgerows, broadleaved woodland and line of trees, and the site offers connectivity to the wider landscape providing foraging opportunities. Bird nests were not identified during the surveys however, it is likely that the site is utilised by nesting birds.
- 8.4.30
- Birds are protected under the WCA 1981, which makes it an offence to intentionally kill, injure or take any wild bird; intentionally take, damage or destroy the nest of any wild bird while that nest is in use or being built; and intentionally take or destroy the nest or eggs of any wild bird.

Hedgehog

- 8.4.31
- The desk study returned two records of the European hedgehog *Erinaceus europaeus* within the site boundary.
- 8.4.32
- The habitats onsite could provide opportunities for hedgehog, which are better adapted as a species to urban environments.

Protected/notable species unlikely to be present on site

- 8.4.33
- The species or groups listed in
- 8.4.34
- Table 8-3 are considered unlikely to be present within the site, either because further surveys have determined their likely absence, or due to the lack of suitable habitat or habitat connectivity.

Table 8-3 Protected species considered unlikely to be present within the site

Species	Reason for likely absence
Hazel dormouse	There are suitable habitats for dormouse within the site, woodland and hedgerows, however no records of dormice were identified within 2km of the site during the desk study. Additionally, the site is isolated by physical barriers such as walls and there are limited suitable habitats for dormice within the wider landscape.
Badger	No evidence of badgers was found during the survey, and the majority of the site is unsuitable for sett building habitat with the exposed amenity grassland. The woodland surrounding the periphery of the site could provide some habitat, but no signs of pathways, latrines or setts were recorded during the survey.
Great crested newts and other amphibians	The off-site pond that lies within Ashburne Hall area of the wider Fallowfield campus outside of the redline 65m to the north of the site boundary was assessed for its potential to support great crested newts or other amphibians. Two waterbodies were identified within 1km of the site, 470 west and 495 north of the site, and these are considered to be separated by major roads and extensive hardstanding. The pond was assessed as being of ‘below average’ suitability through the Habitat Suitability Index (HSI). The suitability of the surrounding habitat for great crested newts is considered to be poor due to the open amenity grassland that is regularly maintained. The off-site areas of woodland and scrub to the north-east may offer some shelter but this is isolated from the wider landscape by A and B roads to the west and south respectively, streets to the north and east, and hardstanding that form a partial barrier to dispersal. An eDNA test was undertaken of the waterbody on the 7th June 2023 to identify whether it supported great crested newts. The results were negative indicating that great crested newts were not present in the pond at the time of the survey and so it is unlikely to be used by a breeding population. Due to the habitats surrounding the pond and the physical barriers, it is unlikely that the pond is used by any species of amphibians.
Reptiles	The extensive areas of amenity grassland do not offer suitable habitat for reptiles. The scrub and woodland could provide some habitat, but it is isolated from the wider landscape by A and B roads to the west and south respectively, streets to the north and east, and hardstanding that may add as a barrier to movement.

Species	Reason for likely absence
Protected plants	The site presents suitable habitats to support protected plants. However, no protected plant species were identified within 2km of the site during the desk study and no protected plants were recorded during the field survey.
Protected invertebrates	No protected invertebrates were identified within 2km of the site during the desk study. In addition, the woodland had a low amount of deadwood that would provide opportunities for saproxylic species.

Biodiversity net gain

- 8.4.35
- In accordance with national and local planning policies, a biodiversity net gain assessment of the existing habitats on site has been undertaken to identify the baseline habitat units against which a future target of at least 10% net gain would need to be obtained. The pre-development biodiversity unit value has been assessed as 27.57 units.
- 8.4.36
- Full details of the biodiversity net gain baseline calculations and assessment can be found in Appendix 8-C.

Future baseline (Phase A 2027 and Phases B & C 2030)

- 8.4.37
- The future baseline accounts for how the baseline conditions would change in absence of the proposed development. The proposed development can be broken down into three phases; Phase A (expected completion in 2027 and Phases B and C (expected completion in 2030). If the proposed development did not proceed it is expected that the buildings would remain on site and would continue to be used in their current capacity. In this case, the buildings would be maintained and continue to offer little additional opportunity as wildlife habitat above the identified bat roosts. It is considered that with the buildings in continued use, the landscaping on site would also continue to be managed in a similar way, with woodland and standard trees maintained and grassland, hedges and planting managed for amenity value.
- 8.4.38
- If the works do not proceed before May 2025, an updated PEA should be undertaken, including a re-assessment of the buildings and trees for their potential to support roosting bats and repeated bat activity surveys of the roosts.

Identified Receptors and their importance

Designated sites

- 8.4.39
- One non-statutory designated site was identified 154 m to the south of the site, the Fallowfield Loop, a disused railway cutting which is designated as a RIGS. This site is not considered likely to be affected by the proposed development due to the distance from the site and the presence of significant urban barriers such as major roads and built development between the site and the RIGS. Furthermore, as the site is designated for its geological interest, rather than biodiversity value, it is beyond the scope of this assessment and not further considered in this report.

Habitats

- 8.4.40
- Most of the terrestrial habitats present on site are not considered to be of formal conservation importance (i.e. HPIs, BAP habitats or otherwise listed). In general, they are common and widespread habitats that are limited in occurrence across the site and so are considered to be of ecological importance at the Site level.

8.4.41 A parcel of HPI comprised of deciduous woodland was identified to the south-east of the site within the red line boundary and other several parcels of HPIs were identified within 2km of the site. These include pockets of broadleaved and deciduous woodland, traditional orchards, wood pasture and parkland and open mosaic habitat on previously developed land. The identified HPI on site, several parcels of priority woodland habitat alongside the boundary and bordering the site and taking into consideration the fragmented urban location of the woodland, the site is considered of Local importance.

8.4.42 The site is also considered of Local importance for other habitats including native hedgerows, line of trees and scattered broadleaved trees. The native hedgerows consist predominantly of at least one native woody species which are considered to meet the requirements for priority habitat classification and therefore are considered of Local importance. The line of trees on site contains a variety of species and age allowing them to be considered of Local importance. Similarly, the scattered broadleaved trees provide a network of trees utilised by commuting and foraging bats as well as nesting birds and are therefore also considered of Local importance.

Invasive non-native species

8.4.43 The extended habitat survey identified two invasive non-native species, Japanese knotweed and Montbretia, in the same areas of the site, . These plant species, were located to the east of building B21 and in the introduced shrub borders, respectively.

8.4.44 Japanese knotweed and Montbretia are species listed on Schedule 9 of the Wildlife and Countryside Act (1981), as amended, making it an offence to allow them to spread in the wild. Removal of this vegetation without implementing the correct methods and bio-security protocols could result in the unlawful spread of the species in the wild and impact on local biodiversity. Therefore, the presence of the invasive non-native species on site is considered to be of Local importance.

Protected, priority and notable species

8.4.45 The bat activity surveys identified six roosts within the site, four of these roosts are of low conservation importance and the other roost of high conservation value. The conservation value for the sixth roost (at B19) is TBC. Four of the roosts were identified in Owens Park, including the soprano pipistrelle day roost of low conservation value and common pipistrelle maternity roost of high conservation value, one at Woolton Hall and one at Oak House. Several roost features such as soffit boxes, were identified to provide roosting space for both common and soprano pipistrelles. Both of these pipistrelle species are of conservation importance in Greater Manchester. In addition, the site comprised habitats that are known to support foraging and commuting bats within the site and surrounding habitats. The site is therefore considered to be of County value for roosting bats and local value commuting and foraging bats. A summary of the bat roosts recorded are presented in

8.4.46 Table 8-2.

8.4.47 All bat species are considered to be of conservation importance in Greater Manchester. Due to the presence of confirmed maternity bat roosts on site of a priority species listed in the Manchester Biodiversity Strategy (MCC, 2022), the site is considered to be of County level value with regards to roosting bats. The surveys also identified consisting foraging and commuting across the site by bats throughout the surveys, associated with the woodland edge and mature trees on site and its connectivity to wider green spaces. The site is therefore also considered to have Local significance for commuting and foraging bats.

8.4.48 All nesting birds are protected under the WCA 1981 as amended. The woodland and mature scattered trees on site offer suitable nesting and foraging opportunities for widely distributed urban adapted species. Additionally, presence of a Section 41 and BAP bird species has previously been recorded on the site. Therefore, breeding birds are considered to be of value at a Local level.

8.4.49 Due to the historic presence of hedgehogs on the site, the semi-natural habitats on site and the presence of physical barriers surrounding large sections of the site in the form of walls and fences, the site is considered to be of Site level value for hedgehogs.

8.4.50 The site is considered to be of site or negligible value for other protected, priority and notable faunal species and so they are not considered further in this assessment.

8.4.51 A list of the features scoped into the assessment and the level of importance attributed to each is provided in

8.4.52 Table 8-4. Those with negligible or site level importance or which have been identified as unlikely to be significantly impacted by the proposed development (i.e. there is no clear pathway of effect), as described previously, are excluded from further assessment (CIEEM, 2018).

Table 8-4 Identified receptors and their importance

Receptor	Importance	Justification
Habitats		
Broadleaved woodland	Local	A parcel to the south-east on site is considered to meet the criteria of mixed deciduous woodland and hence is a Habitat of Principle Importance (HPI) listed in Section 41 of the NERC Act. There are several blocks of this priority woodland habitat across the site alongside the boundaries and surrounding the site to the north and directly adjacent to the east, although this woodland is considered to be isolated due to the urban nature of the habitats surrounding the site. Hence, the site is of Local importance.
Hedgerow (native)	Local	There are a number of native species-poor hedgerows, all of single to two species composition (beech and/or hornbeam <i>Carpinus betulus</i>). All hedgerows consisting predominantly (i.e. 80% or more cover) of at least one woody UK native species, such as beech, are considered to meet the requirements for priority habitat, therefore, they are of Local importance. All hedgerows on site will be removed as part of the proposed development.
Line of trees	Local	There is a row of planted hornbeam, <i>Prunus</i> sp., and <i>Salix</i> sp. in front of the wall to the north of the site, adjacent to the northern boundary. Additionally, there is a mature tree line of mature common lime <i>Tilia x europaea</i> located along fence line between Owens Park and Ashburne Hall, and a line of whitebeam <i>Sorbus aria</i> running along a brick wall to the east near Tree Court. The variety of species, age and number of trees across the site mean they are considered to be of Local importance.
Broadleaved scattered trees	Local	Throughout the site are a network of mature broadleaved scattered trees which are utilised by commuting and foraging bats as well as breeding birds and mist likely other wildlife, and are therefore considered to be of Local importance.
Invasive non-native species	Local	Two invasive non-native species listed in Schedule 9 of the WCA (as amended), Japanese knotweed and Montbretia, were recorded on site. Removal of these plant should be carried out by specialists to avoid their spread across the site. The site is considered to be of Site importance.
Species		
Bats	County (maternity roost) Local (other bat roosts)	Two bat species have been identified to roost on the site within buildings B10, B11, B12, B19 and B25. All buildings are to be demolished as part of the proposed development. The roosts include what is considered to be a maternity colony of common pipistrelle bats that utilise several roosting spaces across the campus, as well as day roosting spaces for individual or low numbers of common and soprano pipistrelle bats.

Receptor	Importance	Justification
		All bat species are considered of importance for conservation in Greater Manchester. Combined with the habitats present on site and blocks of woodland located in close proximity to the north and directly adjacent to the east of the site, the bats on site be vulnerable to the effects of the proposed development through destruction and disturbance of roosts as well as indirect effects such as light and noise pollution. The site is considered to be of County importance for the maternity roost, and of Local importance for the other day roosts recorded on site.
	Local (commuting and foraging)	Due to the site and surrounding area comprising habitats that are known to support foraging and commuting bats such as networks of trees, hedgerows, and woodland areas, the site is considered of Local value to commuting and foraging bats.
Breeding birds	Local	The site offers suitable habitat for foraging and breeding birds through the woodland and extensive mature scattered trees. It is likely that there are breeding birds on site and the presence of a Section 41 and BAP bird species has previously been recorded on the site. Therefore, the site is considered to be of Local importance for breeding birds.

8.5 DEMOLITION AND CONSTRUCTION EFFECTS

Relevant aspects of the scheme

- 8.5.1 A description of the proposed development is provided in ES Chapter 2 Development Description. It is anticipated that the following demolition and construction activities are relevant to ecological considerations:
- Clearance of the site prior to the construction works including demolition of the existing buildings and redundant services as well as vegetation clearance;
 - Ground works for installation of services and infrastructure;
 - Construction of new buildings, hardstanding and associated infrastructure;
 - Tree planting and landscaping within the proposed development; and
 - Disturbance - construction lighting and plant/vehicle noise, vibration, movement and general activity.

Potential effects of the development and their significance

Broadleaved woodland

- 8.5.2 Several parcels of broadleaved woodland are identified as Habitats of Principal Importance and an area of 0.8ha of this habitat was recorded on site. There will be no direct loss to the broadleaved woodland on site as the woodland areas on the perimeter of the site are retained and protected within a development exclusion zone within the Parameter Plans. This habitat will be retained during the vegetation clearance, demolition, and construction activities to facilitate the development of the site. Trees bordering the woodland and if any outside the woodland are to be retained should be protected and an offset buffer applied to ensure that trees, including their root protection areas, are not affected by the proposed development.
- 8.5.3 Potential for impacts to retained areas from demolition and construction activities such as dust, noise/ vibration, impacts to RPAs from vehicle movements and storage, material storage etc. Changes in noise, dust and additional lighting during the construction phase of the proposed development may result in indirect impacts to the woodland. In accordance with construction best practice, the Construction Environmental Management Plan (CEMP) will detail measures to limit associated adverse impacts and to avoid effecting the adjacent and surrounding woodland.
- 8.5.4 in the absence of mitigation, could produce minor adverse effects to the broadleaved woodland during the demolition and construction phases of the proposed development due to dust and airborne pollutants.

- 8.5.5 Therefore, without mitigation there would be a minor temporary adverse effect which would be significant at a Local level.

Hedgerows, line of trees and scattered broadleaved trees

- 8.5.6 According to the Parameter Plans, all hedgerows, the line of trees north of the site and the broadleaved trees scattered throughout the site will not formerly be protected and therefore may consequently lead to significant loss of habitats on site, impacting the ability of achieving a net gain in biodiversity, habitat connectivity throughout the site and likely impacting bat and bird species that rely on these habitats for commuting, foraging and nesting purposes.
- 8.5.7 These habitats within the parameter plans that could potentially be retained still have the potential to be impacted by indirect effects in the absence of mitigation, such as damage to root systems, vehicle activity, earth moving, dust and airborne pollutants.

Invasive non-native species

- 8.5.8 Japanese knotweed and Montbretia are present on site in the introduced shrub close to building B21. The uncontrolled removal, or incidental interaction of people, machinery, vehicles or materials, with these invasive non-native plants during construction could cause the spread of this species onto the site, including the retained woodland, damaging native flora on site.
- 8.5.9 There is the potential, without sufficient biosecurity measures, that incidental spread of Japanese knotweed, which can grow from small fragments of the plant, could be spread further outside of the site boundary through vehicular and people movements if the plant is caught within tyre or boot treads and/or the plant material is not disposed of appropriately.
- 8.5.10 Therefore without suitable measures in place on site, it is considered that uncontrolled demolition and construction work in the vicinity of the Japanese knotweed stands on site could have a permanent minor adverse effect, significant at the Local level.

Bats

- 8.5.11 Six bat roosts were identified in buildings B10 (two roosts), B11, B12, B19 and B25 on the site. All existing buildings are to be demolished as part of the proposed development,
- 8.5.12 The potential effects on bats which require assessment are:
 - Destruction of roosts due to demolition works;
 - Mortality or injury to bats during demolition works;
 - Disturbance from noise or light pollution;
 - Loss of commuting and foraging habitat on site; and
 - Effects from air-borne dust create from vehicle movements, ground-breaking or demolition of buildings.

Permanent or temporary loss of roost

- 8.5.13 At the current stage of development design, it is intended to demolish all existing buildings, including those identified as having bat roosts. There is a risk that as the design progresses to reserved matters, permanent roosts are not delivered or there is a delay in their provision due to construction delays.

- 8.5.14 Without appropriate mitigation, including suitable working methods and a licence from Natural England, the proposed development may result in bats being unlawfully injured or killed as part of the demolition works and the unlawful destruction of roosts without replacement interventions, resulting in a permanent impact to a maternity colony on site.
- 8.5.15 The roosts were identified to be used by common and soprano pipistrelles. Common pipistrelle were recorded occupying a maternity roost, day roost and transitional roosts, and soprano pipistrelle were recorded using a day roost on an occasional basis. The historical data confirmed the presence of maternity roosts in buildings B10, B11 and B12, and considering the high number of bats recorded in the surveys carried out this year, it suggests that it is likely the maternity colony is also using buildings B10, B12 and B19 as part of a maternity roost network. All the roosts were considered to not offer suitable roosting space for hibernation roosts. Therefore, under the criteria set out in the Bat Mitigation Guidelines (Mitchell-Jones, 2004), the maternity roost is considered to be of high conservation significance and the other roosts are considered to be of low conservation significance. In absence of mitigation, the loss of the maternity roost is considered to have a permanent moderate adverse effect at the County level, and the other roosts at a Local level.

Loss of habitat

- 8.5.16 Due to the unknown extent of tree and habitat removal identified within the Parameter Plans, as a precautionary principle it is assumed that all existing habitats on site, including trees, excluding the woodland areas will be removed.
- 8.5.17 The loss of hedgerows and trees will significantly reduce habitat connectivity and permeability through the site impacting commuting and foraging bats. Bats are particularly sensitive to the composition and structure of urban developments and establishing and protecting tree networks throughout development will help improve their resilience to the developmental changes on site (Hale et al., 2012). Removal of the tree networks will most likely have a detrimental effect to the bat populations utilising this site for foraging and commuting purposes. Currently it is unknown what these habitats will be replaced with if lost and therefore it is considered that this loss of substantial habitat will have a permanent moderate adverse effect on commuting and foraging bats.

Disturbance

- 8.5.18 During site clearance, demolition of buildings, excavation and construction activities there is potential for creation of noise and additional lighting which could disturb bats that roost in retained buildings on site during that phase of works, the mitigation roosts on trees within and along the edge of the woodland or near to the site or use the site to commute to adjacent suitable habitat. Without additional mitigation, there would be a temporary minor adverse effect at the local level.

Pollution

- 8.5.19 Vehicle movements, ground-breaking and the demolition of buildings could produce air-borne dust which could degrade nearby habitat suitable for foraging bats with the risk that foraging would be reduced and the suitability of the local environment for roosting bats on or near to the site reduced. Without additional mitigation, there would be a temporary minor adverse effect at the local level.

