

**Apex Tower,
Manchester**
Environmental Statement

051033

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Revision 00

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1 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

- 1.1.1 Arrowsmith Management Ltd. (the applicant) is seeking two detailed planning permissions for land located between Great Bridgewater Street, Albion Street and Trumpet Street (hereafter referred to as the “proposed development”). The proposed development will comprise of two developments divided by The Briton’s Protection public house. The larger parcel of land (site A) is located to the east of Albion Street, to the north of Trumpet Street and to the west of The Briton’s Protection public house. Site A is to be used for residential development. The smaller parcel of land (site B) is located to the south of Great Bridgewater Street, to the west of the Jurys Inn Hotel, to the north of Trumpet Street and to the east of The Briton’s Protection public house. Site B is to be partially used for commercial office and partly used for residential development. The location and boundary of the site can be found in Chapter 2 of this Environmental Statement (ES), the centre of which is located at UK National Grid Reference 383638, 397608. The combined area of the site is approximately 0.072 hectares.
- 1.1.2 The following individual planning applications are being submitted and have been assessed within this ES:
- Site A or application A: *Erection of a 26 storey residential tower for 72 apartments (Use Class C3,) with associated car parking, cycle parking, sub station, servicing, and associated landscaping works; and*
 - Site B or application B: *Erection of a 7 storey building with commercial floorspace (Use Class E/Sui Generis) on the first and second floors and four floors (3rd-6th) of residential containing 4 apartments (Use Class C3), with associated parking and servicing.*
- 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 applications for the proposed development.

1.2 ABOUT THE APPLICANT

- 1.2.1 Arrowsmith Management Ltd is a property development company with a growing presence in the North West. Currently they have active schemes in Stockport, Salford and Trafford. The proposed development marks Arrowsmith’s first scheme in Manchester city centre, with the intention of delivering a residential-led development in a sustainable and growing area of the city.
- 1.2.2 Arrowsmith Management Ltd is run by Tony Connor and Mohammed Haji. Tony Connor is a British construction and property development professional with 30 years of experience in the UK, Middle East, and Europe. Mohammed Haji is a businessman, developer, and entrepreneur with multi-disciplinary business interests built up over 40 years, with property development at its core.

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 the process for identifying the environmental effects (beneficial and adverse) of proposed development before development consent is granted. The aim of the 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.

1.4 REQUIREMENT FOR ENVIRONMENTAL IMPACT ASSESSMENT

- 1.4.1 The European Union (EU) Environmental Impact Assessment Directive 2014/52/EU (‘2014 EIA Directive’) came into force on 15th May 2014. England transposed this on 16th May 2017 through The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended) and these are referred to as the EIA Regulations herein.
- 1.4.2 Projects that require or may require an EIA, an “EIA development”, 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 development requires an EIA where it exceeds certain thresholds as follows:
- 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 The EIA Regulations define “sensitive areas” as including any of the following:
- a) *“Land notified under section 28(1) (sites of special scientific interest) of the Wildlife and Countryside Act 1981;*
 - b) *A National Park within the meaning of the National Parks and Access to the Countryside Act 1949;*
 - c) *The Broads;*
 - d) *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;*
 - e) *A scheduled monument within the meaning of the Ancient Monuments and Archaeological Areas Act 1979;*
 - f) *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;*
 - g) *A European site;”*
- 1.4.5 The site does not contain and is not immediately adjacent to any of the designations outlined above, therefore it does not constitute a “sensitive area”.
- 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 of the EIA Regulations. This refers to infrastructure projects in the form of urban development projects.
- 1.4.7 The EIA Regulations include ‘applicable thresholds’, above which an EIA is typically 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:

- a)

The development includes more than 1 hectare of urban development which is not dwelling house development; or
- b)

The development includes more than 150 dwellings; or
- c)

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

Although the proposed development does not exceed any of the criteria set out above, it is deemed that there is the potential for significant effects for certain technical areas. This is particularly the case due to the tall height of the proposed development. Therefore, the applicant acknowledges that the project constitutes an EIA development and has decided to prepare an ES.
- 1.4.9

It should be noted that the separate planning applications are being considered as one project under the EIA Regulations.

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 a 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 effects, including effects arising as a result of other developments in proximity to the proposed development. Table 1-2 below provides further description.
Volume II – Townscape and Visual Impact Assessment (TVIA)	The TVIA 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 TVIA.
Volume III – Appendices to Main Report	These technical appendices comprise specific supporting documents such as details of modelling, site surveys, 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 its construction and operation.
3 Alternatives and Design Evolution	This chapter presents information on the alternatives that have been considered by the applicant.
4 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.
5-11 Technical Assessments	Technical assessments for the following topics have been carried out as part of the EIA:

Chapter	Description
	Noise and Vibration; Air Quality; Wind Microclimate; Daylight and Sunlight; Built Heritage; and Greenhouse Gas Emissions These chapters present the assessment of effects during construction and operation 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.
15 Cumulative and Interactive Effects	This chapter presents both the combined and cumulative effects resulting from the accumulation of effects generated by the proposed development on the same receptors and the effects potentially arising from adjacent or nearby developments together with those predicted for the proposed development.
16 Residual Effects and Conclusions	This chapter provides potential mitigation measures and summarises the residual effects of the proposed development once mitigation has been applied.

- 1.5.3

A number of appendices support the technical assessments included in Volume I of the ES. These are included in Volume III of the ES as broken down in Table 1-3.

Table 1-3 List of appendices included with Environmental Statement Volume III

Appendix Number	Topic	Description
2-A	Development Description	Design Freeze Drawings
3-A	Alternatives and Design Evolution	Climate change resilience risk assessment
4-A	Methodology	EIA scoping report
4-B		EIA scoping consultation responses
5-A	Noise and Vibration	Monitoring locations
5-B		Noise rating curve assessment – Briton’s Protection
5-C		Noise rating curve assessment – Tower of Light
5-D		Legislative framework, policy and guidance documents
6-A	Air Quality	Assessment input data
7-A	Wind Microclimate	Wind microclimate detailed methodology
8-A	Daylight and Sunlight	Drawings of the baseline proposed scenario
8-B		Daylight and sunlight results for baseline vs proposed scenario
9-A	Built Heritage	Heritage Assessment
9-B		Heritage Asset Plan
10-A	Greenhouse Gas Emissions	Greenhouse gas calculation inputs

- 1.5.4

The detailed planning applications 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 documents described in Table 1-4.