Breeding birds

Loss of habitat

- 8.5.20 The demolition and construction of the proposed development will remove suitable habitat on site for nesting birds such as hedgerows and trees. Additionally, vegetation removal during the nesting bird season, March – August, inclusive, could result in the destruction of active nests and the loss of eggs or chicks if mitigation measures and sensitive working practices are not applied. . This will result in a minor permanent adverse effect.

Disturbance

- 8.5.21 During site clearance, excavation, demolition and construction there is potential for the creation of noise and vibration that could disturb birds nesting on, and close to the site. Site clearance and construction activities are likely to result in increased noise over a number of years. Noise levels can affect the ability of birds to hold territories and successfully breed. Whilst noise impacts will be temporary, they could affect the breeding in the medium term for a number of years for birds with shorter cycles. This will result in a minor temporary adverse effect.

Climate change and adaptation

- 8.5.22 The main predicted impacts of climate change in England, based on the 2018 UK Climate Projections (UKCP18), are increases in summer and winter temperatures, with an associated increase in extended summer dry spells, a reduction in winter frost days, wetter winters and drier summers with an increase in extreme precipitation events.
- 8.5.23 Increases in extreme precipitation events during the demolition and construction phase could increase the potential for pollution events occurring while drier summers could increase levels of dust generated. Both could increase the severity, occurrence or duration of adverse effects on the local habitats.

Summary of effects

- 8.5.24 The potential effects identified during the demolition and construction phase are summarised in 8-5.

Table 8-5 Summary of effects during demolition and construction

Receptor	Importance	Description of effect	Effect significance
Broadleaved woodland	Local	Damage and disturbance from noise/vibration, light, dust and run-off during construction and demolition	Temporary minor adverse effect, significant at the local level
		Indirect effects in the absence of mitigation, include damage to root systems, vehicle activity, earth moving, dust and airborne pollutants.	Temporary moderate or minor adverse effect
Line of trees	Local	Removal of trees and hedgerows leads to significant habitat loss and reduced connectivity throughout site utilised by notable species such as commuting and foraging bats and nesting birds.	Permanent moderate adverse effect which is significant at local level
Broadleaved scattered trees			
Hedgerows (native)			
Invasive non-native species	Local	Uncontrolled removal leading to the spread of species	Permanent minor adverse effect which is significant at Local level
Bats	County (maternity roost)	Potential permanent or temporary loss of four roosts in buildings B10, B11, B12 and B25	Permanent moderate adverse effect, significant at the County
	Local (other bat roosts)	Indirect impacts from noise/vibration, light, dust and run-off during demolition and construction.	Temporary minor adverse effect, which is not significant

Receptor	Importance	Description of effect	Effect significance
	Local (commuting and foraging)	Loss of habitat connectivity and permeability through site and loss of foraging resources.	Permanent moderate adverse effect which is significant at local level
Birds	Local	Loss of habitat for nesting and foraging	Permanent minor adverse effect, significant at the local level
		Disturbance from noise/vibration to nesting birds	Temporary minor adverse effect, significant at the local level

Intermediate year construction effects

- 8.5.25 Construction is planned to take place between Q1 2025 and Q3 2027 for Phase A (Owens Park) and Q1 2027 and Q3 2030 for Phases B & C (Oak House & Woolton Hall), with the site being constructed and occupied in phases as detailed in ES Chapter 2 Development Description. For the purposes of considering intermediate year construction effects, it is considered that each phase of construction will be completed before the next phase is commenced as outlined in the construction programme in ES Chapter 2.
- 8.5.26 After installation and through demolition and construction, works could lead to the disturbance of the tree-placed mitigation bat roosts along the woodland edge. These mitigation bat roosts created in the early phases need to be protected from future demolition and construction impacts that follow.
- 8.5.27 Each phase of the proposed development is likely to contain some extent of soft landscaping and habitat provision as the buildings are completed. Landscaping features created at an early stage need to be protected with mitigation in lace to ensure they are not impacted by future demolition and construction works.

Supplementary mitigation measures

- 8.5.28 The following section sets out the proposed mitigation for the likely significant adverse effects identified in the previous sections as well as those measures which will be employed to further reduce non-significant (minor) adverse effects and ensure that relevant statutory requirements are met.

Loss of habitat

- 8.5.29 It’s unknown the extent to which the semi-natural habitats on site will be retained, enhanced replaced or permanently removed outside of the broadleaved woodland. The most valuable habitat including the woodland on site will be retained and protected through methods identified within an Arboriculture Method Statement which should be secured as a planning condition for the proposed development and future reserved matters phases. However, without a detailed technical plan and landscape plan, the loss of habitat is not yet mitigated for.

Damage to habitats from pollution

- 8.5.30 A Demolition Environmental Management Plan (DEMP) and CEMP will be produced for the proposed development which will detail how airborne dust, run-off, and demolition and construction materials will be managed during the demolition and construction activities. Controls will follow national standards and best practice to ensure that these risks are minimised and that they do not affect the retained woodland HPIs or adjacent habitats or species associated with the habitats beyond the site boundary.
- 8.5.31 Dust attenuation and suppression measures will be agreed and detailed in the CEMP which will avoid impacts on designated sites, along with habitats which support species of conservation value on site (where retained) and off-site.

- 8.5.32 The CEMP will also detail how waste materials from the demolition, ground works and construction activities, including the storage of building materials, will be managed to avoid damaging or contaminating retained and adjacent habitats.

Invasive non-native species

- 8.5.33 Prior to demolition or construction activities commencing on site, the extent of Japanese knotweed and Monbretia should be reviewed by a specialist contractor to ensure that the species does not occur elsewhere across the site. The areas should be clearly demarcated and all personnel working on site made aware of the presence of the invasive non-native species and the treatment of the exclusion zones throughout the demolition and construction periods.
- 8.5.34 A review should be made of the existing treatment programme on site that is currently being undertaken to managed the Japanese knotweed, alongside the proposed demolition and construction methods of work. Where demolition and/or construction works make require access within or through the existing stand of Japanese knotweed, the treatment measures may need to be revised to full excavation of the plant to ensure that the risk of contamination of machinery, plant or personnel is removed. Details of the timings and extent of excavation would need to be sought from an invasive non-native species specialist contractor, but is considered likely to be delivered by those already managing Japanese knotweed across the wider estate.
- 8.5.35 The proposed approach will be detailed and implemented through an invasive non-native species action plan. Control measures for ensuring that Japanese knotweed and Montbretia growing in the introduced shrub near building B21 are not spread to the site or elsewhere off-site through other demolition and construction works will also be included in the DEMP and CEMP for clarity across documentation.

Disturbance of fauna by noise/vibration and lighting

- 8.5.36 The CEMP will include provisions for minimising indirect impacts such as noise/vibration and construction lighting on the surrounding area and sensitive species such as those associated with the woodland, bats and breeding birds.
- 8.5.37 Chapter 11 Residual Effects and Conclusions lists all proposed mitigation measures for incorporation within the CEMP. This includes those related to the management of noise and vibration, such as the use of hoarding and restrictive working hours.
- 8.5.38 Lighting also has a risk of affecting sensitive fauna adjacent to the site such as foraging and commuting bats. The CEMP will detail how lighting will be managed during the demolition and construction phase to limit any potential effects.

Permanent or temporary loss of bat roosts

- 8.5.39 Any permanent or temporary loss of bat roosts on the site will be identified through detailed design of the relevant phase ahead of construction commencing on that phase. The roosts are located in buildings B10, B11 and B12 at Owen’s Park, B25 at Woolton Hall and B19 at Oak House. All buildings will be demolished which will result in the permanent loss of the roosts if not mitigated. Buildings at Owen’s Park are part of Phase A which means that they will be the first to be demolished. Since there will not be new buildings constructed where integrated bat roosts could be provided ahead of the loss, mitigation bat roosts, in the form of maternity and day roosting bat boxes, will be provided within the retained woodland in locations in proximity to where the roost buildings were situated. Boxes will be placed in a variety of aspects to mimic the existing variety of use of the building elevations currently.

- 8.5.40 Permanent integrated bat roosts will be constructed in the new buildings provided on site during each phase of construction. Integrated boxes to the buildings will be provided on a variety of aspects across multiple buildings to reproduce existing roosting choices exploited by the bats on site currently. The number, type and location of the bat boxes will be detailed in support of the Natural England licence application.
- 8.5.41 Once works in each phase are complete, the ‘interim’ mitigation bat roosts will be retained in their location on site to provide enhancement measures for roosting bats .
- 8.5.42 Bats and their roosts are legally protected and so any loss, obstruction or modification to the roosts will require a European Protected Species Mitigation Licence (EPSML) from Natural England. As part of the licence application process, impacts to the roosts will need to be defined and adequate mitigation for the loss of the roosts provided, where required. Working methods to ensure the roosts are empty before they are lost and/or obstructed by the construction works, and/or soft strip methods employed under the guidance of a licenced Ecological Clerk of Works will also need to be detailed to ensure that no bats are harmed or killed during the demolition works.
- 8.5.43 Additionally, internal inspection of the buildings with identified bat roosts are proposed to be carried out to determine where exactly the bats are roosting after they enter the buildings, if they are using the shallow roof voids, prior to submission of the licence application to Natural England. Building B11 has a window where bat swarming at the entrance of the roost prior to re-entering was recorded, which is adjoined to building B7 and is assumed to potentially share a roof void with building B8. Therefore, an internal inspection is being undertaken to confirm whether the buildings share internal space or access features such as a loft space. If B7 and B11 are connected internally, these will be considered as a single potential roosting space and mitigation approaches will be applied to B7 too.
- 8.5.44 Demolition works to the maternity roosts will be undertaken outside of the maternity season for bats, ideally targeting the shoulder months of late September-October, or in late March-April, when bats are less vulnerable if disturbed in a roost. Ahead of demolition commencing, mitigation roosts will be provided in the form of maternity and day roosting bat boxes on trees within the woodland in the vicinity of the current buildings used as roosts. These will be provided in a range of aspects to try to mimic the choice of roosting conditions the bats currently have and utilise across the buildings.
- 8.5.45 Following the provision of temporary mitigation bat roosts, an endoscope inspection, where feasible, of the roost access points (i.e. soffit boxes) should be carried out by a suitably qualified and licensed ecologist to determine whether or not bats are present. If the absence of bats is confirmed a roost exclusion, where possible should be undertaken, depending on the feature type. Additionally, a soft demolition approach will be undertaken on the identified feature with a Natural England licenced ecologist be on site during the soft demolition process to deliver toolbox talks prior to works starting, oversee the removal of the identified roosting features and to ensure that no bats are harmed or killed during the process. Any bats found during the works will be moved by the licensed ecologist to one of the mitigation roosts provided on trees nearby.

- 8.5.46 Prior to works commencing, a toolbox talk (Appendix 8-B) should be delivered to the site team that outlines the potential constraints posed by bats, and actions to be taken should a roosting bat be identified during the works. This may need to be amended once the EPSL mitigation measures have been agreed with Natural England. As the demolition works for Phases B and C (Oak House & Woolton Hall) are not due to commence on site until Q3 2027, updated bat surveys of the identified roosts and other features with the potential to support roosting bats at Woolton Hall and Oak House will be required. The survey update will assess whether any additional roosts have established on site in the interim time period and assess the use of the identified roosts on the site. These surveys would need to be undertaken between May and August preceding the proposed commencement of the demolition works on the site and in sufficient time to allow for the application for a European Protected Species Mitigation Licence to be applied for from Natural England ahead of demolition to B25 and B19 and other roosts if identified. A similar mitigation approach to that identified for B10, B11 and B12 will likely be adopted for B25 and B19, the details of which would be confirmed following updated bat surveys ahead of the Natural England licence application, but would as a minimum provide interim bat roost space in the form of bat boxes on trees within the woodland areas in proximity to the existing roost, sensitive working methods during demolition, and the incorporation of integrated bat roosting features into the new buildings.
- 8.5.47 To prevent disturbance to the new temporary and permanent built-in roosts during the demolition and construction works, the location of the bat roosts will be included within the CEMP to ensure that no plant or materials are stored in front of, or immediately below the roost entrances which might obscure the flight paths of the bats accessing the roosting features. Additionally, any night time construction or security lighting required on site will be positioned so as to not illuminate the features and allow for a flight route with lighting levels no higher than currently found on site.

Killing and injury of birds by the destruction of active nests

- 8.5.48 Breeding birds, their nests and young are protected under Schedule 1 of the Wildlife and Countryside Act 1981 as amended and any site clearance which takes place within the bird breeding season (i.e. between March and August inclusive), could kill or injure adults, chicks or damage eggs.
- 8.5.49 Any vegetation clearance required to facilitate the demolition or construction of the proposed development should be undertaken outside the bird nesting season (March – August, inclusive). This includes removal of trees, hedgerows, and areas associated with the woodland, if required. Where avoidance of the bird nesting season is not possible, a suitably experienced ecologist must carry out a nesting bird check no more than 48 hours prior to vegetation removal. If an active nest is found, this would need to be protected throughout the works, with a suitable buffer area of semi-natural habitat as defined by the ecologist, until the chicks have fledged and the nest is no longer in use.
- 8.5.50 Full details on the avoidance of the killing and injury of birds, and avoidance of active nest destruction, will be included in and agreed on in the CEMP prior to works commencing.
- 8.5.51 A summary of the recommended demolition and construction mitigation measures is provided in Table 8-6.

Table 8-6 Summary of demolition and construction supplementary mitigation measures for proposed development.

Ecological feature	Adverse effect	Mitigation measure	Responsibility / Mechanism for implementation	Timing
Broadleaved woodland	Damage to habitats from pollution	Airborne dust, siltation and pollution caused by run-off, spread of invasive weeds and management of demolition waste and construction materials will be controlled and managed in keeping with national guidelines following recommendations made in chapters 4 and 8 of this ES and in the CEMP, to avoid damage of retained habitats on site and to habitats beyond the site boundary	CEMP to be secured through planning condition and implemented by contractor	Prior to and during demolition and construction
Invasive non-native species	Spread of non-native invasive species	Control measures to prevent the spread of Japanese knotweed and Montbretia currently growing in the introduced shrub near building B21 will be reviewed by a specialist contractor, with measures for avoidance and further management requirements detailed in an invasive species management plan and mirrored within the DEMP and CEMP documents	Invasive species management plan, DEMP and CEMP to be secured through planning condition and implemented by contractor	Prior to and during demolition and construction
Fauna associated with the broadleaved woodland including foraging and commuting bats	Disturbance of fauna by noise/vibration and lighting	Noise and lighting will be managed in keeping with national and local guidelines, following recommendations made in Chapter 7 of this ES and in the CEMP, to avoid disturbance beyond the site boundary as much as possible	CEMP to be secured through planning condition and implemented by contractor	Prior to and during demolition and construction
Roosting bats	Permanent or temporary loss of bat roosts	As bat roosts are to be lost due to building demolition, a European Protected Species Mitigation Licence from Natural England which will include the provision of appropriate mitigation measures and working method statements to ensure no risk of injury or mortality to bats during demolition or construction works will be required ahead of demolition commencing on B10, B11, B12, B19 and B25. Update bat surveys to be conducted in the May-August ahead of demolition commencing on site for future phases of the proposed development.	Update bat surveys to be secured through planning condition. Natural England bat licence to be obtained by applicant and implemented by contractor.	Prior to and during site clearance and during construction/demolition
	Disturbance to interim or permanent built-in roosts to be incorporated at Owen's Park, Woolton Hall and Oak House	Measures to protect the temporary and permanent bat roosts will be detailed within the CEMP. This will include identifying the roost location and ensuring no plant or materials are stored in front or beneath the roost and lighting does not illuminate the roost entrances	CEMP to be secured through planning condition and implemented by contractor	Prior to and during site clearance and during construction/demolition
Breeding birds	Killing and injury of birds by the destruction of active nests	Avoidance of harm to birds, their nests and young to prevent an offence under legislation, will be ensured through following the recommendations outlined in this Chapter of the ES which will be detailed in the CEMP	CEMP to be secured through planning condition and implemented by contractor	Prior to and during demolition

8.6 OPERATIONAL EFFECTS

Relevant aspects of the scheme and designed-in mitigation

- 8.6.1 Upon completion, the proposed development will incorporate new buildings, associated hard and soft landscaping and improvements to the site. Operational aspects of the proposed development that have the potential to affect ecology include:
- Increased human activity level, noise levels and lighting.
- 8.6.2 Predicted operational phase impacts include degradation of habitats due to inappropriate management and disturbance to species from lighting, noise and movement. Proposed mitigation to address the predicted effects includes the implementation of an External Lighting Statement and Landscape and Ecological Management Plan (LEMP). Both documents can be secured by a planning condition.

Potential effects of the development and their significance

Increased human activity levels, noise levels and lighting

- 8.6.3 Impacts from noise, human disturbance and lighting have the potential to increase adverse indirect effects on habitats created on site and the retained woodland. Impacts are anticipated to largely be isolated to those habitats within the site boundary, as the area surrounding the proposed development has limited semi-natural habitats, which are considered likely to be at a sufficient distance to avoid indirect impacts from noise and lighting.
- 8.6.4 The site is located within an urban area with a certain level of existing disturbance within the vicinity. It is considered that species likely to utilise the site in the future are likely to be those that are typically urban adapted.
- 8.6.5 An External Lighting Strategy should be submitted at the future reserved matters planning stages which will illustrate the proposed external lighting plan with lux contours. Low level, directional lighting should be installed adjacent to the woodland area to minimise light spill on the trees within the woodland and maintain their value for light-sensitive species including birds and bats. Additionally, the external lighting should not create additional light spill which may affect the retained woodland on the site.
- 8.6.6 The effect significance for this noise and human disturbance is negligible and for lighting is minor adverse, long-term.

Climate change and adaptation

- 8.6.7 As previously discussed, the main predicted impacts of climate change in England, based on the 2018 UK Climate Projections (UKCP18), are warmer, drier summers and warmer, wetter, winters with an increase in extreme precipitation events.
- 8.6.8 Planting along roads and other infrastructure will buffer the effects of activity associated with these by, for example, helping to reduce urban heating effects, and will provide vegetated links across the site. Corridors of planting established through the site will also contribute to creating green corridors in the locality and aid the permeability of the urban landscape for wildlife species. Improving connectivity and increasing the permeability of urban areas for wildlife helps the adaptation of native species to climate change by providing linked migration pathways and reducing the amount of isolated habitat.
- 8.6.9 In combination, these will help buffer the effects of climate change on biodiversity, consequently increasing the resilience of species and habitats, and providing more places and habitats for urban wildlife to occupy as they adapt to future climatic conditions.

Summary of effects

8.6.10 The potential operational effects identified are summarised in Table 8-7.

Table 8-7 Summary of effects during operation

Receptor	Importance	Description of effect	Effect significance
Local fauna, including bats and generalist birds	Local	Impacts from noise and human disturbance	Negligible
		Impacts from lighting	Minor adverse, permanent, significant at the local level.