Table 1-4 Documents supporting the planning applications

Document	Description
Location Plan	Shows the proposed development in relation to its surrounding properties.
Planning and Tall Buildings Statement	Sets out the planning context, relevant national, regional and local planning policy and assesses the proposed development having regard to the planning policy framework.
Design and Access Statement (DAS)	Sets out the context, design concepts, principles and ideas which have informed the development of the scheme as well as addressing the needs of access and inclusive design.
Outline Construction Environmental Management Plan (CEMP)	The purpose of a CEMP is to outline how a construction project will avoid, minimise or mitigate effects on the environment and surrounding area. CEMPs often detail the implementation of measures in accordance with environmental commitments outlined in; the ES, environmental policy or an environmental plan, requirements of planning conditions, Section 106 agreements or other legislative requirements. This is a 'live' document that will be passed onto the contractor and reviewed and updated throughout the project lifecycle.
Energy Statement	Sets out the most suitable and cost-effective solutions to reduce carbon emissions and integrate low or zero carbon renewable energy technologies, and clarifies how the proposed development will achieve a reduction in energy usage or CO ₂ emissions that complies with the minimum standards set by MCC.
Environmental Standards Statement	Addresses sustainability ratings and the provision of renewable energy within the proposed development, and the proposals for the provision of onsite renewable energy to provide 20% of final site energy demand and CO ₂ reduction.
Circular Economy Statement	Demonstrates how the proposed development will incorporate circular economy measures into all aspects of the design, construction and operation process, to minimise embodied carbon and operate within a circular economy.
Crime Impact Statement	An assessment of how crime and safety issues will be addressed through the proposed development, and how the proposed development will incorporate measures to minimise the risk of crime and to meet the specific security needs of the site. Any security measures to be implemented shall seek to achieve the 'secured by design' accreditation by the Greater Manchester Police.
Ground Conditions Phase 1 Report	A desk-based preliminary risk assessment report with no intrusive ground investigation. It is used to establish the geology, hydrology, history and environmental setting and sensitivity of the site and identify potential sources, pathways and receptors to establish a robust conceptual site model.
Flood Risk Assessment	Reviews the proposed development to assess it against the risk of flooding, whether from groundwater, fluvial (river), pluvial (surface water), tidal (estuary/coastal) or from sewer sources. It also considers the surrounding area and whether the proposed development poses a flood risk to areas nearby.
Drainage Strategy	A drainage strategy typically contains information on the site's characteristics, the calculated surface water runoff rates and required storage volumes, information on where the runoff is to be discharged to, the sustainable drainage system (SuDS) features proposed and information on how the drainage system is going to be managed and maintained.
Ecology Phase 1 Report	This typically includes a search of evidence and potential for statutory protected species and habitats, and will assess likely impacts upon designated conservation sites in the wider area. Assesses the potential ecological effects for a proposed development, the ecological value of the site and the measures required for biodiversity net gain.
Archaeological Assessment	A desk-based assessment including a description of the significance of the heritage assets affected by the proposed development and their contribution to the site, the impact of the proposed development, and any historic features that may exist on or adjacent to the site.
Fire Statement	Defines the fire safety objectives and performance requirements of a proposed development, and the methods by which these objectives will be provided/satisfied.
Travel Plan	Long-term management strategies for integrating proposals for sustainable travel into the planning process based on evidence of the anticipated transport impacts of development. Sets measures to promote and encourage sustainable travel.

Document	Description
Transport Statement	Sets out the potential transport impacts of a development and if relevant proposes mitigation measures to promote sustainable development.
Statement of Community Involvement	Sets out pre-application consultation undertaken by the applicant, including meetings with statutory authorities and presentations of the proposed development to local residents and interested parties.

1.6 TECHNICAL TEAM

1.6.1 This ES has been prepared and coordinated by a team of experienced and qualified environmental consultants. 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 1-5 and Table 1-6.

Table 1-5 EIA coordinators

Buro Happold Consultant	Qualifications, experience and memberships
Tom Peacock	Tom Peacock has an MSc in 'Sustainability and Consultancy' and is a Practitioner Member of the Institute of Environmental Management and Assessment (IEMA). He is an Environmental Consultant with experience of coordinating EIAs and writing technical chapters for a range of mixed-use developments.
Helen Lund	Helen Lund is an Associate with 18 years' experience in the delivery of EIA in the UK. She 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. Helen is a Practitioner Member of the Institute of Environmental Management and Assessment (IEMA).

Table 1-6 EIA technical specialists

Specialism	Consultant	Qualifications, experience and memberships
Noise and Vibration	Jake Schofield Hydrock	Jake Schofield (BSc (Hons), Pg.Dip) is a Senior Acoustic Engineer at Hydrock and is a full member of the Institute of Acoustics (MIOA). He holds 5 years' experience in carrying out noise and vibration impact assessments and acoustic engineering and consultancy. He has carried out assessments for residential, industrial and mixed-use schemes. He also has experience in assessing noise and vibration from construction, mineral and mining operations, and has carried out assessments for waste and utilities for permitting.
Air Quality	Jethro Redmore Redmore Environmental	Jethro Redmore is Director of Redmore Environmental and has worked as a professional environmental scientist for approximately 16 years. He has been responsible for conducting environmental studies for major road improvement and construction schemes, power stations, oil refineries and other major industrial complexes. In addition, he has undertaken air quality assessments for a wide variety of residential schemes, from individual properties to large scale 'eco-towns'. These studies have been carried out for ESs, planning applications and to investigate potential nuisance issues, and have often made reference to relevant industry guidance produced by the Department for Environment, Food and Rural Affairs (DEFRA) and the Institute of Air Quality Management (IAQM), amongst others.