Supplementary mitigation measures

8.6.11 External lighting will be designed in detail as part of future reserved matters applications. These designs will seek to introduce sensitive lighting in proximity to existing broadleaved woodland dark wildlife corridor. The broadleaved woodland is likely to be utilised by several bat species. Therefore, lighting will be designed to minimise light spill onto the woodland and bat roost entrances with a limit of a 0.5 lux increase above existing levels intended.

Table 8-8 Summary of operational supplementary mitigation measures for proposed development

Ecological feature	Adverse effect	Mitigation measure	Responsibility / Mechanism for implementation	Timing
Local fauna including bats and generalist birds	Impacts from noise, human disturbance and lighting	A detailed lighting plan will be prepared for each phase to minimise impacts on adjacent habitats and corridors with benefit for local fauna. Lighting levels on the woodland will be kept below a 0.5lux increase from existing levels	Implementation of lighting plan in identified sensitive areas	During construction and operation

8.7 RESIDUAL EFFECTS AND CONCLUSIONS

8.7.1 The risk of effects to ecology from run-off, airborne dust, noise and lighting will be controlled through mitigation that will be detailed in the CEMP to manage these factors and ensure no detrimental effect to potential receptors. During clearance of the site there will be a loss of semi-natural vegetation and buildings which have the potential to support generalist breeding birds. Clearance of vegetation and buildings on site should follow the guidance outlined in the operational mitigation section to avoid an impact on legally protected breeding birds. The details of these requirements will be set out in the CEMP.

8.7.2 Potential impacts that may arise to the identified bat roosts on site will be dealt with under specific mitigation measures once the full impacts are identified with ongoing further design of the proposed development at the reserved matters stage. Permanent or temporary loss of the roosting sites will be mitigated in accordance with Natural England licensing requirements and working method statements for the closure of the roosts, with alternative roosting sites provided, where appropriate.

8.7.3 Adverse impacts remain due to the uncertainty regarding habitat retention, loss and creation as part of the proposed development, which can lead to the loss of habitat connectivity and permeability through site and loss of foraging resources for protected species recorded on site such as bats.

Table 8-9 Summary of residual effects during demolition and construction

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
Broadleaved woodland	Damage and disturbance from noise/vibration, light, dust and run-off during construction and demolition	Temporary minor adverse effect, which is not significant	Airborne dust, siltation and pollution caused by run-off, spread of invasive weeds and management of demolition waste and construction materials will be controlled and managed in keeping with national guidelines following recommendations made in chapters 4 and 8 of this ES and in the CEMP, to avoid damage of retained habitats on site and to habitats beyond the site boundary	Negligible
	Indirect effects in the absence of mitigation, include damage to root systems, vehicle activity, earth moving, dust and airborne pollutants.	Temporary moderate or minor adverse effect	Woodland on site will be retained and protected through methods identified within an Arboriculture Method Statement and a CEMP. Both should be secured as a planning condition for the proposed development and future reserved matters phases	Negligible
Hedgerow (native)	Removal of trees and hedgerows leads to significant habitat loss and reduced connectivity throughout site utilised by notable species such as commuting and foraging bats and nesting birds	Permanent moderate adverse effect which is significant at Local level	Currently it is unknown the extent of tree and habitat retention and the habitat replacement, therefore, existing habitat retention such as broadleaved scattered trees and habitat creation that provide connectivity across the site should be sought. However, as this is not determined yet, the residual effect remains adverse	Permanent, moderate adverse
Line of trees				
Broadleaved scattered trees				
Invasive non-native species	Uncontrolled removal leading to the spread of species	Permanent minor adverse effect which is significant at Local level	Control measures to prevent the spread of Japanese knotweed and Montbretia currently growing in the introduced shrub near building B21 will be reviewed by a specialist contractor, with measures for avoidance and further management requirements detailed in an invasive species management plan and mirrored within the included in the DEMP and CEMP documents	Negligible
Bats	Potential permanent or temporary loss of five roosts in buildings B10, B11, B12 and B25	Permanent moderate adverse effect, significant at the Local level	Update bat surveys to be conducted in the May-August ahead of demolition commencing on site.	Negligible

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
			Any bat roosts to be lost as a result of the proposed development will require a Mitigation Licence from Natural England which will include the provision of appropriate mitigation measures and working method statements to ensure no loss of roost or risk of injury or mortality to bats using the roosts during demolition or construction works	
	Indirect impacts from noise/vibration, light, dust and run-off during demolition and construction.	Temporary minor adverse effect, which is not significant	Noise and lighting will be managed in keeping with national and local guidelines, following recommendations made in Chapter 7 of this ES and in the CEMP, to avoid disturbance beyond the site boundary as much as possible	Negligible
	Loss of habitat connectivity and permeability through site and loss of foraging resources	Permanent moderate adverse effect which is significant at local level	Currently it is unknown the extent of tree and habitat retention and the habitat replacement, therefore, existing habitat retention such as broadleaved scattered trees and habitat creation that provide connectivity across the site should be sought. However, as this is not determined yet, the residual effect remains adverse.	Permanent, moderate adverse
Birds	Loss of habitat for nesting and foraging	Permanent minor adverse effect, which is not significant	Avoidance of harm to birds, their nests and young to prevent an offence under legislation, will be ensured through following the recommendations outlined in this Chapter of the ES which will be detailed in the CEMP	Negligible
	Disturbance from noise/ vibration to nesting birds	Temporary minor adverse effect, which is not significant	Noise and lighting will be managed in keeping with national and local guidelines, following recommendations made in Chapter 7 of this ES and in the CEMP, to avoid disturbance beyond the site boundary as much as possible	Negligible

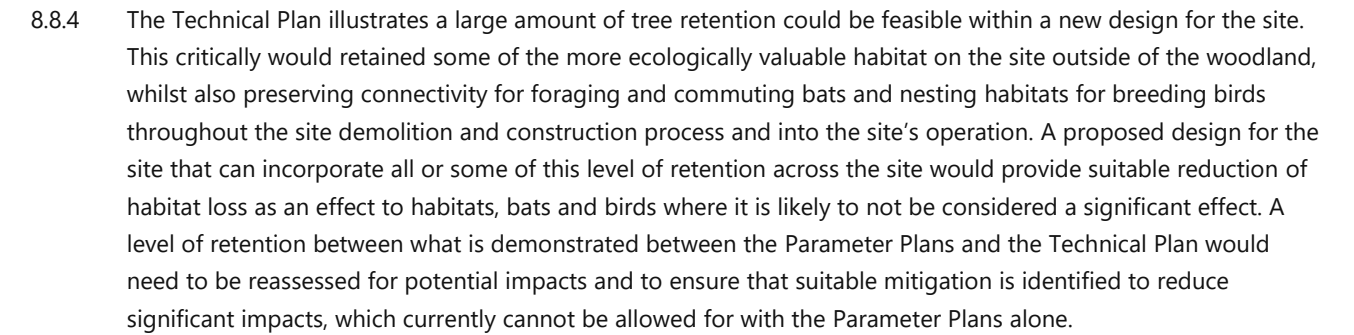
Table 8-10 Summary of residual effects during operation

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
	Impacts from noise and human disturbance	Negligible	N/A	Negligible

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
Local fauna, including bats and generalist birds	Impacts from lighting	Moderate adverse, long-term	A detailed lighting plan will be prepared for each phase to minimise impacts on adjacent habitats and corridors with benefit for local fauna. Lighting levels on the woodland will be kept below a 0.5 lux increase from existing levels	Negligible

8.8 Technical Plan Example

- 8.8.1 Whilst the Parameter Plans has been assessed for potential impacts to ecological receptors on the site, the limited information relating to the post-development design has lead to residual impacts relating to habitat loss on the site as the worst-case scenario presented by the Parameter Plans had to be assessed (ie all habitats lost except for the retained woodland on the perimeter of the site). However, it is considered unlikely that the proposed development would actually seek to remove all habitats across the site due to the ecological and landscape value provided by the mature tree network that is currently established within the site. In addition, it is generally thought to be significantly easier to rebuild in areas of existing built footprints as the areas of the site are already levelled and have utility connectivity in generally the correct places, rather than having to establish new connections in new part of the site.
- 8.8.2 What may be possible to achieve on the site in a sensitive approach to the existing site conditions has been explored in the Technical Plan, and this is appraised as such within the Biodiversity Net Gain Report in Appendix 8-C.
- 8.8.3 The Technical Plan (Figure 8-2) illustrates an example of a potential post-development plan, which comprises retained, enhanced and created habitats of biodiversity value, whilst delivering the target 35% building footprint within the site. The potential habitats that could be incorporated into the post-development design, as illustrated in the Technical Plan landscape proposals, include:
 - Woodland understorey;
 - Biodiverse green roofs;
 - Green roofs (i.e. wildflower) to be installed under PVs;
 - Nectar rich shrubs;
 - Hedgerows;
 - Mown lawn;
 - Biodiverse grassland sward;
 - Individual trees; and
 - Two ponds.



8.8.6 Incorporating a balanced approach of minimising loss to development and construction footprint, and applying the Mitigation Hierarchy, whilst also creating new habitats on site within a post development design similar to those presented within the Technical Plan will support a more ecologically appropriate approach to the proposed development than the Parameter Plans currently suggests. New habitats such as biodiverse green roofs have the potential to add m2 of habitat onto the site as well as providing a new and more biodiverse habitat than currently exists in an otherwise urban and amenity dominated landscape.

8.9.1 It is recommended that the council requests a condition for a detailed Ecological Mitigation and Management Plan as part of each reserved matters phase that demonstrates habitat retention, creation and mitigation procedures to avoid or reduce adverse impacts identified within this impact assessment.

- Identifying areas of retention of connected and continuous lines of existing mature trees across the site to maintain bat commuting and foraging corridors. During the bat surveys, areas of the site including the woodland, were recorded to be used as commuting corridors by multiple pipistrelle bats to access nearby greenspaces such as Platt Fields Park and Firs Botanical Gardens.
- The proposed location, number, and type of interim bat boxes to support the loss of bat roosts within buildings during the demolition and construction phase. Where trees are retained within the site, the consideration of further non-maternity summer roosting boxes will also be accounted for on retained commuting routes.
- The proposed location, number and type of integrated bat boxes on the proposed buildings.
- Retain existing habitat areas outside of the mature tree lines and consider them for enhancement potential.
- Identify a long-term initiative to remove all invasive non-native species from the site. Whilst it is understood the university currently have a programme in place for Japanese knotweed, the redevelopment of the site poses an opportunity to remove other species, such as Monbretia.

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- Incorporation of a range of soft landscaping across the site area including the provision of more trees than lost, and green roofs, where use of native species and those considered of value to wildlife is encouraged.
- Provision of high ecological value biodiverse green roofs close to the woodland areas to increase connectivity across the site.

8.9.3 In addition to the specific recommendations for re-landscaping of the site and ecological enhancement, a number of recommendations have been identified to further enhance the site's ecological value in line with planning policies and BAP guidance, to achieve a net gain for biodiversity. These are:

- Incorporate bird, bat and invertebrate boxes in suitable locations across the site such as facing green infrastructure, away from light spill and near to green roofs. Box types should target Manchester BAP species including swift *Apus apus*, a flagship species strongly associated with the built environment which nest colonially and house sparrows *Passer domesticus*, which also are typically urban adapted. The proposed development should include a variety of north and east facing elevations that are considered to be suitable to support new nesting features for bird species that may be attracted to the new habitats and nesting opportunities on the site.;
- Incorporate the use of native species and those of benefit to biodiversity (i.e. flowering/fruitlet species) within landscaping;
- Plant a variety of native species within the site such that there will be a large positive increase in the number and diversity of species in comparison to the existing baseline condition;
- Incorporate features and select planting species to create additional opportunities for invertebrates (including pollinators) in order to provide nesting habitat, cover and foraging; and
- Apply sustainable horticultural practices to increase the sustainability of the soft landscaping by:
 - no, or low, use of residual pesticides;
 - no use of peat-based products;
 - avoiding a design that is heavily reliant on irrigation;
 - utilise rainwater harvesting in the irrigation system;
 - design-in features to reduce water use and enable composting and integrated pest management;
 - source and use UK-produced plants to reduce risk of introduction of imported pests and diseases and to reduce the carbon footprint;
 - select plants that require less water and chemical inputs and are suited to the local conditions; and
 - widen the diversity of species planted to increase resilience to climate change and new pest/disease outbreaks.

8.9.4 It is also recommended that the council requests a Landscape and Ecology Management Plan (LEMP) to ensure the appropriate management of habitats so that their intended biodiversity value is achieved and maintained in the long-term. The LEMP should also include proposals for monitoring, to allow the success of management to be assessed and to inform requirements for any changes in management practices.

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8.11 GLOSSARY

Term	Definition
BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CRoW Act	Countryside and Rights of Way Act 2000
DEFRA	Department for Environment, Food and Rural Affairs
DEMP	Demolition Environmental Management Plan
EPSML	European Protected Species Mitigation Licence
eDNA	Environmental DNA
ES	Environmental Statement

Term	Definition
GMCA	Greater Manchester Combined Authority
GMEU	Greater Manchester Ecological Unit
GMLRC	Greater Manchester Local Record Centre
HPI	Habitats of Principal Importance
ILP	Institute of Lighting Professionals
JNCC	Joint Nature Conservancy Committee
MAGIC	The Multi-Agency Geographical Information for the Countryside
MCC	Manchester City Council
NE	Natural England
NERC Act	Natural Environment and Rural Communities Act 2006
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
PEA	Preliminary Ecological Appraisal
PRA	Preliminary Roost Assessment
S41 NERC	Section 41 of the NERC Act which lists priority habitats and species for England
UKBAP	UK Biodiversity Action Plan
UKHab	UK Habitat Classification System survey
UKPC18	2018 UK Climate Projections
WCA	Wildlife & Countryside Act
ZoI	Zone of Influence

8.12 LIST OF APPENDICES (ES VOLUME III)

8.12.1 Supporting technical documents and data should be included as appendices

Reference	Title
8-A	Constraints and opportunities report (Buro Happold, 2023)
8-B	Bat survey report (Thomson Environmental, 2023)
8-C	Biodiversity Net Gain Assessment (Buro Happold, 2023)

9 GREENHOUSE GAS EMISSIONS

9.1 INTRODUCTION

- 9.1.1
- This chapter of the ES assesses the likely environmental effects of the proposed development with respect to greenhouse gas (GHG) emissions. This chapter also describes the methods used to assess the effects; the baseline conditions currently existing at the site and surrounding area; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been adopted.
- 9.1.2
- The GHG emissions ES chapter is accompanied by a summary of the assumptions and benchmarks that have been used when calculating the GHG emissions (Appendix 9-A, ES Volume III).

9.2 METHODOLOGY AND ASSESSMENT CRITERIA

EIA Scoping

- 9.2.1
- An EIA Scoping Report was submitted to Manchester City Council (MCC) on 6th June 2023. The EIA scoping opinion was received on 25th July 2023, and provided agreement with the proposed scope and methodology of this chapter.

Baseline study methodology

- 9.2.2
- The baseline consists of the GHG emissions associated with the current site use. The baseline GHG emissions have then been compared to GHG emissions associated with the proposed development. The operational lifespan of the proposed development is 60 years from completion in 2030. Therefore, when considering the baseline GHG emissions, it has been assumed that the current buildings and uses would continue to function as they currently do for this time period. This is in order to give a reasonable status quo scenario to assess the proposed development against.

Assessment approach

- 9.2.3
- There is currently no standard methodology for quantifying GHG emissions within the EIA process. The institute of Environmental Management and Assessment (IEMA) ‘*Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance*’, 2nd Edition (2022), instead advocates for flexibility and proportionality to suit the proposed development under assessment.
- 9.2.4
- For the purposes of the assessment, the proposed development has been split up into lifecycle stages, as per BS EN 15978 Sustainability of Construction Works - Assessment of Environmental Performance of Buildings - Calculation Method, as shown in Figure 9-1.

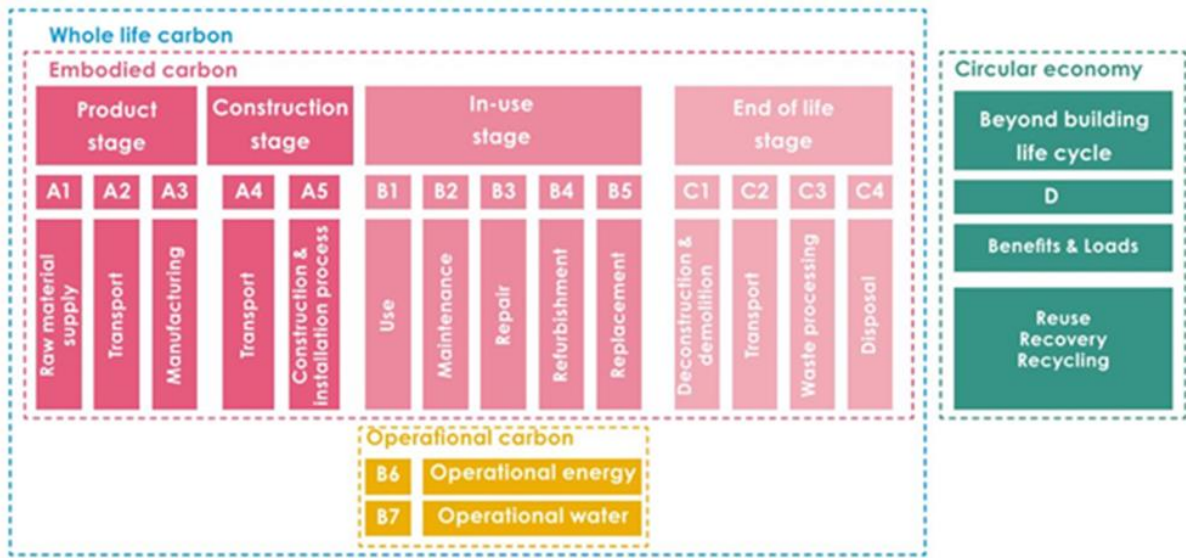


Figure 9-1 Diagram showing the stages of a lifecycle GHG emissions assessment. Diagram taken from the London Energy Transformation Initiative (LETI) (2020) Embodied Carbon Primer, based on lifecycle stages set out in BS EN 15978:2011 Sustainability of Construction Works – Assessment of Environmental Performance of Buildings – Calculation Method.

- 9.2.5
- Where emissions cannot be quantified due to lack of available benchmarks, a qualitative assessment on their likely contribution to significance has been made based on professional judgement.
- 9.2.6
- GHG emissions caused by an activity are often categorised into ‘scope 1’, ‘scope 2’ or ‘scope 3’, following the guidance of the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) Greenhouse Gas Protocol suite of guidance documents (WRI and WBCSD, 2014).
- 9.2.7
- The ES chapter does not refer to scope 1, 2 and 3 emissions throughout, instead referring to emissions by lifecycle stage. However, the following section provides an overview of which scope the assessed emissions fall within.
- 9.2.8
- Scope 1 emissions include direct emissions from owner or controlled sources. With respect to the proposed development, this may include:
 - Emissions from fleet vehicles e.g. heavy goods vehicles (HGV’s).
- 9.2.9
- Scope 2 emissions include indirect emissions from purchased energy. With respect to the proposed development this may include:
 - Electricity, steam, heat or cooling generated offsite, purchased and consumed by the proposed development.
- 9.2.10
- Scope 3 emissions include indirect value chain emissions, resulting from the activities of assets not controlled or owned by the proposed development occurring before or after they have control of an asset. With respect to the proposed development this may include:
 - Upstream emissions related to the purchase of required goods and services; and
 - Downstream emissions related to goods leaving the proposed development.

Construction

9.2.11 Based on the criteria set out in Figure 9-1, the assessment of the construction phase takes into account the following sources of GHG emissions;

- A1-A3 Product stage: GHG emissions associated with the material extraction, transportation and manufacturing of construction products. These fall within scope 3 emissions; and
- A4-A5 Construction process stage: GHG emissions associated with product delivery to site and the installation process. These mainly fall within scope 1 and scope 2 emissions.

Operation

9.2.12 Based on the criteria set out in Figure 9-1, the assessment of the operational stage takes into account the following sources of GHG emissions;

- B1-B5 In-use stage: This use stage captures GHG emissions associated with the operation of the built asset over its entire lifecycle, from practical completion to the end of its service life. These fall within scope 3 emissions;
- B6 Operational energy: GHG emissions associated with the estimated total operational energy. These fall within scope 2 emissions;
- B7 Operational water: GHG emissions associated with operational water consumption and foul water. These fall within scope 2 emissions; and
- C1-C4 End of Life Stage: GHG emissions associated with the demolition and disassembly of the proposed development, as well as the exploration of circular economy principles. These mainly fall within scope 1 emissions.

9.2.13 Additionally, this assessment considers operational transport emissions, which is not included in Figure 9-1. Operational transport emissions are considered due to the significant role these play in the UK's overall GHG emissions. Surface transport is the largest source of GHG emissions in the UK, accounting for 24% of 2019 emissions according to the Committee on Climate Change (2020). This falls within scope 1 and scope 2 emissions.

Sources of GHG emissions excluded from the assessment

9.2.14 The following sources of GHG emissions have been excluded from the scope of the assessment:

- Operational waste: The opportunities for design and construction decisions to significantly influence the reduction of GHG emissions associated with operational waste are low as it is highly dependent on occupant behaviour and waste processing at the city scale by the Local Authority. The emissions associated with operational waste are not considered to be material in quantity to influence the overall significance of effects, and are therefore scoped out;
- Carbon sequestration of green infrastructure: GHG emissions associated with carbon sequestration of proposed green infrastructure will be low relative to total GHG emissions over the whole life of the proposed development, therefore the offset benefits will not be quantified. The emissions associated with carbon sequestration of green infrastructure are not considered to be material in quantity to influence the overall significance of effects, and are therefore scoped out; and

- Beyond building lifecycle: GHG emissions associated with beyond building lifecycle stage cannot be guaranteed, for example material and component re-use, therefore potential benefits will not be quantified and taken as an offset. The emissions associated with the beyond building lifecycle are not considered to be material in quantity to influence the overall significance of effects, and are therefore scoped out.

Assessment of effects

9.2.15 The metric for assessing the climate change impacts of GHG emissions in this assessment is Global Warming Potential (GWP). This is expressed in units of CO₂ equivalent (CO₂e) over 100 years. This allows for the emissions of the seven key GHGs: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), nitrogen trifluoride (NF₃) and sulphur hexafluoride (SF₆) expressed in terms of their equivalent global warming potential in mass of CO₂e.

Construction

9.2.16 Sources of GHG emissions during the demolition and construction stage are as follows:

- GHG emissions associated with site clearance and waste removal;
- GHG emissions associated with the extraction and manufacturing of building materials (i.e., the product stage); and
- GHG emissions associated with the transport of materials to the site and construction and installation of products on site (i.e., the construction process stage).

Completed Development

9.2.17 Sources of GHG emissions during the operational stage are as follows:

- GHG emissions associated with maintenance, repair, replacement and refurbishment within the buildings (i.e., the embodied carbon);
- GHG emissions associated with the operational energy requirements for the day to day running of the building (i.e., heating, cooling, lighting etc.);
- GHG emissions associated with operational water consumption for the proposed development;
- GHG emissions associated with operational transport (i.e., deliveries, staff journeys and occupant journeys). Where appropriate transport figures are available for the proposed development; and
- GHG emissions associated with End-of-life demolition.

Determining effect significance

9.2.18 The assessment of the potential impacts and likely effects as a result of the proposed development has taken into account both the demolition/construction phase and the operational phase. In line with the IEMA (2022) guidance, the sensitivity of the receptor (i.e., the global atmosphere) in relation to GHG emissions is always considered to be 'high'. The criteria for determining the significance of effects are outlined in Table 9-1. The significance level attributed to each effect is based on the best practice guidance from IEMA (2022).

Table 9-1 Criteria for determining significance of change/impact

Significance	Descriptor
Major adverse	The proposed development's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
Moderate adverse	The proposed development's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.
Minor adverse	The proposed development's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.
Negligible	The proposed development's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
Beneficial	The proposed development's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

9.2.19 Note that moderate and major effects are considered to be 'significant'.

9.2.20 Effects can also be described, for example, as:

- Beneficial or adverse;
- Permanent or reversible;
- Short, medium or long term; and
- Significant (moderate or major) or insignificant (negligible or minor).

9.3 Legislation and policy which has influenced assessment or mitigation

National legislation and policy

The Climate Change Act 2008 (2050 Target Amendment)

9.3.1 The Climate Change Act 2008 originally required the UK to reduce carbon emission by at least 80% by 2050 from a 1990 baseline. On 27th June 2019, the UK Government increased the ambition to 100% reduction in carbon emissions by 2050.

Town and Country Planning (EIA) Regulations 2017

9.3.2 Schedule 4, Clause 5(f) of the EIA Regulations state that an EIA is to consider the following in relation to climate change:

9.3.3 "A description of the likely significant effects of the development on the environment resulting from, inter alia... the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change".

National Planning Policy Framework (NPPF) (DLUHC (formerly MHCLG), 2021)

9.3.4 The NPPF states the following in relation to GHG emissions:

9.3.5 "In determining planning applications, local planning authorities should expect new development to:

- Comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and
- Take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption."

National Planning Practice Guidance (NPPG) (DLUHC (formerly MHCLG), 2021)

9.3.6 The Climate Change Guidance states the importance of planning to consider climate change:

9.3.7 "Effective spatial planning is an important part of a successful response to climate change as it can influence the emission of greenhouse gases. In doing so, local planning authorities should ensure that protecting the local environment is properly considered alongside the broader issues of protecting the global environment. Planning can also help increase resilience to climate change impact through the location, mix and design of development."

The Building Regulations Part L 2021 Edition

9.3.8 Building Regulations Part L1A and Part L2A set out minimum legal requirements for energy efficiency in residential (Part L1A) and non-residential (Part L2A) building construction. A new edition of Part L of the Building Regulations came into force in June 2022, with new minimum performance benchmarks set. All buildings on-site will have to comply with the relevant version of Part L.

Regional Planning Policy

Places for Everyone, Joint Development Plan – Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, Wigan. Publication Stage (GMCA, 2021)

9.3.9 Although this plan is yet to be adopted, the consultation period has finished, and the NPPF provides guidance on the weight that should be given to emerging policies, stating the following:

- "Local planning authorities may give weight to relevant policies in emerging plans according to:
- the stage and preparation of the emerging plan (the more advanced its preparation, the greater the weight that may be given)"

9.3.10 The following policies in the joint development plan are of relevance to GHG emissions:

9.3.11 Policy JP-S 1 Sustainable Development states the following:

- "To help tackle climate change, development should aim to maximise its economic, social and environmental benefits simultaneously, minimise its adverse impacts, utilise sustainable construction techniques and actively seek opportunities to secure net gains across each of the different objectives.
- Preference will be given to using previously-developed (brownfield) land and vacant buildings to meet development needs"

9.3.12 Policy JP-S 2 Carbon and Energy states the following:

- "The aim of delivering a carbon neutral Greater Manchester no later than 2038, with a dramatic reduction in greenhouse gas emissions, will be supported through a range of measures including:

1. Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy, heating and cooling;
 2. Promoting the use of life cycle cost and carbon assessment tools to ensure the long term impacts from development can be captured;
 3. Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities;
 4. Keeping fossil fuels in the ground;
 5. Planning for a balanced and smart electricity grid by identifying geographical locations which could support energy assets;
 6. Increasing the range of nature based solutions including carbon sequestration through the restoration of peat-based habitats, woodland management, tree-planting and natural flood management techniques;
 7. Development of Local Area Energy plans to develop cost effective pathways to achieve carbon targets;
 8. An expectation that new development will:
 - a. Be net zero carbon from 2028 by following the energy hierarchy (with any residual carbon emissions offset), which in order of importance seeks to:
 - i. Minimise energy demand;
 - ii. Maximise energy efficiency;
 - iii. Utilise renewable energy;
 - iv. Utilise low carbon energy; and
 - v. Utilise other energy sources.
 - b. Incorporate adequate electric vehicle charging points to future proof for the likely long-term demand, taking account of the potential maximum energy demand for the site;
 - c. Where practicable, prioritise connection to a renewable energy/heating/cooling network in the first instance or a low carbon energy/heating/cooling network that is adaptable to non-fossil fuels at a later date;
 - d. Achieve energy demand reductions for residential development in terms of space heat demand; hot water energy demand and the delivery of on-site renewable energy generation.
- For renewable energy generation priority should be given to PV installation where technically feasible, alternative technologies will be appropriate where the equivalent generation is evidenced.
- e. For non-residential developments, achieve at least BREEAM excellent standard (or equivalent) for the reduction of energy use and carbon emissions' category rising to "BREEAM outstanding' equivalent for ENE 01 from 2028.
 - f. Include a detailed energy statement to demonstrate via site relevant evidence how the development has sought to maximize reductions in carbon emissions in line with relevant policy targets, including the minimisation of overheating risks and appropriate measures for post occupancy evaluation. Whole life cycle emissions should be considered where possible."

9.3.13 Policy JP-S 7 Resource Efficiency states the following:

"The achievement of a circular economy and a zero-waste economy will play a key role in meeting Greater Manchester's ambition of becoming a leading green city region by 2038. The following measures will help to achieve this:

Using sustainable design and construction techniques to reduce carbon emissions, adapt and future proof to the impact of climate change, reduce and recycle waste and minimise water use."

Local policy and guidance

Manchester’s Local Development Framework. Core Strategy Development Plan Document (MCC, 2012)

- 9.3.14 The Core Strategy was adopted in July 2012, and includes the following spatial objectives relating to the reduction of GHG emissions:
- SO1. Spatial Principles: Provide a framework within which the sustainable development of the city can contribute to halting climate change; and
 - SO6. Environment: Protect and enhance both the natural and built environment of the city and ensure the sustainable use of natural resources, in order to mitigate and adapt to climate change, support biodiversity and wildlife, improve air, water and land quality, recreational opportunities and provide networks of high-quality green infrastructure, ensuring that the city is inclusive and attractive to residents, workers, investors and visitors.
- 9.3.15 Policies relevant to GHG emissions are set out below:
- 9.3.16 Policy EC1 Employment and Economic Growth in Manchester states the following:
- "Development proposals should have regard to:*
- *Climate change resilience demonstrating how CO2↘ emissions will be minimised with an aim of zero carbon emissions, through energy efficiency, renewable energy and contributing to low and zero carbon decentralised energy infrastructure."*
- 9.3.17 Policy C2 District centres states the following:
- *"New development should deliver improvements to the quality and accessibility of the centre environment. Opportunities should be taken to adopt sustainable building design and practices to assist in adapting to climate change."*
- 9.3.18 Policy EN 4 Reducing CO2 Emissions by Enabling Low and Zero Carbon Development states the following:
- 9.3.19 *"The Council will seek to reduce fuel poverty and decouple growth in the economy, growth in CO2 emissions, and rising fossil fuel prices, through the following actions:*
- All development must follow the principle of the Energy Hierarchy, being designed;
 - to reduce the need for energy through design features that provide passive heating, natural lighting and cooling;
 - to reduce the need for energy through energy efficient features such as improved insulation and glazing; and
 - to meet residual energy requirements through the use of low or zero carbon energy generating technologies.

- Wherever possible new development and retrofit projects, including energy generation plant, must be located and designed in a manner that allows advantage to be taken of opportunities for low and zero carbon energy supplies;
 - Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings;
 - Where appropriate new development and retrofit projects will be required to connect to and/or make contributions to low or zero carbon energy schemes and/or to incorporate provision to enable future connection to any existing/potential decentralised energy schemes; and
 - The use of building materials with low embodied carbon in new development and refurbishment schemes.”
- 9.3.20 Policy EN 6: Target Framework for CO2 reductions from low or zero carbon energy supplies states the following:
- 9.3.21 “Applications for residential development of 10 or more units and all other development over 1,000 sqm will be expected as a minimum to meet the target shown in Table 7.1 and Table 7.2, unless this can be shown not to be viable. This should be demonstrated through an energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated CO₂ emissions for all phases of the development.”
- 9.3.22 “The target framework relates to three broad development locations and their potential for low and zero carbon, decentralised energy. The areas are defined as follows
- Target 1 Network development areas: Locations where the proximity of new and existing buildings, the mix of uses and density of development provide the right conditions to support district heating (and cooling).
 - Target 2 Electricity intense areas: Locations where the predominant building type has an all electric fit-out such as retail units and leisure complexes.
 - Target 3 Micro-generation areas: Locations where lower densities and a fragmented mix of uses tend to mean that only building scale solutions are practical.”

Table 9-2 Domestic CO2 emissions reduction targets (Core Strategy Development Plan, 2012)

Target	% Minimum requirement
Target 1: Network development area	CHP/district heating anchor or connection or where not feasible a 15% increase on Part L 2010
Target 2: Electricity intense buildings	+ 15% increase on Part L 2010
Target 3: Micro generation area	+ 15% increase on Part L 2010

Table 9-3 Non-domestic CO2 emissions reduction targets (Core Strategy Development, 2012)

Target	% Minimum requirement
Target 1: Network development area	CHP/district heating anchor or connection or where not feasible a 15% increase on Part L 2010
Target 2: Electricity intense buildings	+ 10% increase on Part L 2010
Target 3: Micro generation area	+ 15% increase on Part L 2010

- 9.3.23 “The energy statement will be required to be submitted at the outset of any proposed development (outline application or before). Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO₂ mitigation, subject to the energy statement incorporating evidence such as modelling to demonstrate compliance.”

- 9.3.24 Policy EN 8 Adaptation to Climate Change states the following:
- 9.3.25 “Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO₂ mitigation under Policy EN6, subject to sufficient evidence to quantify their contribution to compliance.”

Manchester City Council Climate Change Action Plan 2020 – 2025

- 9.3.26 The Manchester City Council (MCC) Climate Change Action Plan sets out MCC’s commitments to tackling climate change from 2020-2025 and builds on previous plans over the last decade.
- 9.3.27 It summarises the specific actions which are required to ensure that MCC reduces its direct emissions by at least 50% by 2025 (compared to 2019/20) whilst also playing its full part in supporting and influencing the city to do the same.
- 9.3.28 The purpose of the plan is as follows:
- “The document sets out MCC’s commitments to tackling climate change over the next 5 years and builds on previous action plans over the last decade; and
- It covers MCC’s plans for adapting to the expected impacts of climate change and supporting and influencing others, including through the implementation of the Manchester Green and Blue Infrastructure Strategy 2015-2025”
- 9.3.29 Specific commitments that MCC are making are:
- “Deliver at least a 50% reduction in carbon emissions from our buildings, energy and transport by 2025 (from circa 30-32,000 tonnes in 2019/20 to circa 15-16,000 tonnes in 2024/25) via a 13% year on year reduction;
- Report quarterly on progress against the actions in the plan and provide quantitative reports on data in tonnes of CO₂; and
- Become zero carbon by 2038 at the latest (based on the Tyndall Centre for Climate Research definition of zero which is at least a 95% reduction i.e., a reduction of 35,547 tonnes CO₂ from the 2018/19 total which would mean that the Council’s direct emissions in 2037/38 would be less than 1,871 tonnes CO₂).”
- 9.3.30 The plan states the following in relation to citywide emissions:
- “The Council also recognises the importance of supporting and influencing our residents and organisations to take action to reduce their direct and indirect CO₂ emissions and to adapt to the changing climate.”

Manchester Climate Change Framework 2020 – 2025

- 9.3.31 Produced by the Manchester Climate Change Partnership, the Manchester Climate Change Framework 2020-2025 is the city’s high-level strategy for tackling climate change. It sets out how Manchester will play its full part in limiting the impacts of climate change.
- 9.3.32 The objectives and targets include:
- “Staying within our carbon budgets – based on recommendations by the Tyndall Centre for Climate change Research in 2020;
 - Climate adaptation and resilience; and
 - Inclusive, zero carbon and climate resilient economy.”
- 9.3.33 Areas for action to meet the objectives and targets include:

- *“Buildings (existing and new);*
- *Renewable energy; and*
- *Green infrastructure and nature-based solutions”*

Guidance documents

IEMA EIA Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance 2nd Edition (IEMA, 2022)

- 9.3.34
- This guidance is a revision of the 2017 IEMA guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance. It complements IEMA’s latest guidance on Climate Change Resilience and Adaptation (2020) and builds on the Climate Change Mitigation and EIA overarching principles. This guidance states that:
- *“GHG emissions should be assessed and reported as part of a good practice approach to EIA.”*
- 9.3.35
- The guidance provides the following justification for scoping in a GHG emissions assessment:
- *“All projects create GHG emissions that contribute to climate change;*
 - *climate change has the potential to lead to significant environmental effects; and*
 - *there is a GHG emission budget that defines a level of dangerous climate change whereby any GHG emissions within that budget can be considered as significant.”*
- 9.3.36
- One of the major updates in this guidance is that mitigation has taken a much more prominent role within the EIA. It is no longer an element to be considered towards the later stages of the EIA process but should be considered from the outset and throughout the project’s lifetime.
- 9.3.37
- The IEMA (2022) guidance document provides information on GHG emissions assessment methodology (e.g., sources of GHG emissions data, spatial scope and temporal scope), as well as guidance on the determination of significance of effects.
- 9.3.38
- This guidance document also states that the following factors should be considered when determining a proportionate approach to the assessment of GHG emissions in EIA:
- *“The type, size, location and temporal scale of the proposed project*
 - *Whether other assessment work has already considered life cycle GHG emissions*
 - *Whether mitigation has already been agreed with the design team, particularly if this is beyond minimum policy requirements*
 - *Whether the proposed project has specific goals or aspirations (e.g. achieving BREEAM certification)”*

BS EN 15978 Sustainability of Construction Works – Assessment of Environmental Performance and Buildings – Calculation Method (BSI, 2011)

- 9.3.39
- The purpose of this Standard is to provide a consistent framework for the assessment of lifecycle GHG emissions associated with new and existing buildings. This follows a modular approach, breaking down the lifecycle of the development into the product stage, the construction stage, the in-use stage, the End-of-life stage and elements beyond the building lifecycle.