Specialism	Consultant	Qualifications, experience and memberships
	Amelia Leatherbarrow-Hurst Redmore Environmental	Amelia Leatherbarrow-Hurst is a Senior Air Quality Consultant at Redmore Environmental and Associate Member of the Institute of Environmental Sciences and IAQM. She has been responsible for conducting air quality studies for a range of projects, including residential, commercial, employment and industrial schemes with a particular emphasis on dispersion modelling of road vehicle exhaust emissions. In addition, she has produced, or project managed, over 200 assessments in support of planning applications for developments throughout the UK.
Wind Microclimate	Jon Winchester GIA	Jon is a Wind Technical Director at GIA. Jon has a BS in Mathematics, an MS in Mechanical Engineering and a PhD in Renewable Energy. Jon has 10 years' experience in the field of computational fluid dynamics (CFD), which is used to assess effects associated with wind microclimate.
Daylight and Sunlight	Sam Wallis GIA	This chapter of the ES was written by Sam Wallis BSc (Hons) MRICS. Sam is a chartered surveyor with 15 years' experience specialising in daylight and sunlight. GIA are the largest specialist daylight and sunlight advisor in the UK, with over 28 years of specialisation and expertise, having advised on some of the largest developments within Greater Manchester.
Built Heritage	Katy Lightbody Turley	MA (Hons) Town Planning, PGDip Conservation of the Historic Environment, MRTPI, IHBC Affiliate. Katy is a heritage specialist and town planner, with 19 years' experience. She represents a range of public and private sector clients and specialises in the provision of strategic and detailed advice on managing change within the historic environment. Katy is experienced in dealing with the challenges presented by the reuse, adaptation and alteration of listed buildings, heritage-led regeneration and the integration of new development into a historic context. She has contributed to over 30 Built Heritage ES Chapters involving assessing the impact of new development on the significance and setting of heritage assets, utilising best practice and recognised Historic England guidance and methodology.
Climate Change	Charlotte Ainsworth Buro Happold	Charlotte Ainsworth is a 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.
	Tom Peacock Buro Happold	Tom Peacock has an MSc in 'Sustainability and Consultancy' and is a Practitioner Member of the Institute of Environmental Management and Assessment (IEMA). He is an Environmental Consultant with experience of coordinating EIAs and writing technical chapters for a range of mixed-use developments.
Townscape and Visual Impact	Wendy Lancaster Tyler Grange	Wendy Lancaster CMLI FRSA, is a Landscape Director at Tyler Grange, Wendy has in excess of 15 years' experience and is a specialist in Landscape/Townscape and Visual Impact Assessment (L/TVIA) for large-scale strategic sites.
	Rob Mayers Tyler Grange	Rob Mayers BA (Hons) is a Landscape Architect with 9 years' experience and has been responsible for the assessment of projects over a wide variety of scales and sectors. Rob has extensive experience of preparing Landscape/Townscape and Visual Impact Assessments (L/TVIAs) for ESs for large mixed-use developments, residential schemes, infrastructure projects and developments within historic landscapes.

1.7 ENVIRONMENTAL STATEMENT AVAILABILITY

- 1.7.1 This ES and accompanying 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 applications can also be made online during the applicable consultation period using the link above.

1.8 REFERENCES

- Department for Communities & Local Government (2014) Planning Practice Guidance: Environmental Impact Assessment.
- 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.

1.9 GLOSSARY

Term	Definition
CEMP	Construction Environmental Management Plan
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
LVIA	Landscape and Visual Impact Assessment
MCC	Manchester City Council
SuDS	Dustainable drainage system
TVIA	Townscape and Visual Impact Assessment

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 plans which accompany the planning applications for the proposed development.

2.2 THE SITE AND SETTING

Location and context

The site area occupies approximately 0.072 and is located in Manchester City Centre, at National Grid Reference 383686, 397608. The site is split into two parcels of land. Site A, the larger parcel of land (0.051 hectares), is located to the east of Albion street, to the north of Trumpet Street and to the west of The Briton's Protection public house (as shown in Figure 2-1). Site B, the smaller parcel of land (0.021 hectares), is to the south of Great Bridgewater Street, to the west of the Jurys Inn Hotel, to the north of Trumpet Street and to the east of The Briton's Protection public house (as shown in Figure 2-2). The Briton's Protection public house divides the two sites.