Royal Institution of Chartered Surveyors (RICS) Whole Life Carbon Assessment for the Built Environment (RICS, 2017)

- 9.3.40
- This aims to harmonise whole life carbon assessment by providing consistency in the interpretation and implementation of the methodology BS EN 15978 to achieve coherent and comparable results that can be used to benchmark whole lifecycle carbon performance of built assets.

UK Green Building Council (UKGBC) Embodied Carbon: Developing a Carbon Brief (UKGBC, 2017)

- 9.3.41
- This is a guide to writing effective briefs for commissioning embodied carbon measurements and holds extensive information on latest applications, standards and tools.

Waste and Resource Action Programme (WRAP) Cutting Embodied Carbon in Construction Projects (WRAP, 2011a)

- 9.3.42
- This guidance helps designers identify basic cost-effective actions to reduce the carbon impact of the materials used in construction projects.

WRAP Procurement Requirements for Carbon Efficiency (WRAP, 2011b)

- 9.3.43
- This guidance is for low-carbon building projects and estates management; to set requirements for “carbon efficiency” (or low-carbon buildings) when procuring design, construction, refurbishment and facilities management services for existing and new buildings.

Greater London Authority Construction Scope 3 (Embodied) Guidance on Greenhouse Gas Accounting and Reporting (GLA, 2013)

- 9.3.44
- Although the proposed development is not in London, this guidance provides information on best practice. This accounting and reporting guidance written for the Greater London Authority contains a series of recommendations which aims to improve the understanding and consistency of the accounting and reporting of embodied emissions within the construction sector from cradle-to-grave. This document provides guidance on how to carry out calculations to measure the embodied carbon impact of buildings.

Mayor of London Whole Life-Cycle Carbon Assessments Guidance (GLA, 2020)

- 9.3.45
- Although the proposed development is not in London, this guidance provides information on best practice. Draft London Plan Policy SI 2 sets out a requirement for developments to calculate and reduce whole lifecycle carbon emissions. Guidance has been published to explain how the assessment of these carbon emissions should be approached and presented.

LETI Embodied Carbon Primer (LETI, 2020)

- 9.3.46
- Although the proposed development is not in London, this guidance provides information on best practice. The Embodied Carbon Primer offers supplementary guidance to the Climate Emergency Design Guide, for those interested in exploring embodied carbon in more detail. There is a current lack of knowledge in the built environment industry surrounding embodied carbon reduction strategies and calculations. Therefore, the London Energy Transformation Initiative has produced this document to support project teams to design buildings that deliver ambitious embodied carbon reductions.

Assessment limitations (technical deficiencies or lack of knowledge)

- 9.3.47
- The main limitation associated with the assessment is that there is limited detailed information around land use and material quantities for the proposed development, due to it being submitted as an outline planning application. Therefore, appropriate assumptions have been made where there is a lack of information available.

9.3.48 When calculating GHG emissions associated with the baseline scenario and the demolition/construction and operation of the proposed development, appropriate energy and carbon benchmarks have been used based on the floor areas and building uses provided in the indicative area schedule. Whilst these benchmarks have given an estimate of the scale of GHG emissions associated with the proposed development, they will not be completely accurate due to variations between buildings, including geography, construction processes and construction materials used. However, these are considered the best available methods for estimating GHG emissions given the information available. Additionally, where there is uncertainty, a worst-case scenario approach has been taken.

9.4 BASELINE CONDITIONS

Current baseline

- 9.4.1 In line with IEMA Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance, 2nd Edition (2022) (in this document referred to as IEMA (2022) guidance), the current baseline for the proposed development is defined as the current GHG emissions arising from activities within the site boundary for the assessment year (2023).
- 9.4.2 The existing site is currently UoM student accommodation and university-related land uses. Oak House and Woolton Hall are still in use as student accommodation. Owens Park covering the northern half of the site is now closed. The buildings on site are predominately four storeys in height, with Owens Park tower in the north of the site standing at 18 storeys tall.
- 9.4.3 In line with IEMA (2022) guidance, the baseline for the proposed development is defined as the current GHG emissions arising from activities and infrastructure within the site for the assessment year (2023). Table 9-4 provides a summary of the current land uses by area for the site. The areas for Oak House Squirrels Bar and Carill House were provided by the project architect. All remaining areas have been estimated by measuring the area of each building on the demolition phase plan and by multiplying this by the number of floors for each building. Typical electricity and fossil-thermal benchmarks taken from the Chartered Institution of Building Services Engineers (CIBSE) Technical Memorandum 46 (TM46) have been applied to the current land uses. The Department for Business, Energy and Industrial Strategy (BEIS) Greenhouse Gas Reporting: Conversion Factors 2022 for gas and grid electricity have then been applied to these figures in order to provide an estimate of annual GHG emissions from the site for the assessment year (2023). GHG emissions figures are based on the current building occupancy rates, therefore GHG emissions associated with the unoccupied buildings in Owens Park have not been included. Total GHG emissions are between 2,383 (low) and 3,335 tCO₂e (high scenario) for the 2023 baseline year. The range (low-, medium-, high scenario) is dependent on the approach to construction and the associated emissions scenario.

Table 9-4 Current land use schedule

Land use type	Total estimated area m ²	CIBSE TM46 building type
Oak House and Woolton Hall Accommodation	30,701	General accommodation
Squirrels Bar	1,553	Bar, pub or licenced club
Carill House	805	General office
The Limes	2400	General office

Future baseline

- 9.4.4 In order to provide a point of comparison for the impact of the proposed development on emissions of GHGs to the global atmosphere over the lifetime of the development (60 years), the emissions of the existing site (baseline) have also been assessed over this timeframe. This approach is in line with the IEMA (2022) guidance.
- 9.4.5 The future baseline represents the scenario where the proposed development does not go ahead, and the site remains in situ over the lifetime period it would have had. As with the current baseline, GHG emissions associated with the unoccupied Owens Park buildings have not been quantified as part of the assessment.
- 9.4.6 Figure 9-2 shows the estimated annual operational energy GHG emissions for the land uses currently on the site for a 60-year period from 2023. Relevant BEIS carbon factors have been applied for each year over the 60-year study period. This shows that GHG emissions associated with current land uses on the site will become less intensive in the future as the electricity grid decarbonises, with the phase out of fossil fuels in favour of more renewable energy sources. Annual GHG emissions reduce to 2,054-2,876 tCO₂e/y in 2050, a reduction from 2,383-3,336 CO₂e/y in 2023. Beyond 2050, the annual emissions remain between 2,054-2,876 tCO₂e/y as BEIS projections assume near zero carbon for grid electricity by 2050 before plateauing in their projections to 2100. Since the carbon factor for gas remains constant, and this is assumed to be the dominant energy use in existing building stock for heating and hot water, the majority of the remaining GHG emissions can be attributed to gas consumption. Although it is expected that gas boilers will be replaced with electric heating, it is unknown when this will occur, therefore a worst-case approach has been used.

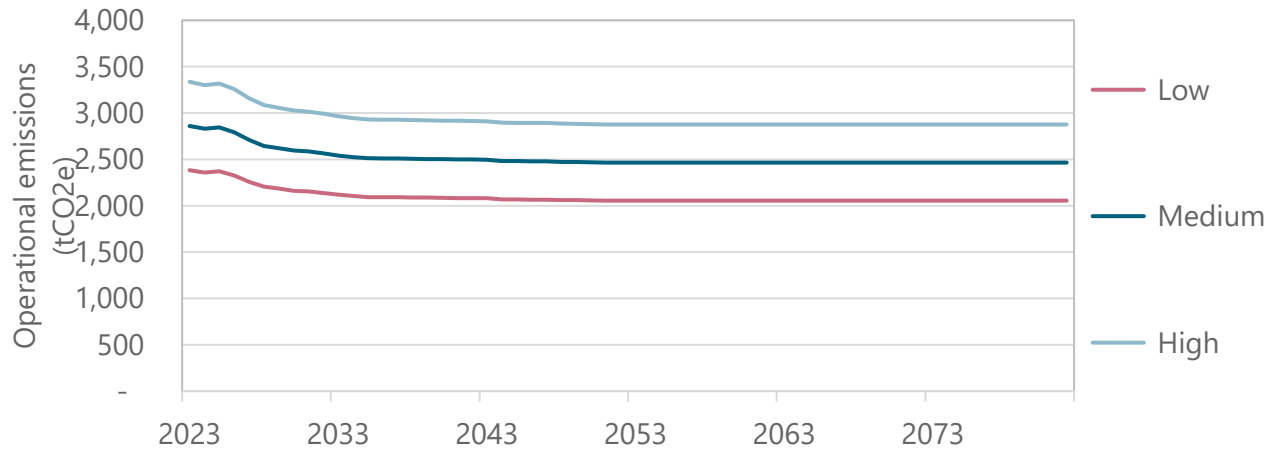


Figure 9-2 Estimated annual operational energy GHG emissions for current land use on site over the 60-year study period. A range of values (i.e., low, medium, and high) have been provided to allow for variations from the benchmarks applied.

- 9.4.7 Figure 9-3 shows the cumulative operational energy GHG emissions associated with the current land uses on the Site over a 60-year period. Total cumulative emissions over the 60-year period are estimated to be 125,700 – 176,000 tCO₂e.

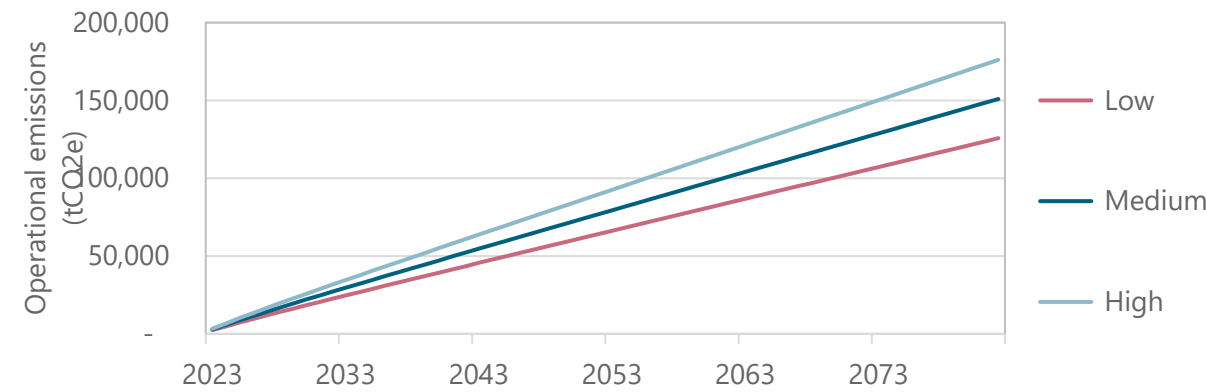


Figure 9-3 Cumulative operational energy GHG emissions associated with current land use on site for the 60-year study period. A range of values (i.e., low, medium, and high) have been provided to allow for variations from the benchmarks applied.

Identified receptors and their sensitivity

- 9.4.8 The sensitive receptor which has been considered in the assessment is the global atmosphere.
- 9.4.9 GHG emissions arising from the demolition/construction and operation of the proposed development are considered the key impacts, with the principal receptor being atmospheric GHG concentrations. The consequence of GHG emissions associated with the proposed development is that atmospheric GHG emissions are pushed closer towards environmental thresholds, triggering subsequent effects on the global climate system.
- 9.4.10 Sensitivity is defined by taking into consideration the value, vulnerability and reversibility of the receptor. With regard to global atmospheric GHG concentrations, sensitivity is considered ‘high’ based on the following conclusions:
- Value of the resource: the atmosphere and its role in regulating the global climate is of high ecological social and economic value and underpins life on the planet therefore is of global critical value;
 - Vulnerability: it is recognised by the Paris Agreement (2015) that the GHG concentrations in the atmosphere are already approaching their environmental limit and the effects of climate change are already evident; and
 - Reversibility of the effect: climate change is considered irreversible, with a delayed effect in any actions or technologies employed to reduce concentrations of GHG emissions already in the atmosphere.

9.5 DEMOLITION AND CONSTRUCTION EFFECTS

Relevant aspects of the proposed development

- 9.5.1 Demolition and construction effects consider GHG emissions associated with the product stage (lifecycle stages A1-A3) and the construction process stage (lifecycle stages A4-A5).
- 9.5.2 The following commitments to reduce construction phase GHG emissions are set out in the Sustainability and Energy Strategy (which has been submitted as a standalone planning report for this application):
- Material optimisation to minimise use of new materials considered via the Construction Environmental Management Plan (CEMP);
 - Use less new materials by exploring opportunities for increasing recycled content and materials to reduce the embodied carbon. e.g. recycled aggregates;
 - Where possible, use responsible and locally sourced materials; and

- Standardised design to optimise the use of material on site.

9.5.3 The University of Manchester Environmental Sustainability Strategy 2023-2028 states the following commitments with regards to demolition and construction effects. The delivery partner will be asked to adhere to these commitments:

- Adopt standard metrics for monitoring and reporting embodied carbon for major construction; and
- Reduce to a minimum construction and redevelopment waste, establishing clear expectations with contractors and measuring impact throughout.

Potential effects of the development and their significance

- 9.5.4 Embodied carbon associated with the demolition and construction stage of the proposed development has been estimated by applying appropriate embodied carbon benchmarks based on floor area and the building typologies. Embodied carbon benchmarks have been taken from the Atkins Carbon Critical Tool, WRAP Embodied Carbon Database, the University of Washington Embodied Carbon Benchmark Study and the Building Research Establishment Green Guide. These are considered the best publicly available benchmarks at present. A summary of the assumptions that have been made when calculating estimated GHG emissions can be found in Appendix 9-A, ES Volume III.
- 9.5.5 The total estimated cumulative embodied carbon associated with the demolition and construction of the proposed development has been calculated to be between 168,000 – 196,000 tCO₂e . A range of values (i.e., low, medium, and high) have been provided to allow for variations from the benchmarks based on location and material and construction efficiencies. Figure 9-4 provides a summary of the cumulative embodied carbon associated with the demolition and construction phase.

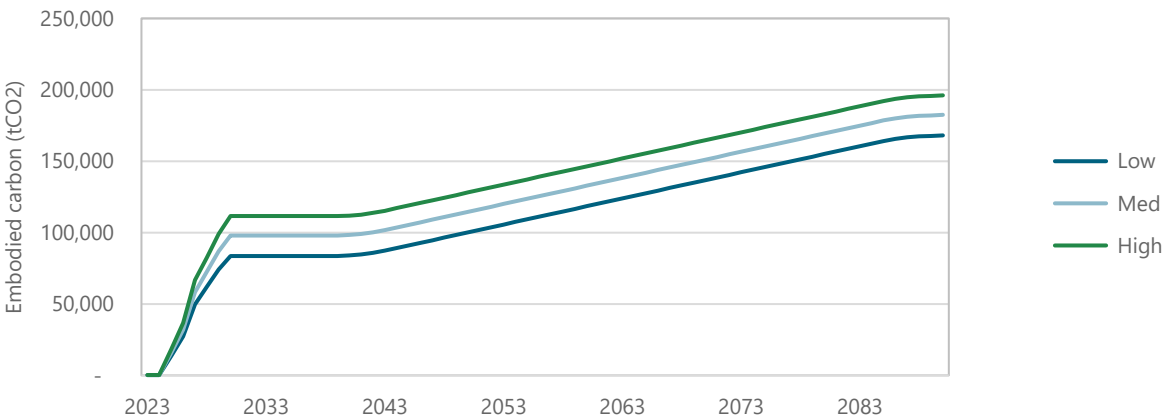


Figure 9-4 graph showing cumulative embodied carbon for the demolition and construction of the proposed development. A range of values (i.e., low, medium, and high) have been provided to allow for variations from the benchmarks applied.

9.5.6 For the worst-case scenario, a total of 107,000 tCO₂e can be attributed to the raw material phase, 3,800 tCO₂e to the construction phase, 860 tCO₂e the delivery and transportation phase, and 287 tCO₂e to the demolition phase. The main source of GHG emissions during demolition and construction therefore is the raw material phase.

9.5.7 There are commitments in place to reduce embodied carbon during the demolition and construction phase of the proposed development. These include standardising design, and using locally sourced materials. The sensitivity of the receptor is high, the significance of effects of embodied carbon associated with the product and construction stages of the proposed development are of moderate adverse significance. The effects are long term.

Summary of effects

9.5.8 Table 9-5 provides a summary of construction effects in relation to GHG emissions. This considers embodied carbon associated with the raw material, construction, and delivery and transportation of materials.

Table 9-5 Summary of effects during demolition and construction

Receptor	Sensitivity	Description of effect	Effect significance
The global atmosphere	High	Embodied carbon associated with the product stage (lifecycle stages A1-A3).	Moderate adverse
The global atmosphere	High	Embodied carbon associated with the construction process stage (lifecycle stages A4-A5).	Moderate adverse

Intermediate year construction effects

9.5.9 The build out of the proposed development in entirety represents the worst-case scenario for GHG emissions, therefore an assessment of intermediate year construction effects has not been carried out.

Supplementary mitigation measures

9.5.10 Table 9-6 provides a summary of the supplementary mitigation measures relating to demolition and construction GHG emissions associated with the proposed development.