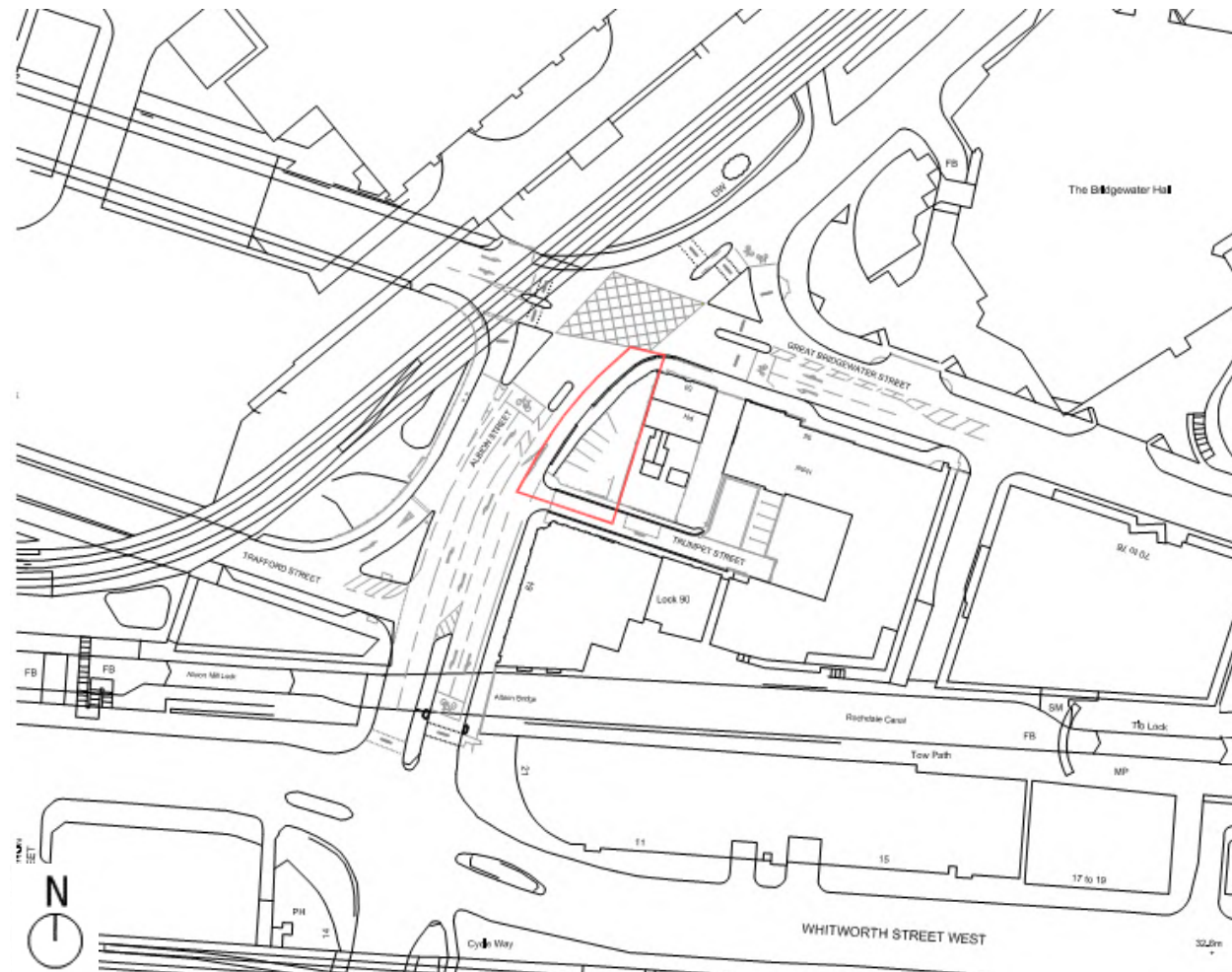


Figure 2-1 Site location for site A/application A

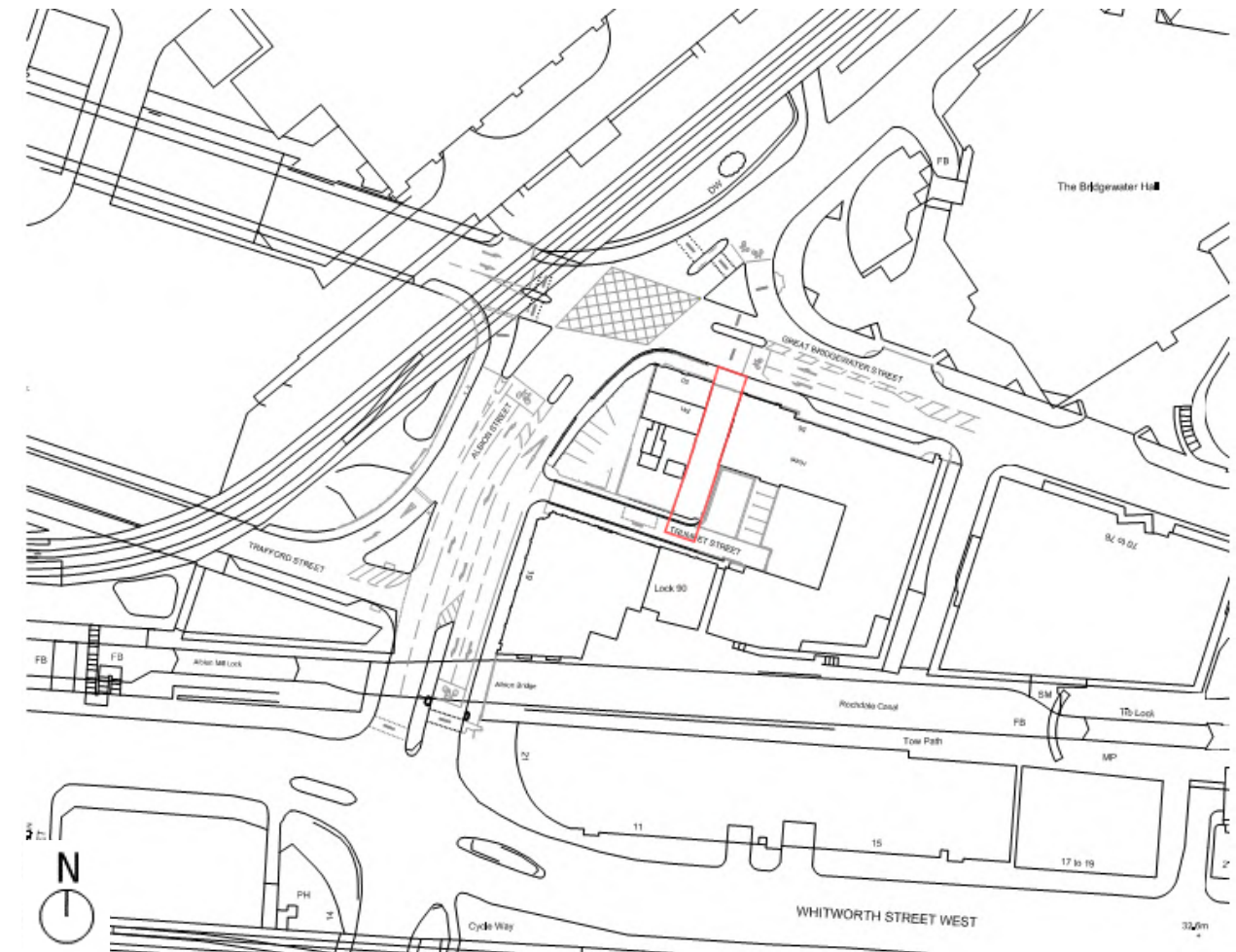


Figure 2-2 Site location for site B/application B

Surrounding uses

- 2.2.1 The area in the vicinity of the site is characterised by office, leisure, hotel and residential uses. The Bridgewater Hall concert venue and Chepstow House are located to the north east of the site and the Manchester Central Convention Centre and the Tower of Light Energy Centre are located to the north of the site. The Jurys in Hotel is located to the west of the site and Axis Tower, a residential development, is located to the south west of the site. The Hacienda residential apartments are located to the south.
- 2.2.2 A railway line runs east to west approximately 90m to the south of the site, with Deansgate Station located approximately 350m to the south west and Oxford Road station located approximately 600m to the south east. A tram line runs approximately 25m to the west of the site, with Manchester Central (Stop SP) located approximately 150m to the north and Deansgate-Castlefield tram stop located approximately 150m to the west of the site.
- 2.2.3 The Rochdale Canal is located approximately 35m to the south of the site, running east to west. The River Medlock is located approximately 170m to the south of the site, roughly running east to west,
- 2.2.4 There are a number of listed buildings in the immediate vicinity (within 250m) of the site, as follows:
- Grade II listed The Briton's Protection Public House. Directly adjacent to the site;
 - Grade II listed 13-17 Albion Street. Approximately 5m south of the site;
 - Grade II* listed G-MEX. Located approximately 70m north of the site;
 - Grade II listed Rochdale Canal Lock Number 89. Approximately 100m south east of the site;

- Grade II listed Rochdale Canal Lock Number 90. Approximately 80m south west of the site;
- Grade II listed Chepstow House. Approximately 110m to the east of the site;
- Grade II listed Peveril of the Peak Public House. Approximately 160m to the east of the site;
- Grade II listed Manchester South Junction and Altrincham Railway Viaduct. Approximately 190m south east of the site;
- Grade II listed Deansgate Station. Approximately 200m south west of the site;
- Grade II listed Rochdale Canal Lock Keepers Cottage at Lock Number 91. Approximately 200m west of the site;
- Grade II listed Rochdale Canal Lock Number 91. Approximately 210m south west of the site;
- Grade II* listed Deansgate Goods Station and Attached Carriage Ramp. Located approximately 230m north west of the site;
- Grade II listed 235-291 Deansgate. Approximately 240m north west of the site;
- Grade II* listed Midland Hotel. Located approximately 240m north of the site.
- Grade II listed Canada House. Approximately 250m to the east of the site; and
- Grade II listed Lee House. Approximately 250m to the east of the site.