Table 9-6 Summary of construction supplementary mitigation measures

Adverse effect	Mitigation measure	Responsibility / Mechanism for implementation	Timing
Demolition and construction stage GHG emissions (lifecycle A1-A3)	Put in place a commitment to reduce lifecycle embodied carbon by 10% compared to the business-as-usual baseline. The business-as-usual baseline is defined as the design of the residential or commercial unit using current standard best practice construction materials and techniques. An appropriate baseline should be defined for the proposed development, taking into consideration industry benchmarks set by LETI and RIBA, and reduction secured through further design refinement.	Developer/contractor	Detailed design stage
Demolition and construction stage GHG emissions (lifecycle A1-A3)	Review opportunities to minimise internal finishes such as dry lining, ceilings and decorative floor screeds / covering where not technically required (e.g. for acoustics or fire protection), opting for fair faced finishes instead.	Architect and Structural Engineer	Detailed design stage
Demolition and construction stage GHG emissions (lifecycle A1-A3)	A whole life carbon assessment should be undertaken for each building to identify opportunities to reduce embodied carbon through design, material specification and construction processes.	Developer	Detailed design stage

Adverse effect	Mitigation measure	Responsibility / Mechanism for implementation	Timing
Demolition and construction stage GHG emissions (lifecycle A4-A5)	Explore the use of off-site modular construction to consolidate delivery requirements, and for energy efficient assembly and minimising site installation process.	Developer/contractor	Post appointment of a delivery partner
Demolition and construction stage GHG emissions (lifecycle A4-A5)	Implement a travel plan for site staff	Contractor To be included as part of the Construction Management Plan	Site enabling works – post appointment of a delivery partner

9.6 OPERATIONAL EFFECTS

Relevant aspects of the proposed development and designed-in mitigation

- 9.6.1 Operational effects relate to GHG emissions associated with operational embodied carbon associated with maintenance, repair and replacement (lifecycle stages B1-B5), operational energy consumption (lifecycle stage B6), operational water consumption (lifecycle stage B5) and End-of-life demolition (lifecycle stage C1-C4).
- 9.6.2 The following commitments to reduce operational phase GHG emissions are set out in the Sustainability and Energy Strategy:
 - Where possible, incorporate local generation through the use of photovoltaic panels (PV);
 - All electric systems are offered that have the benefit of decarbonising alongside the grid;
 - Design for whole life and End of life to minimise lifecycle carbon;
 - Decentralised plant utilised across the entirety of the proposed development means that individual apartments and zones can be easily re-fit or have components replaced over time;
 - Design of ventilation systems to mitigate overheating reduces the need to fit cooling systems in the future; and
 - Implementation of efficient sanitaryware and low flow fittings to reduce operational water consumption.
- 9.6.3 The University of Manchester Environmental Sustainability Strategy 2022028 states the following commitments with regards to operational effects. The delivery partner will be asked to adhere to these commitments:
 - Purchase 100% renewable electricity;
 - Achieve zero carbon emissions in operation (Scope 1&3) by 2038;
 - Follow Passivhaus principles;
 - No gas boilers will be fitted other than in exceptional circumstances and must be approved through the zero carbon governance process;
 - Carry out Post Occupancy Evaluation to assess performance of new buildings and drive continued efficiencies and improvements;
 - Net zero carbon emissions from water use by 2050; and
 - Improve water metering to provide greater clarity on consumption and opportunities for increased efficiency.

Potential effects of the development and their significance

Operational embodied carbon (lifecycle stage B1-B5)

- 9.6.4
- Embodied carbon associated with the operational stage of the proposed development has been estimated by applying appropriate embodied carbon benchmarks based on floor area and building typologies. Embodied carbon associated with the in-use (maintenance) stage has been estimated to be approximately 84,100 tCO₂e over the 60-year lifecycle of the proposed development.
- 9.6.5
- There are commitments in place to reduce operational embodied carbon, including applying circular economy principles and designing for whole life and End of life. The sensitivity of the receptor is high, the effects associated with operational embodied carbon (lifecycle stage B1-B5) stage are moderate adverse. Effects are long term.

Operational energy consumption (lifecycle stage B6)

- 9.6.6
- Based on the committed targets, a value of 35 kWh/m²/year has been applied to provide an estimate of annual operational energy GHG emissions associated with the proposed development. A summary of the assumptions that have been made when calculating estimated GHG emissions figures can be found in Appendix 9-A.
- 9.6.7
- Figure 9-5 shows the estimated annual GHG emissions for operational energy associated with the proposed development for a 60-year period from 2030. Relevant BEIS carbon factors have been applied for each year over the 60-year study period. This shows that GHG emissions associated with the proposed development will become less intensive in the future as the electricity grid decarbonises with the phase out of fossil fuels in favour of more renewable energy sources. Annual GHG emissions associated with operational energy peak at between 216 and 305 tCO₂e/y in 2027 when the majority of the proposed development has been built out.
- 9.6.8
- Annual GHG emissions associated with operational energy are then predicted to reduce to between 3 and 5 tCO₂e/y by 2050, which is the year that the BEIS conversion factors stretch to. Beyond 2050, it is assumed that the energy grid will be net zero carbon, in line with the Climate Change Act 2008 (2050 Target Amendment) Order 2019, with any residual GHG emissions being offset at a national scale. A range of values (i.e., low, medium and high) have been provided to allow for variations in energy consumption for building typologies, taking into account factors such as building location, building orientation and building materials used.

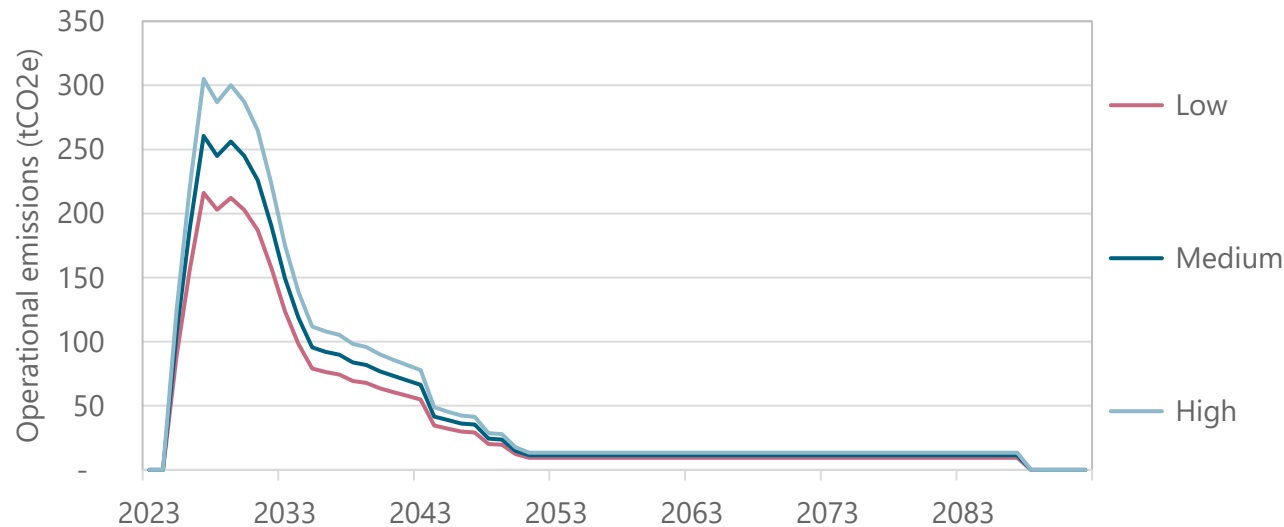


Figure 9-5 Annual GHG emissions associated with operational energy over a 60-year design life. A range of values (i.e., low, medium, and high) have been provided to allow for variations from the benchmarks applied.

- 9.6.9
-
- 9.6.10
- Figure 9-6 Figure shows the cumulative GHG emissions associated with operational energy over the 60-year lifecycle of the proposed development. It is predicted that cumulative GHG emissions associated with operational energy will be between 2,800 and 3,900 tCO₂e over the 60-year lifecycle of the proposed development.

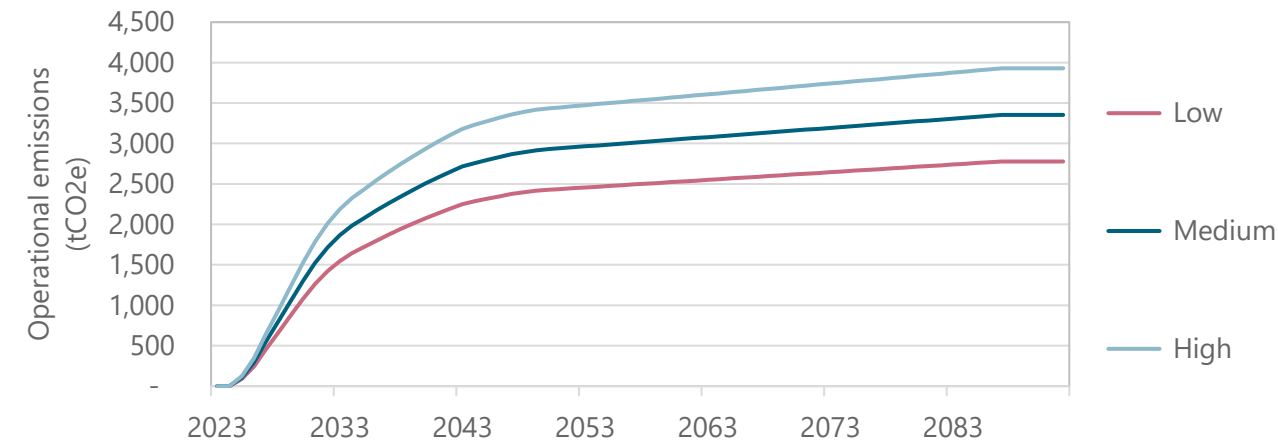


Figure 9-6 Cumulative operational energy GHG emissions over the 60-year design life of the Proposed Development. A range of values (i.e., low, medium, and high) have been provided to allow for variations from the benchmarks applied.

- 9.6.11
- There are commitments in place to reduce operational GHG emissions. These include using all-electric systems, incorporating local generation from PV arrays, and designing ventilation to minimise the need for cooling. The sensitivity of the receptor is high, the effects associated with operational energy consumption (lifecycle stage B6) are minor adverse. Effects are long term.

Operational water (Lifecycle B7)

- 9.6.12
- Estimated water consumption for the residential units has been based on the Building Services Research and Information Association (BSRIA) Rules of Thumb Guidance for Building Services (BSRIA, 2011), which is estimated to be 120 litres per day per person (0.11 cubic metres). The number of occupants on the site as a whole has been calculated from the residential unit allocation in the area schedule.
- 9.6.13
- Estimated water consumption and maximum occupancy for the proposed development's non-residential uses has been based on the BSRIA Rules of Thumb Guidelines for building services (BSRIA, 2011). The number of people in the facilities has been based on the figure of 0.3 m² /person for standing spectator areas. Furthermore, for average water consumption, the benchmark of 7L/day/person has been used to calculate GHG emissions.
- 9.6.14
- Estimated foul water has been assumed to be equal to water consumption.
- 9.6.15
- The BEIS Greenhouse Gas Reporting: Conversion Factors 2023 states that the carbon factor for water supply in the UK is 0.177 kg CO₂e per m³ of water supplied, and is 0.201 kg CO₂e per m³ of water disposed. Based on this, GHG emission attributed to water demands for the proposed development over the 60-year lifecycle are summarised in Table 9-7 .
- 9.6.16
- A summary of the assumptions that have been made and benchmarks used when calculating estimated GHG emissions from operational water consumption can be found in Appendix 9-A ES Volume III.

9.6.17 Table 9-7 for Summary of GHG emissions associated with water consumption for the 60-year design life of the proposed development.

Table 9-7 Summary of GHG emissions associated with water consumption for the 60-year design life of the proposed development

Use class	Water consumption over 60-year lifecycle (m3)	GHG Emissions from water consumption (tCO ₂ e)	GHG Emissions from water disposal (tCO ₂ e)	GHG Emissions (tCO ₂ e)
Block A-P	8,816,940	1561	1772	3333
Ancillary	2,299,500	407	462	869
	11,116,440	1,968	2,234	4,202

9.6.18 There is a commitment to use low-flow fittings and sanitaryware to reduce operational water consumption. The sensitivity of the receptor is high, the effects associated with operational water consumption (lifecycle stage B7) are of minor adverse significance. Effects are long term.

Operational Transport

9.6.19 An assessment of GHG emissions associated with operational transport has been carried out for delivery and servicing vehicles arriving at the site.

9.6.20 GHG emissions associated with cars traveling to the proposed development have been estimated by applying an emissions factor to trip numbers provided by the transport consultant, and a worst-case scenario trip distance figure, estimated by the Department for Transport (see Appendix 9-A).

9.6.21 Diesel vehicles have been used as a worst-case scenario, as they emit the greatest amount of emissions compared to other vehicle fuel types. The BEIS Greenhouse Gas Reporting: Conversion Factors 2023 states that the carbon factor for the average laden diesel HGV is 0.87205 kg CO₂ per km.

9.6.22 GHG emissions attributed to the operational transport for the proposed development over the 60-year lifecycle are summarised in Table 9-8. A summary of the assumptions that have been made when calculating estimated GHG emissions figures can be found in Appendix 9-A.

9.6.23 The figures presented here do take into account the UK Government’s target for net zero emissions by 2050, however the electrification of vehicles has not been taken into account up to 2050 to provide an assessment of the worst-case scenario. In reality, with electric vehicles becoming more widespread and the decarbonisation of the grid, it is likely that the numbers here present an overestimation. However, whilst the Government announced the end to sales of new petrol and diesel cars by 2030 on 18 November 2020, existing petrol and diesel cars would still be in circulation until their End of life.

Table 9-8 Summary of GHG emissions associated with operational transport for the 60-year design life of the proposed development

Trip type	GHG emissions (tCO ₂ e) over the 60-year design life of the proposed development
Delivery and servicing	70,130

9.6.24 There are no commitments in place to reduce emissions resulting from delivery and servicing trips. The sensitivity of the receptor is high, the effects are of major adverse significance, and the effects are long term.

End of Life stage (lifecycle C1-C4)

9.6.25 GHG emissions associated with the End-of-life stage (lifecycle stage C1-C4) have been estimated by applying appropriate benchmarks based on the proposed floor area and the building typologies. GHG emissions associated with the End-of-life stage are estimated to be approximately 430 tCO₂e.

9.6.26 There are commitments in place to reduce the GHG emissions associated with the end-of-life stage. These include designing for End of life. The sensitivity of the receptor is high, the effects associated with End-of-life stage (lifecycle stage C1-C4) are moderate adverse. Effects are long term.

Summary of effects

9.6.27 Table 9-9 provides a summary of operational effects in relation to GHG emissions. This takes into account GHG emissions associated with operational energy, operational embodied carbon, operational water consumption, operational transport, and GHG emissions associated with the End-of-life stage.

Table 9-9 Summary of effects during operation

Receptor	Sensitivity	Description of effect	Effect significance
The global atmosphere	High	Embodied carbon associated with the in-use stage for the proposed development (lifecycle stages B1-B5).	Moderate adverse
The global atmosphere	High	GHG emissions associated with operational energy for the proposed development (lifecycle stage B6).	Minor adverse
The global atmosphere	High	GHG emissions associated with operational water (lifecycle stage B7)	Minor adverse
The global atmosphere	High	GHG emissions associated with operational transport – servicing and delivery trips	Major adverse
The global atmosphere	High	GHG emissions associated with the end-of-life stage (lifecycle stage C1-C5).	Moderate adverse

Supplementary mitigation measures

9.6.28 Table 9-10 provides a summary of the supplementary mitigation measures relating to operational GHG emissions associated with the proposed development.

Table 9-10 Summary of operational supplementary mitigation measures

Adverse effect	Mitigation measure	Responsibility / Mechanism for implementation	Timing
In use stage (B1-B5) and End of life stage (C1-C4)	Put in place a commitment to reduce lifecycle embodied carbon by 10% compared to the business-as-usual baseline. The business-as-usual baseline is defined as the design of the residential or commercial unit using current standard best practice construction materials and techniques. An appropriate baseline should be defined for the proposed development, taking into consideration industry benchmarks set by LETI and RIBA, and reduction secured through further design refinement.	Developer/ contractor	Detailed design stage
Operational energy (B6)	Explore the use of passive design measures in order to reduce the need for heating.	Architect	Detailed design stage
Operational energy (B6)	Where any electrical equipment (e.g., oven, white goods etc.) is being installed by the house builder, identify unregulated energy loads and demonstrate reduction through specifying energy efficient equipment.	Developer/ contractor	Detailed design stage

Adverse effect	Mitigation measure	Responsibility / Mechanism for implementation	Timing
Operational water (B7)	Specify the use of water meters to measure water consumption.	Developer/ contractor	Detailed design stage
Operational water (B7)	Explore the feasibility of specifying rainwater harvesting in order to reduce potable water consumption.	Developer/ contractor	Reserved matters stage.
Operational water (B7)	Specify landscaping that does not require irrigation in order to reduce unregulated water consumption	Developer	Reserved matters stage.
Operational transport	Where possible, use green routing to optimise route choices of servicing and delivery trips	Developer / contractor	Prior to construction
In use stage (B1-B5 and End of life stage (C1-C4)	A whole life carbon assessment should be undertaken for each building to identify opportunities to reduce embodied carbon through design, material specification and construction processes. Consideration should be given for embodied carbon associated with the maintenance and replacement cycle.	Developer	Detailed design stage

9.7 WHOLE LIFE CARBON SUMMARY

- 9.7.1 This section of the ES chapter provides a summary of the lifecycle GHG emissions for the proposed development in comparison to the future baseline scenario.
- 9.7.2 Figure 9-7 shows the lifecycle GHG emissions for the sources that were assessed as part of this ES chapter, thereby considering both the demolition/construction and operation phases of the proposed development. The GHG emission associated with the demolition of existing buildings and End-of-life demolition stages are negligible, even in the high scenario it only accounts for 755 tCO₂e. The total GHG emissions for these sources over the 60-year design life of the proposed development are between approximately 329,557 and 358,762 tCO₂e, as outlined in Table 9-11. In comparison, if the proposed development were to not go ahead, estimated GHG emissions associated with the future baseline scenario are assumed to be approximately between 125,700 and 176,000 tCO₂e for the lifecycle of the proposed development.

Table 9-11 Whole life carbon summary for the proposed development

Emissions source	Low scenario tCO ₂ e	High scenario tCO ₂ e
Construction (A1-A5)	168,000	196,000
In use stage (B1-B5)	84,100	84,100
Operational energy (B6)	2,800	3,900
Operational water (B7)	4,202	4,202
Operational transport	70,130	70,130
End of life stage (C1-C4)	325	430
Total	329,557	358,762

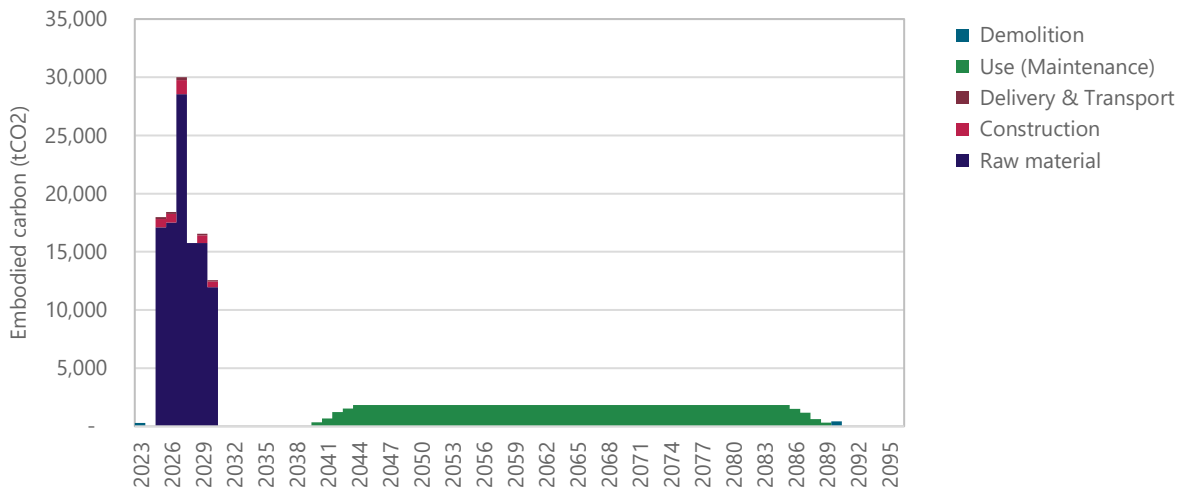


Figure 9-7 Diagram breaking down GHG emissions associated with the proposed development by lifecycle stage. Note: CO₂e from demolition of existing buildings is spread out over the demolition period (2023-2028), however relative contribution is so minor it is not visible in this chart.

- 9.7.3 Figure 9-8 breaks down the GHG emissions associated with each lifecycle stage of the proposed development as a proportion of the whole life GHG emissions.

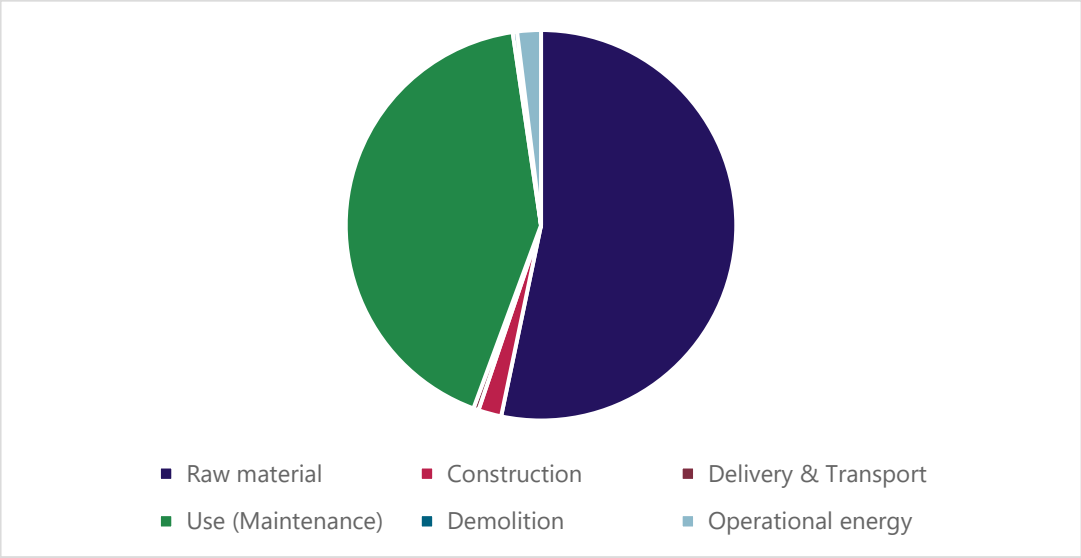


Figure 9-8 Pie chart breaking down the GHG emissions associated with the proposed development by lifecycle stage

9.8 WIDER CONTEXT GHG EMISSIONS

9.8.1 According to 2005 to 2020 UK local regional greenhouse gas emissions data provided by the Department for Business, Energy and Industrial Strategy (BEIS), emissions associated with Manchester for 2020 (the most recent available dataset) were 2,186 kt CO₂e. In order to gain a sense of scale of the GHG emissions associated with the proposed development, it may be noted that the proposed development represents approximately 0.00013952% of Manchester’s emissions at the peak of operational emissions in 2027, and approximately 0.0000059469% during operation post 2050. However, direct comparisons should not be made between these figures because the BEIS GHG emissions figures do not consider ‘consumption-based’ emissions (i.e. embodied carbon), while the GHG emissions figures for the proposed development do. It is likely that a significant proportion of construction materials will be imported; therefore, it is not a like-for-like comparison. Additionally, due to the global nature of GHG emissions, this point of comparison has not been used to determine significance of effects.

9.9 RESIDUAL EFFECTS AND CONCLUSIONS

9.9.1 Table 9-12 provides a summary of the demolition and construction phase residual effects relating to GHG emissions.

Table 9-12 Summary of residual effects during demolition and construction

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
The global atmosphere	Embodied carbon associated with the product stage (lifecycle stages A1-A3).	Moderate adverse	Put in place a commitment to reduce lifecycle embodied carbon by 10% compared to the business-as-usual baseline. The business-as-usual baseline is defined as the design of the residential or commercial unit using current standard best practice construction materials and techniques. An appropriate baseline should be defined for the proposed development, taking into consideration industry benchmarks set by LETI and RIBA, and reduction secured through further design refinement. Review opportunities to minimise internal finishes such as dry lining, ceilings and decorative floor screeds / covering where not technically required (e.g. for acoustics or fire protection), opting for fair faced finishes instead. A whole life carbon assessment should be undertaken for each building to identify opportunities to reduce embodied carbon through design, material specification and construction processes.	Minor adverse
The global atmosphere	Embodied carbon associated with the construction process stage (lifecycle stages A4-A5).	Moderate adverse	Explore the use of off-site modular construction to consolidate delivery requirements, and for energy efficient assembly and minimising site installation process. Implement a travel plan for site staff	Minor adverse

9.9.2 Table 9-13 provides a summary of the operational phase residual effects relating to GHG emissions.

Table 9-13 Summary of residual effects during operation

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
The global atmosphere	Embodied carbon associated with the in-use stage for the proposed development (lifecycle stages B1-B5).	Moderate adverse	Put in place a commitment to reduce lifecycle embodied carbon by 10% compared to the business-as-usual baseline. The business-as-usual baseline is defined as the design of the residential or commercial unit using current standard best practice construction materials and techniques. An appropriate baseline should be defined for the proposed development, taking into consideration industry benchmarks set by LETI and RIBA, and reduction secured through further design refinement. A whole life carbon assessment should be undertaken for each building to identify opportunities to reduce embodied carbon through design, material specification and construction processes. Consideration should be given for embodied carbon associated with the maintenance and replacement cycle.	Minor adverse
The global atmosphere	GHG emissions associated with operational energy for the proposed development (lifecycle stage B6).	Minor adverse	Explore the use of passive design measures in order to reduce the need for heating. Where any electrical equipment (e.g., oven, white goods etc.) is being installed by the house builder, identify unregulated energy loads and demonstrate reduction through specifying energy efficient equipment.	Negligible
	GHG emissions associated with operational water (lifecycle stage B7)	Minor adverse	Specify the use of water meters to measure water consumption. Explore the feasibility of specifying rainwater harvesting in order to reduce potable water consumption. Specify landscaping that does not require irrigation in order to reduce unregulated water consumption	Negligible
	GHG emissions associated with operational transport – servicing and delivery trips	Major adverse	Where possible, use green routing to optimise route choices of servicing and delivery trips.	Moderate adverse
	GHG emissions associated with the End of life stage (lifecycle stage C1-C5).	Moderate adverse	Put in place a commitment to reduce lifecycle embodied carbon by 10% compared to the business-as-usual baseline. The business-as-usual baseline is defined as the design of the residential or commercial unit using current standard best practice construction materials and techniques. An appropriate baseline should be defined for the proposed development, taking into consideration industry benchmarks set by LETI and RIBA, and reduction secured through further design refinement.	Minor adverse

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
			A whole life carbon assessment should be undertaken for each building to identify opportunities to reduce embodied carbon through design, material specification and construction processes. Consideration should be given for embodied carbon associated with the maintenance and replacement cycle.	

9.10 REFERENCES

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- Waste and Resource Action Programme (WRAP). (2018) Embodied Carbon Database; and
- World Resources Institute (WRI) (2004) The Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard.

9.11 GLOSSARY

Term	Definition
BEIS	Department for Business, Energy & Industrial Strategy
BSIRA	Building Services Research and Information Association
CH ₄	Methane
CIBSE	Chartered Institution of Building Service Engineers
CO ₂	Carbon dioxide
DLUHC	Department for Levelling Up, Housing and Communities
EIA	Environmental Impact Assessment
ES	Environmental Statement
GHG	Greenhouse Gas
GLA	Greater London Authority
GMCA	Greater Manchester Combined Authority
GWP	Global Warming Potential
HFCs	Hydrofluorocarbons
HGVs	Heavy Goods Vehicle
IEMA	Institute of Environmental Management and Assessment
LETI	London Energy Transformation Initiative

Term	Definition
MCC	Manchester City Council
MHCLG	Ministry of Housing, Communities & Local Government
N ₂ O	Nitrous Oxide
NF ₃	Nitrogen Trifluoride
NPFF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
PFCs	Perfluorocarbons
PV	Photovoltaic panels
RIBA	Royal Institute of British Architects
SFs	Sulphur Hexafluoride
TM46	Technical Memorandum 46
WBCSD	World Business Council for Sustainable development
WRAP	Waste and Resources Action Programme
WRI	World resource institute

9.12 LIST OF APPENDICES (ES VOLUME III)

9.12.1 Supporting technical documents and data should be included as appendices.

Reference	Title
Appendix 9-A	Greenhouse Gas Calculation Inputs

10 INTERACTIVE EFFECTS

10.1 INTRODUCTION

- 10.1.1 This chapter reports the likely significant cumulative effect interactions resulting from the proposed development. Cumulative effects can occur as either interactions between effects associated with a single development (intra-project effects) or interactions between the effects of several developments on the same sensitive receptors (inter-project effects).
- 10.1.2 Cumulative effects have been defined as:
- "The impacts on the environment which result from incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."* (Council on Environmental Quality, 1970).
- 10.1.3 In other words, those impacts that may be considered to generate a non-significant effect in isolation may result in a significant effect when combined with other non-significant environmental effects from one or more projects.
- 10.1.4 The following types of cumulative effects are typically assessed and identified as part of an EIA:

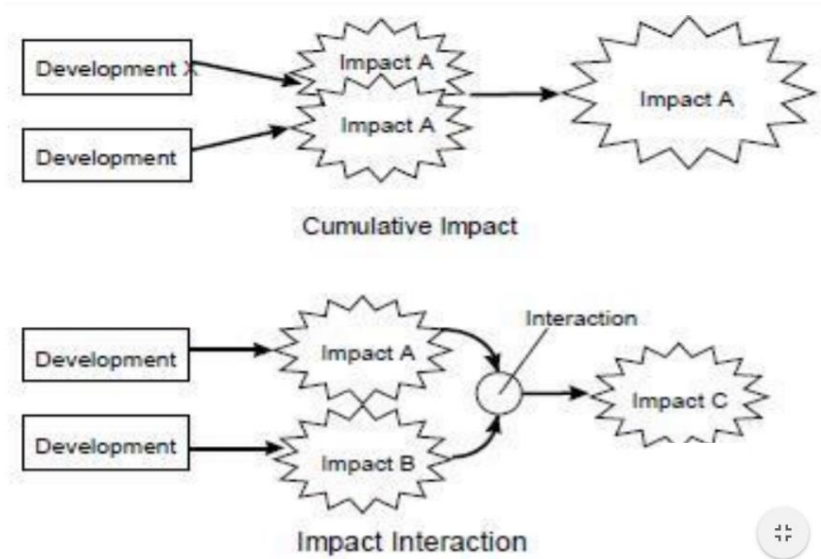


Figure 10-1 Types of cumulative effect (European Commission, 1999)

Scope of inter-project cumulative effects

- 10.1.5 EIAs are required to provide a review and assessment of the combined effects of the proposed development with other proposed developments. Cumulative projects that are relevant to be considered for the assessment of cumulative effects are typically those that are of a significant size (e.g. other EIA projects) within the zone of influence of the proposed development, defined as 1 km from the site boundary. As an approximate threshold, the developments that would be relevant for inclusion in an intra-project cumulative assessment are:
- Those submitted for planning via a planning application, permitted/with a resolution to grant permission or under construction;
 - Located within approximately 1 km of the site;

- Those which are 10,000 square meters or greater Gross External Area; and
- Schemes below the above thresholds but of more than 50 residential units.

- 10.1.6 A review has been undertaken and there are no cumulative developments under construction, consented or proposed within the zone of influence of the proposed development that meet these criteria. Therefore it has been agreed with MCC through the EIA Scoping process that the inter-project cumulative assessment can be scoped out of the ES.

Scope of interaction effects

- 10.1.7 As inter-project cumulative effects are scoped out and not relevant for this assessment, the only type of cumulative impact considered in this chapter is the potential for interaction effects generated by the proposed development.

10.2 INTERACTION EFFECTS

- 10.2.1 By considering the residual effects greater than negligible described in each technical assessment, and the receptors they act upon (Table 10-1), it is possible to identify a list of specific receptors at risk of interaction effects, i.e. sensitive receptors that may experience an accumulation of environmental effects from more than one source.

Table 10-1 Residual effects (greater than negligible) and the receptors they act upon

Topic	Residual effects	Effect significance	Receptor
Air Quality	No residual effects greater than negligible.		
Noise and Vibration	Demolition/Construction: Temporary noise from demolition activities	Minor adverse	All surrounding directions
	Demolition/Construction: Temporary vibration from demolition activities.	Minor adverse	All surrounding directions
Ecology and Biodiversity	Removal of trees and hedgerows leads to significant habitat loss and reduced connectivity throughout site utilised by notable species such as commuting and foraging bats and nesting birds	Moderate adverse	Hedgerow (native); Line of trees; Broadleaved scattered trees
	Loss of habitat connectivity and permeability through site and loss of foraging resources	Moderate adverse	Bats
Climate Change and GHG Emissions	Demolition/Construction: Embodied carbon associated with the product stage (lifecycle stages A1-A3).	Minor adverse	The global atmosphere
	Demolition/Construction: Embodied carbon associated with the construction process stage (lifecycle stages A4-A5).	Minor adverse	The global atmosphere
	Operation: Embodied carbon associated with the in-use stage for the proposed development (lifecycle stages B1-B5).	Minor adverse	The global atmosphere

Topic	Residual effects	Effect significance	Receptor
	Operation: GHG emissions associated with operational transport – servicing and delivery trips.	Moderate adverse	The global atmosphere
	Operation: GHG emissions associated with the End of life stage (lifecycle stage C1-C5).	Minor adverse	The global atmosphere
Heritage, Townscape and Visual Impact (Heritage)	Demolition/Construction: The potential indirect construction effects of the proposed development such as dust, noise and vibration	Minor-Moderate adverse	Behrens Hall
		Minor-Moderate adverse	Ashburne Hall
		Minor-Moderate adverse	The Firs
		Minor-Moderate adverse	Lodge of the Firs
		Minor adverse	Queen of Hearts
	Operation: The regenerative nature of the proposed development	Minor beneficial	Behrens Hall
	Operation: increase the intensity of built form along the interface between the two parts of the campus which serves to diminish the presence and prominence of Ashburne Hall.	Minor adverse	Ashburne Hall
	Operation: The potential visual impact which could result from the layering of new buildings in the setting of the former villa and lodge when experienced from the east.	Negligible-minor adverse	The Firs
		Negligible-minor adverse	Lodge of the Firs
	Operation: The potential impact of the proposed development on the setting and appreciation of the church	Negligible-minor adverse	Church of the Holy Innocents and St James
Heritage, Townscape and Visual Impact (Townscape)	Demolition/Construction: The introduction of construction traffic and associated environmental effects of the demolition of old buildings and the construction of new ones, such as dust, vibration, and noise, are likely to have an effect on the experience and enjoyment of these local areas.	Moderate adverse	University Campus
		Minor adverse	Commercial Frontage
		Negligible-minor adverse	Fine Grain Terraces
		Negligible-minor adverse	Municipal Park
		Negligible-minor adverse	Light Industrial and Residential
	Operation: The overall effect of the proposed development on the character, appearance, and function of these areas.	Moderate beneficial	University Campus
Heritage, Townscape and Visual Impact (Visual Impact)	Demolition/Construction: The overall effect on the amenity value of the view and the experience of receptors.	Minor adverse	View 1
		Negligible-minor adverse	View 2
		Negligible-minor adverse	View 3
		Negligible-minor adverse	View 4
		Negligible-minor adverse	View 6
		Negligible-minor adverse	View 7
		Minor adverse	View 8
		Negligible-minor adverse	View 9
		Minor beneficial	View 1

Topic	Residual effects	Effect significance	Receptor
	Operation: The overall effect on the amenity value of the view and the experience of receptors.	Minor neutral	View 2
		Minor neutral	View 3
		Minor adverse	View 4
		Minor neutral	View 6
		Minor neutral	View 7
		Minor adverse	View 8

- 10.2.2 The majority of the receptors highlighted in Table 10-1 are affected by single effects, and for these there are no interaction effects which occur.
- 10.2.3 The only receptor which is subject to multiple effects is ‘the global atmosphere’, which experiences adverse impacts during both demolition/construction and operation. These impacts are generally minor adverse, with the exception of the GHG emissions associated with operational transport – servicing and delivery trips – which is considered moderate adverse. It is considered that the cumulative impact of all the sources of GHG emissions during both demolition/construction and operation will result in a combined minor to moderate adverse effect on the global atmosphere.

10.3 CONCLUSIONS

- 10.3.1 An assessment has been undertaken of the potential for cumulative effects to arise through the interaction of effects – that is, whether individual receptors could be subject to the interaction of more than one effect simultaneously, leading to significant effects on those individual receptors.
- 10.3.2 The majority of the receptors are affected by single effects and therefore no interaction effects occur; however, it is considered that the global atmosphere will experience a minor to moderate adverse impact as a result of the combined sources of greenhouse gas emissions during both demolition/construction and operation of the proposed development.

10.4 REFERENCES

- Council on Environmental Quality (1970) National Environmental Policy Act, as amended, part 1508: terminology and index
- European Commission (1999) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions
- Stationery Office (2017). The Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

10.5 GLOSSARY

Term	Definition
EIA	Environmental Impact Assessment
ES	Environmental Statement
GHG	Greenhouse gas

11 RESIDUAL EFFECTS AND CONCLUSIONS

11.1 INTRODUCTION

- 11.1.1
- This chapter summarises the residual effects resulting from the proposed development following adoption of the mitigation measures recommended in this Environmental Statement (ES). The residual effects have been derived from the assessments carried out in each of the technical chapters within this ES.
- 11.1.2
- The effects and proposed supplementary mitigation measures have been summarised in Section 11.2 for reference. A summary of the residual effects, both adverse and beneficial, has been provided in tabular form in Section 11.3.