2.2.5 Chapter 9 Built Heritage provides detailed information on the site history and surrounding heritage assets.

Site description

2.2.6 Site A, the larger parcel of land to the west, is currently being used for surface car parking, with an asphalt surface and space for seven cars. Site B, the smaller parcel of land to the east, currently has no formal usage, with a gravel surface. Both sites are accessed by car from the south via Trumpet Street, with the larger parcel of land also accessible on foot from the north and west.

Site baseline for the purpose of the EIA

2.2.7 For the purposes of the EIA, the baseline is the site in its current state, as of the baseline year (2022).

2.3 OVERVIEW OF THE PROPOSED DEVELOPMENT

- 2.3.1 The proposed development is split into two detailed planning applications, a detailed planning application for site A and a detailed planning application for site B.
- 2.3.2 The formal description for the site A detailed planning application is as follows:
- ‘Erection of a 26-storey residential tower for 72 apartments (Use Class C3,) with associated car parking, cycle parking, substation, servicing, and associated landscaping works.’*
- 2.3.3 The formal description for the site B detailed planning application is as follows:
- ‘Erection of a 7-storey building with commercial floorspace (Use Class E/Sui Generis) on the first and second floors and four floors (3rd-6th) of residential containing 4 apartments (Use Class C3), with associated parking and servicing.’*
- 2.3.4 An assessment of the design freeze plans has been carried out for all disciplines. The design freeze plans include floor plans, elevations (showing building height), a hard landscaping plan and an area schedule.

2.3.5 Furthermore, the DAS, prepared by the architects (LRW), submitted as a standalone document with the planning application, provides context on how the design development has evolved (see also ES Chapter 4 Alternatives and Design Evolution).

Proposed land uses

- 2.3.6 The proposed development contains the following land uses:
- 76 2-bed residential units (Use Class C3);
 - 236.86 sqm of commercial area (Use Class E/Sui Generis);
 - Associated ancillary uses (e.g. entrance lobby, plant, refuse/cycle store); and
 - Improvements to the public realm within the red line boundary.

Layout, massing and height

2.3.7 The proposed building on site A will be 26 storeys in height (121.85 m AOD). In addition, a basement level is proposed to house the water and sprinkler tanks, which will be 80.96 sqm GIA and up to 4m deep. Table 2-1 provides a breakdown of the floor area for application A.

Table 2-1 Area breakdown for application A

Floor	Description	Area (sq m GIA)
Basement	Ancillary uses (water and sprinkler tanks)	80.96
Ground floor	Ancillary uses (entrance lobby and staff facilities)	80.96
Lower mezzanine	Ancillary uses (life safety room and switch room)	61.77
Upper mezzanine	Ancillary uses (parcel room and comms/elect room)	61.77
1 st floor	Ancillary uses (refuse store, tank room and cycle store)	267.18
2 nd – 25 th floors	Residential units (72, 2 bedroom units)	6,412.26

2.3.8 The proposed building on site B will be 7 storeys in height (60.75 m AOD). There is no basement level proposed. Table 2-2 provides a breakdown of the floor area for application B.

Table 2-2 Area breakdown for application B

Floor	Description	Area (sq m GIA)
Ground floor	Ancillary uses (Entrance Lobby and Refuse Stores)	119.49
1 st floor	Ancillary uses	42.32
	Commercial area	76.11
2 nd floor	Ancillary uses	42.32
	Commercial area	76.11
3 rd 6 th floors	Residential units (6, 2 bedroom units)	1,068.71

2.3.9 Figure 2-3 and Figure 2-4 are rendered images of the proposed development from the south and the north, showing the scale of the proposed development in relation to surrounding buildings.



Figure 2-3 Rendered image of the proposed development from the south.

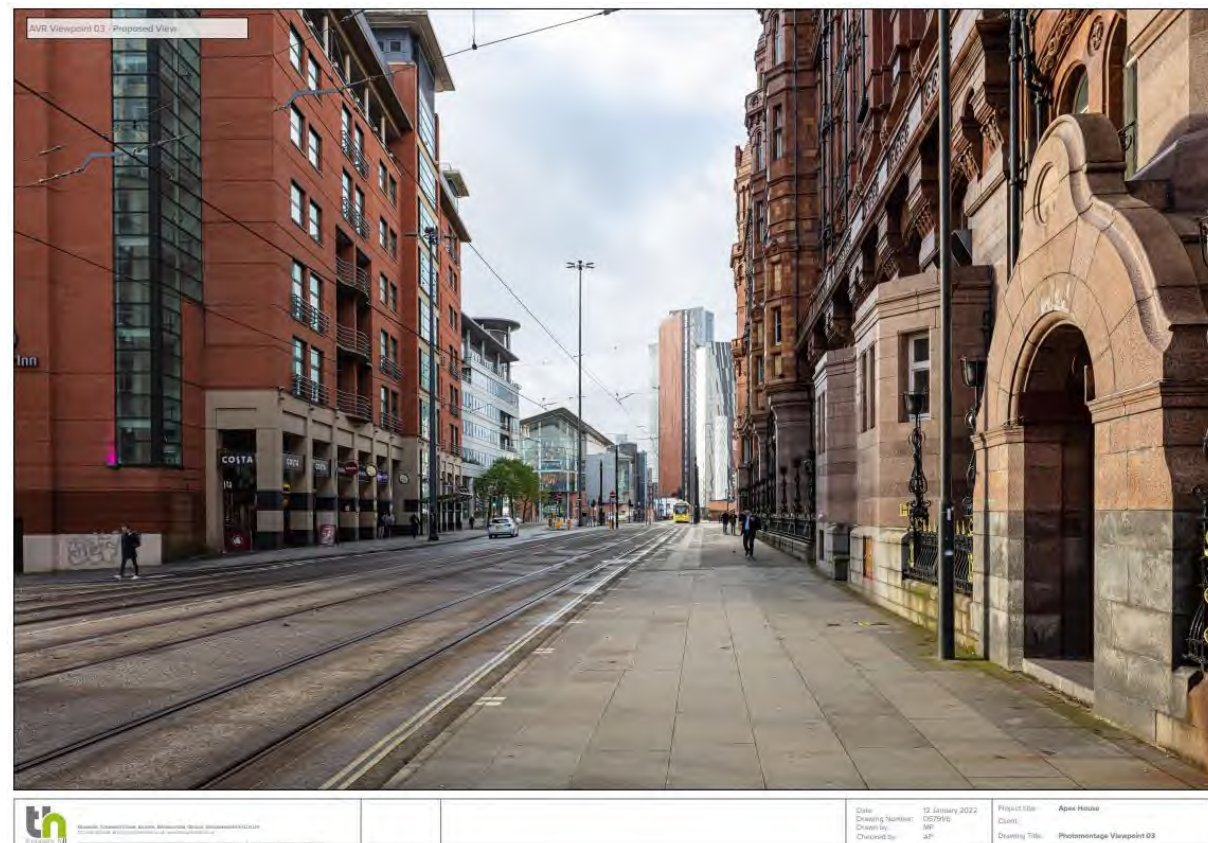


Figure 2-4 Rendered image of the proposed development from the north.

2.3.10 Figure 2-5, Figure 2-6, Figure 2-7, Figure 2-8 and Figure 2-9 show proposed layouts for site A.

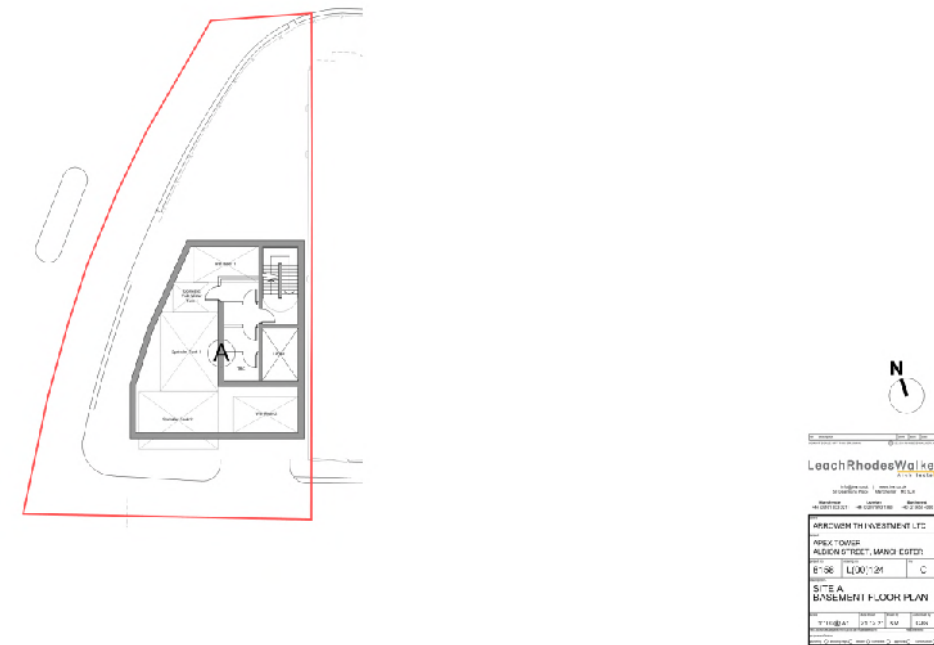


Figure 2-5 Basement layout plan for site A

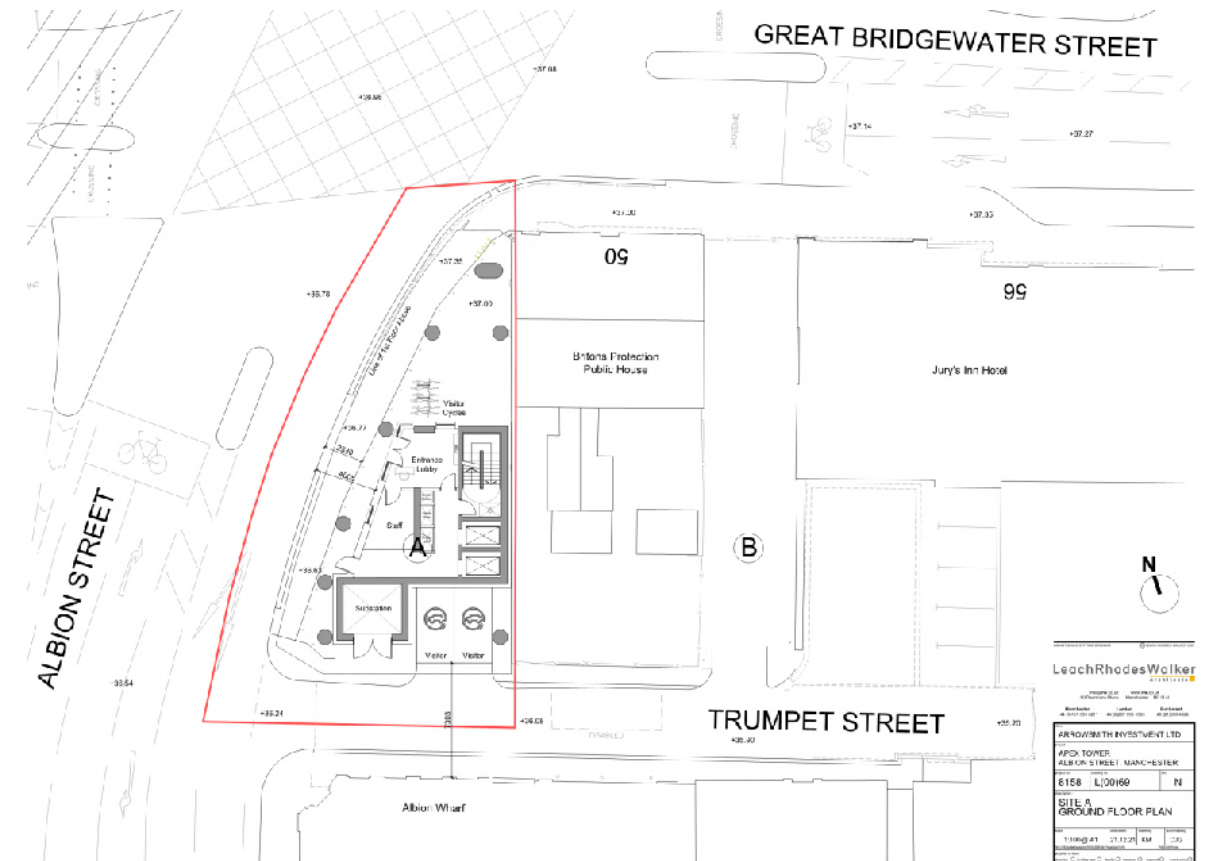


Figure 2-6 Ground floor layout plan for site A