11.2 SUMMARY OF SUPPLEMENTARY MITIGATION

- 11.2.1
- Where adverse effects have been predicted, mitigation measures have been proposed to reduce the effects where practicable; these are summarised in Table 11-1 (for demolition and construction effects) and Table 11-2 (for operational effects). Reference should be made to individual technical assessment chapters for further details of mitigation measures.

Demolition and Construction

Table 11-1 Summary of supplementary mitigation measures required to reduce demolition and construction effects

Topic	Adverse effect	Mitigation measure	Mechanism for implementation
Air Quality	Loss of amenity due to dust deposition	Suite of construction dust and Particulate Matter (PM) mitigation measures (see Appendix 6-B of this ES)	Measures should be included in an Air Quality and Dust Management Plan (AQDMP). This can be secured via planning condition.
	Impacts on human health due to emission of PM during construction	Suite of construction dust and PM mitigation measures (see Appendix 6-B of this ES).	Measures should be included in an AQDMP. This can be secured via planning condition.
Noise and Vibration	Construction: noise and vibration from demolition works	A Demolition Environmental Management Plan (DEMP) will be produced including details of measures to mitigate and manage noise from the demolition works based on the concept of best practicable means (BPM). Mitigation measures are expected to include the selection of plant and methods producing lower levels of noise, and the use of localised screening and enclosures around noisy plant and activities. It is anticipated that implementation of such measures would reduce noise levels by up to 10 dB. An overarching Construction Environmental Management Plan (CEMP) will also be produced containing similar details on the other elements of the construction process.	Applicant to submit DEMP and CEMP to Manchester City Council (MCC) for approval. Demolition Contractor to implement mitigation measures detailed in DEMP.

Topic	Adverse effect	Mitigation measure	Mechanism for implementation
Ecology and Biodiversity	Damage to habitats from pollution	Airborne dust, siltation and pollution caused by run-off, spread of invasive weeds and management of demolition waste and construction materials will be controlled and managed in keeping with national guidelines following recommendations made in Chapters 4 and 8 of this ES and in the CEMP, to avoid damage of retained habitats on site and to habitats beyond the site boundary.	CEMP to be secured through planning condition and implemented by contractor
	Disturbance of fauna by noise/vibration and lighting	Noise and lighting will be managed in keeping with national and local guidelines, following recommendations made in Chapter 7 of this ES and in the CEMP, to avoid disturbance beyond the site boundary as much as possible	CEMP to be secured through planning condition and implemented by contractor
	Permanent or temporary loss of bat roosts	As bat roosts are to be lost due to building demolition, a European Protected Species Mitigation Licence from Natural England which will include the provision of appropriate mitigation measures and working method statements to ensure no risk of injury or mortality to bats during demolition or construction works will be required ahead of demolition commencing on B10, B11, B12, B19 and B25 (further details in Chapter 8, Ecology and Biodiversity, Table 8-3). Update bat surveys to be conducted in the May-August ahead of demolition commencing on site for future phases of the proposed development.	Update bat surveys to be secured through planning condition. Natural England bat licence to be obtained by applicant and implemented by contractor.
	Disturbance to interim or permanent built-in roosts to be incorporated at Owen’s Park, Woolton Hall and Oak House	Measures to protect the temporary and permanent bat roosts will be detailed within the CEMP. This will include identifying the roost location and ensuring no plant or materials are stored in front or beneath the roost and lighting does not illuminate the roost entrances	CEMP to be secured through planning condition and implemented by contractor

Topic	Adverse effect	Mitigation measure	Mechanism for implementation
	Killing and injury of birds by the destruction of active nests	All nesting birds, their nests, eggs and chicks are protected by law from damage and destruction until the nests are no longer in use. Therefore, any vegetation clearance required to facilitate the demolition or construction of the proposed development should be undertaken outside the bird nesting season (March – August, inclusive). This includes removal of trees, hedgerows, and areas associated with the woodland, if required. Where avoidance of the bird nesting season is not possible, a suitably experienced ecologist must carry out a nesting bird check no more than 48 hours prior to vegetation removal. If an active nest is found, this would need to be protected throughout the works, with a suitable buffer area of semi-natural habitat as defined by the ecologist, until the chicks have fledged and the nest is no longer in use. Additional measures will be detailed in the CEMP.	CEMP to be secured through planning condition and implemented by contractor
	Spread of non-native invasive species	Control measures to prevent the spread of Japanese knotweed and Montbretia currently growing in the introduced shrub near building B21 will be reviewed by a specialist contractor, with measures for avoidance and further management requirements detailed in an invasive species management plan and mirrored within the DEMP and CEMP documents.	Invasive species management plan, DEMP and CEMP to be secured through planning condition and implemented by contractor

Topic	Adverse effect	Mitigation measure	Mechanism for implementation
Climate Change and Greenhouse Gas (GHG) Emissions	Demolition and construction stage GHG emissions (lifecycle A1-A3)	Put in place a commitment to reduce lifecycle embodied carbon by 10% compared to the business-as-usual baseline. The business-as-usual baseline is defined as the design of the residential or commercial unit using current standard best practice construction materials and techniques. An appropriate baseline should be defined for the proposed development, taking into consideration industry benchmarks set by the London Energy Transformation Initiative (LETI) and Royal Institute of British Architects (RIBA), and reduction secured through further design refinement.	Developer/contractor
	Demolition and construction stage GHG emissions (lifecycle A1-A3)	Review opportunities to minimise internal finishes such as dry lining, ceilings and decorative floor screeds / covering where not technically required (e.g. for acoustics or fire protection), opting for fair faced finishes instead.	Architect and Structural Engineer
	Demolition and construction stage GHG emissions (lifecycle A1-A3)	A whole life carbon assessment should be undertaken for each building to identify opportunities to reduce embodied carbon through design, material specification and construction processes.	Developer
	Demolition and construction stage GHG emissions (lifecycle A4-A5)	Explore the use of off-site modular construction to consolidate delivery requirements, and for energy efficient assembly and minimising site installation process.	Developer/contractor
	Demolition and construction stage GHG emissions (lifecycle A4-A5)	Implement a travel plan for site staff	Contractor To be included as part of the CEMP.
Heritage, Townscape and Visual Impact	No supplementary mitigation measures required.		

Operation

Table 11-2 Summary of supplementary mitigation measures required to reduce operational effects

Topic	Adverse effect	Mitigation measure	Mechanism for implementation
Air Quality	No adverse operational effects identified		

Topic	Adverse effect	Mitigation measure	Mechanism for implementation
Noise and Vibration	No adverse operational effects identified		
Ecology and Biodiversity	Impacts from noise, human disturbance and lighting	A detailed lighting plan in identified sensitive areas will be prepared for each phase to minimise impacts on adjacent habitats and corridors with benefit for local fauna. Lighting levels on the woodland will be kept below a 0.5lux increase from existing levels	Implementation of lighting plan in identified sensitive areas
Climate Change and GHG Emissions	In use stage (B1-B5) and End of life stage (C1-C4)	Put in place a commitment to reduce lifecycle embodied carbon by 10% compared to the business-as-usual baseline. The business-as-usual baseline is defined as the design of the residential or commercial unit using current standard best practice construction materials and techniques. An appropriate baseline should be defined for the proposed development, taking into consideration industry benchmarks set by LETI and RIBA, and reduction secured through further design refinement.	Developer/ contractor
	Operational energy (B6)	Explore the use of passive design measures in order to reduce the need for heating.	Developer/ contractor
	Operational energy (B6)	Where any electrical equipment (e.g., oven, white goods etc.) is being installed by the house builder, identify unregulated energy loads and demonstrate reduction through specifying energy efficient equipment.	Developer/ contractor
	Operational water (B7)	Specify the use of water meters to measure water consumption.	Developer/ contractor
	Operational water (B7)	Explore the feasibility of specifying rainwater harvesting in order to reduce potable water consumption.	Developer/ contractor
	Operational water (B7)	Specify landscaping that does not require irrigation in order to reduce unregulated water consumption	Developer
	Operational transport	Where possible, use green routing to optimise route choices of servicing and delivery trips	Developer / contractor

Topic	Adverse effect	Mitigation measure	Mechanism for implementation
	In use stage (B1-B5 and End of life stage (C1-C4)	A whole life carbon assessment should be undertaken for each building to identify opportunities to reduce embodied carbon through design, material specification and construction processes. Consideration should be given for embodied carbon associated with the maintenance and replacement cycle.	Developer
Heritage, Townscape and Visual Impact	No supplementary mitigation measures required.		

11.3 SUMMARY OF RESIDUAL EFFECTS (POST MITIGATION)

Effects associated with the proposed development

Demolition and Construction

Table 11-3 Summary of residual effects of the proposed development during demolition and construction

Topic	Receptor	Effect	Residual significance
Air Quality	Surrounding sensitive uses, particularly residential properties, including adjacent university halls of residence	Loss of amenity due to dust deposition	Negligible
	Surrounding sensitive uses, particularly residential properties, including adjacent university halls of residence	Impacts on human health due to emission of PM during construction	Negligible
Noise and Vibration	North	Construction: noise from demolition works, temporary.	Not significant: minor adverse.
	East/South		
	West		
	On-site (south)		
	North	Construction: vibration from demolition works, temporary.	Not significant: minor adverse.
	East/South		
	West		
	On-site (south)		
Ecology and Biodiversity	Broadleaved woodland	Damage and disturbance from noise/vibration, light, dust and run-off during construction and demolition	Negligible
		Indirect effects in the absence of mitigation, include damage to root systems, vehicle activity, earth moving, dust and airborne pollutants.	Negligible
	Hedgerow (native)		Moderate adverse
	Line of trees		Moderate adverse

Topic	Receptor	Effect	Residual significance
	Broadleaved scattered trees	Removal of trees and hedgerows leads to significant habitat loss and reduced connectivity throughout site utilised by notable species such as commuting and foraging bats and nesting birds.	Moderate adverse
	Bats	Potential permanent or temporary loss of five roosts in buildings B10, B11, B12 and B25	Negligible
		Indirect impacts from noise/vibration, light, dust and run-off during demolition and construction.	Negligible
		Loss of habitat connectivity and permeability through site and loss of foraging resources	Moderate adverse
	Birds	Loss of habitat for nesting and foraging	Negligible
		Disturbance from noise/ vibration to nesting birds	Negligible
Climate Change and GHG Emissions	The global atmosphere	Embodied carbon associated with the product stage (lifecycle stages A1-A3).	Minor Adverse
	The global atmosphere	Embodied carbon associated with the construction process stage (lifecycle stages A4-A5).	Minor Adverse
Heritage, Townscape, and Visual Impact (Heritage)	Behrens Hall	The potential indirect construction effects of the proposed development such as dust, noise and vibration	Minor-Moderate Adverse
	Ashburne Hall		Minor-Moderate Adverse
	The Firs		Minor-Moderate Adverse
	Lodge of the Firs		Minor-Moderate Adverse
	Queen of Hearts		Minor Adverse
	Church of the Holy Innocents and St James		Negligible Adverse
	Fallowfield War Memorial		Negligible Adverse
	Synagogue		Negligible Neutral
	Unitarian Chapel		Negligible Neutral
	Hollings Building at Manchester Metropolitan University		Negligible Adverse
	Section of an early medieval boundary ditch known as the Nico Ditch in Platt Fields		Negligible Neutral
Heritage, Townscape, and Visual Impact (Townscape)	University Campus	The introduction of construction traffic and associated environmental effects of the demolition of old buildings and the construction of new ones, such as dust, vibration, and noise, are likely to have an effect on the experience and enjoyment of these local areas.	Moderate Adverse
	Commercial Frontage		Minor Adverse
	Fine Grain Terraces		Negligible-Minor Adverse
	Municipal Park		Negligible-Minor Adverse
	Low Density Residential		Negligible Neutral
	Mixed Townscape		Negligible Adverse
	Light Industrial and Residential		Negligible-Minor Adverse

Topic	Receptor	Effect	Residual significance
Heritage, Townscape, and Visual Impact (Visual Impact)	View 1	The overall effect on the amenity value of the view and the experience of receptors	Minor Adverse
	View 2		Negligible-Minor Adverse
	View 3		Negligible-Minor Adverse
	View 4		Negligible-Minor Adverse
	View 5		Negligible Neutral
	View 6		Negligible-Minor Adverse
	View 7		Negligible-Minor Adverse
	View 8		Minor Adverse
	View 9		Negligible-Minor Adverse

Operation

Table 11-4 Summary of residual effects of the proposed development during operation

Topic	Receptor	Effect	Residual significance
Air Quality	Surrounding existing sensitive uses, including residential properties and schools.	Effects on human health due to changes in air quality due to the operation of the proposed development	Negligible
	Future site users	Exposure of residents introduced by the operation of the proposed development to air pollutants	Negligible
Noise and Vibration	No operational effects identified		
Ecology and Biodiversity	Local fauna, including bats and generalist birds	Impacts from noise and human disturbance	Negligible
		Impacts from lighting	Negligible
Climate Change and GHG Emissions	The global atmosphere	Embodied carbon associated with the in-use stage for the proposed development (lifecycle stages B1-B5).	Minor Adverse
		GHG emissions associated with operational energy for the proposed development (lifecycle stage B6).	Negligible
		GHG emissions associated with operational water (lifecycle stage B7)	Negligible
		GHG emissions associated with operational transport – servicing and delivery trips	Moderate Adverse
		GHG emissions associated with the End of life stage (lifecycle stage C1-C5).	Minor Adverse
	Behrens Hall	The regenerative nature of the proposed development	Minor Beneficial

Topic	Receptor	Effect	Residual significance
Heritage, Townscape, and Visual Impact Assessment (Heritage)	Ashburne Hall	The proposed development has the potential to increase the intensity of built form along the interface between the two parts of the campus which serves to diminish the presence and prominence of Ashburne Hall.	Minor Adverse
	The Firs	The potential visual impact which could result from the layering of new buildings in the setting of the former villa and lodge when experienced from the east.	Negligible-Minor Adverse (mitigated by design)
	Lodge of the Firs		Negligible-Minor Adverse (mitigated by design)
	Queen of Hearts	N/A	Negligible Neutral
	Church of the Holy Innocents and St James	The potential impact of the proposed development on the setting and appreciation of the church	Negligible-Minor Adverse (mitigated by design)
	Fallowfield War Memorial	N/A	Negligible Neutral
	Synagogue	N/A	Negligible Neutral
	Unitarian Chapel	N/A	Negligible Neutral
	Hollings Building at Manchester Metropolitan University	N/A	Negligible Neutral
	Section of an early medieval boundary ditch known as the Nico Ditch in Platt Fields	N/A	Negligible Neutral
Heritage, Townscape, and Visual Impact (Townscape)	University Campus	The overall effect of the proposed development on the character, appearance, and function of these areas.	Moderate Beneficial
	Commercial Frontage		Minor Beneficial
	Fine Grain Terraces		Negligible Beneficial
	Municipal Park		Negligible Neutral
	Low Density Residential		Negligible Neutral
	Mixed Townscape		Negligible Adverse
	Light Industrial and Residential		Negligible Neutral
Heritage, Townscape, and Visual Impact (Visual Impact)	View 1	The overall effect on the amenity value of the view and the experience of receptors	Minor Beneficial
	View 2		Minor Neutral
	View 3		Minor Neutral
	View 4		Minor Adverse
	View 5		Negligible Neutral
	View 6		Minor Neutral
	View 7		Minor Neutral
	View 8		Minor Adverse
	View 9		Negligible Neutral

Cumulative effects

Interactive cumulative effects

11.3.2 The only interactive effect identified during both demolition/construction and operation of the proposed development is on the global atmosphere. This receptor will experience a minor to moderate adverse effect as a

result of the combined sources of greenhouse gas emissions. All other receptors are affected by single effects and therefore no interaction effects occur.

In-combination cumulative effects

11.3.3 As there are no cumulative developments that act in combination with the proposed development, no in-combination cumulative effects occur during demolition/construction or operation.

11.4 CONCLUSIONS

11.4.1 The majority of environmental effects associated with the proposed development are deemed to be non-significant with embedded and supplementary mitigation measures in place. However, there are some effects that are still deemed to be significant with mitigation measures in place.

Demolition and Construction

11.4.2 A small number of significant adverse residual effects (i.e. taking into account supplementary mitigation measures) have been identified during the demolition and construction phase:

- **Ecology:** The removal of trees and hedgerows is expected to lead to significant habitat loss and reduced connectivity throughout site which is utilised by notable species such as commuting and foraging bats and nesting birds. This impact on native hedgerows, line of trees and broadleaved scattered trees is expected to have a permanent, moderate adverse impact on these receptors. In addition, this associated loss of habitat connectivity and permeability through the site and loss of foraging resources is also anticipated to result in a permanent, moderate adverse impact on bats.
- **Heritage, Townscape and Visual Impact:** The introduction of construction traffic and associated environmental effects of the demolition of old buildings and the construction of new ones, such as dust, vibration, and noise, is likely to have a moderate adverse effect on the experience and enjoyment of the University Campus area.

Operation

11.4.3 Significant adverse residual effects (i.e. taking into account supplementary mitigation measures) have been identified during the operation phase:

- **Greenhouse gas emissions:** Whilst appropriate measures have been specified to reduce emissions, the greenhouse gas emissions assessment has noted that potentially significant effects could occur. However, this is not specific to the proposed development, rather all development, so far as this is an acknowledgement of the Institute of Environmental Management & Assessment (IEMA) guidance which specifies that “any GHG emissions or reductions from a project might be considered to be significant”.

11.4.4 One significant beneficial residual effect that has been identified during operation of the proposed development:

- **Heritage, Townscape and Visual Impact:** The overall effect of the proposed development on the character, appearance, and function of the University Campus area is deemed to be moderate beneficial.

Cumulative

11.4.5 An assessment has been undertaken of the potential for cumulative effects to arise through the interaction of effects – that is, whether individual receptors could be subject to the interaction of more than one effect simultaneously, leading to significant effects on those individual receptors. The majority of the receptors are affected by single effects and therefore no interaction effects occur; however, it is considered that the global atmosphere will experience a minor to moderate adverse interactive effect as a result of the combined sources of greenhouse gas emissions during both demolition/construction and operation.

11.5 GLOSSARY

Term	Definition
AQDMP	Air Quality and Dust Management Plan
CEMP	Construction Environmental Management Plan
DEMP	Demolition Environmental Management Plan
ES	Environmental Statement
GHG	Greenhouse Gas
IEMA	Institute of Environmental Management & Assessment
LETI	London Energy Transformation Initiative
MCC	Manchester City Council
RIBA	Royal Institute of British Architects