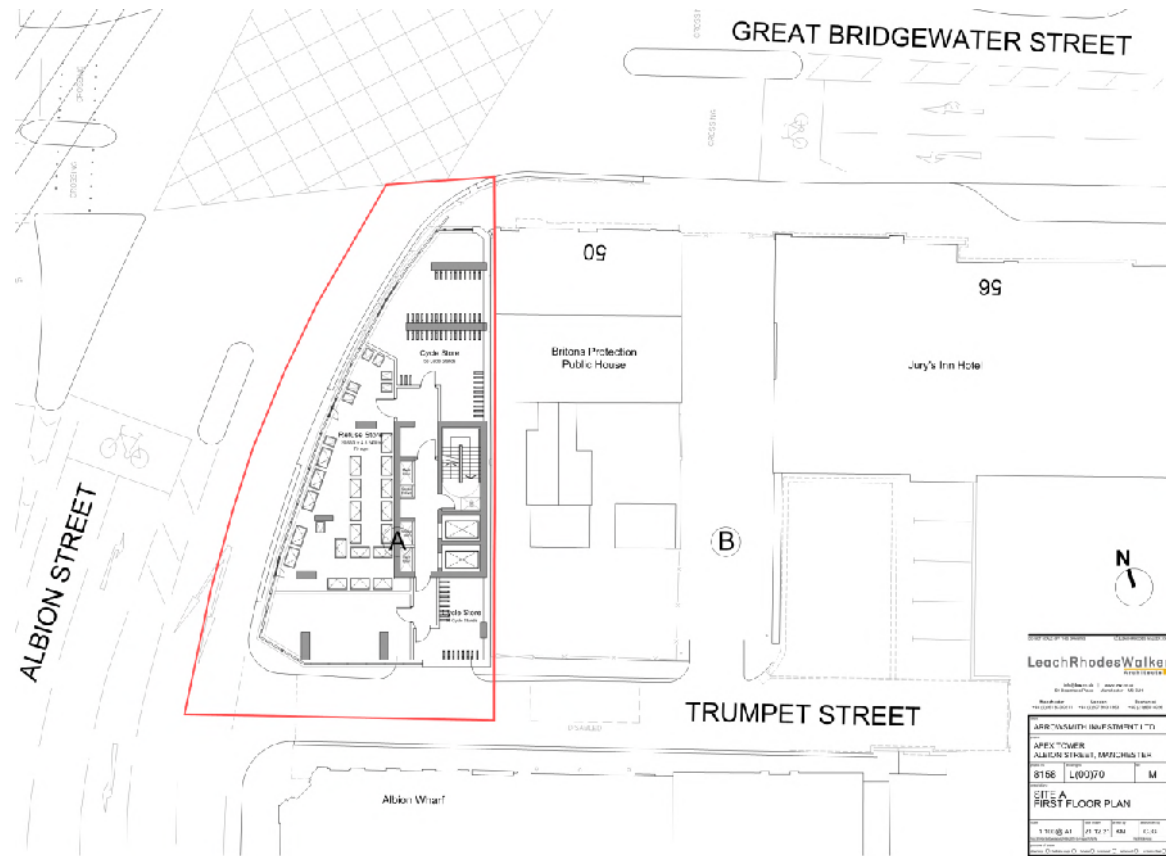


Figure 2-7 First floor layout plan for site A

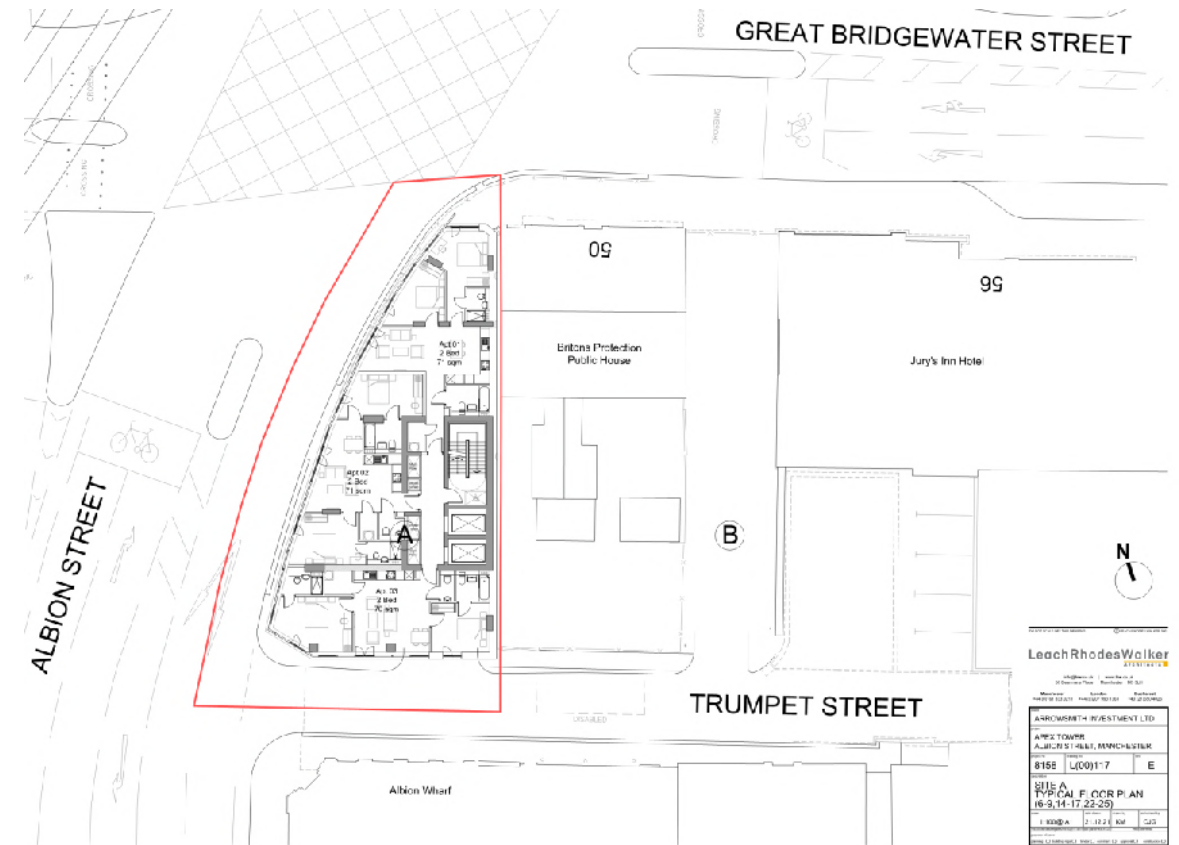


Figure 2-9 Typical layout plan for floor 6-9, 14-17 and 22-25 of site A

Figure 2-10, Figure 2-11 and Figure 2-12 show proposed layouts for site B.

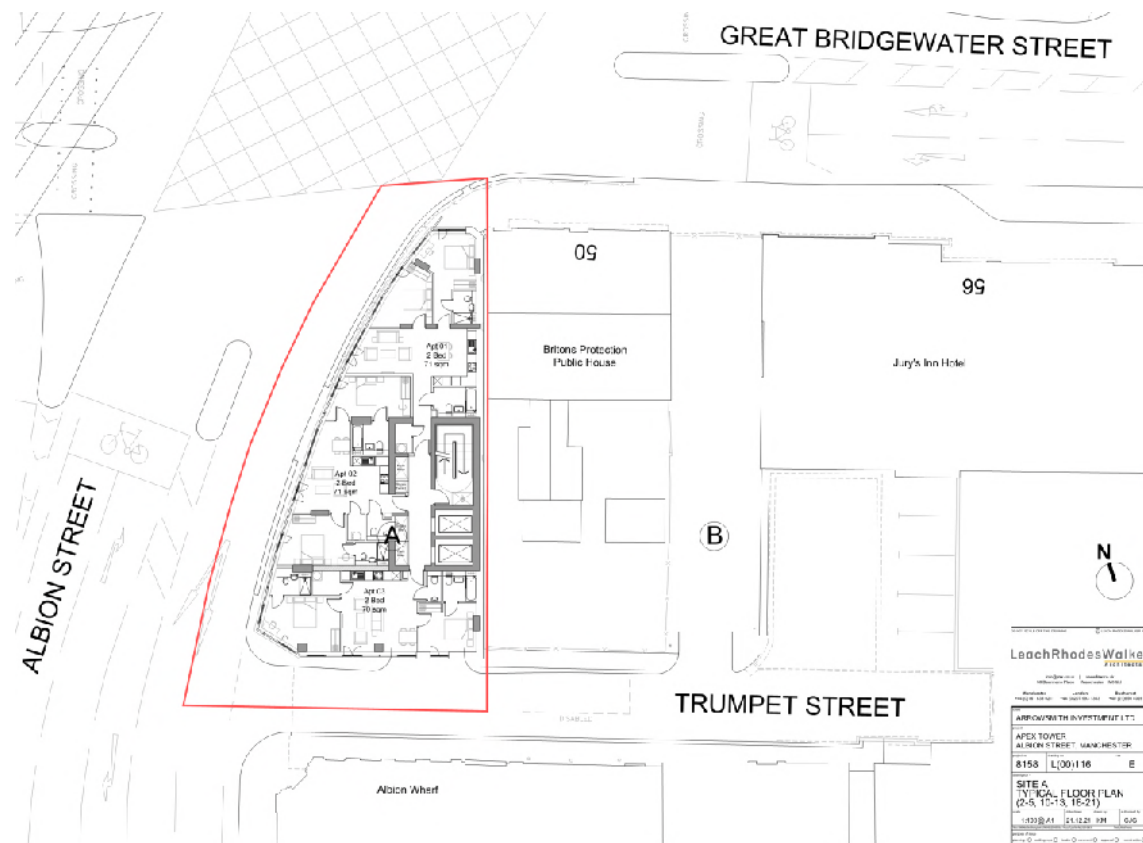


Figure 2-8 Typical layout plan for floor 2-5, 10-13 and 18-21 of site A

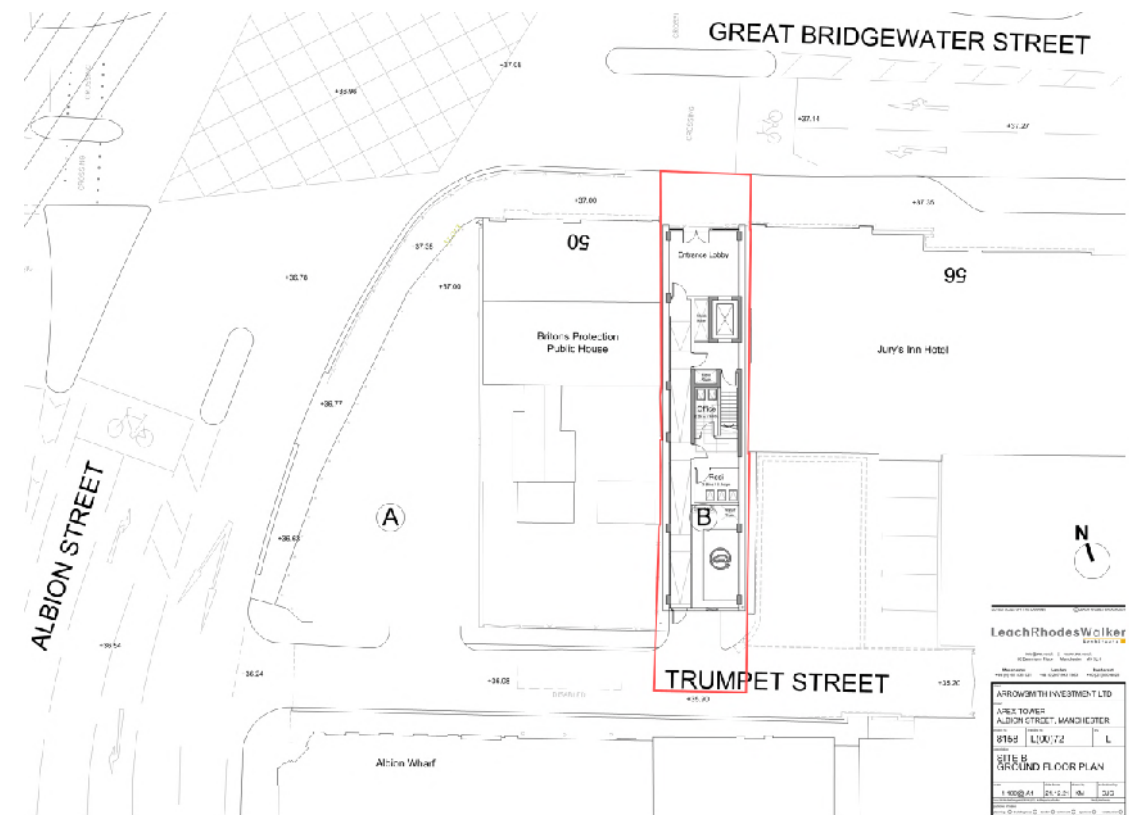


Figure 2-10 Ground floor layout for site B

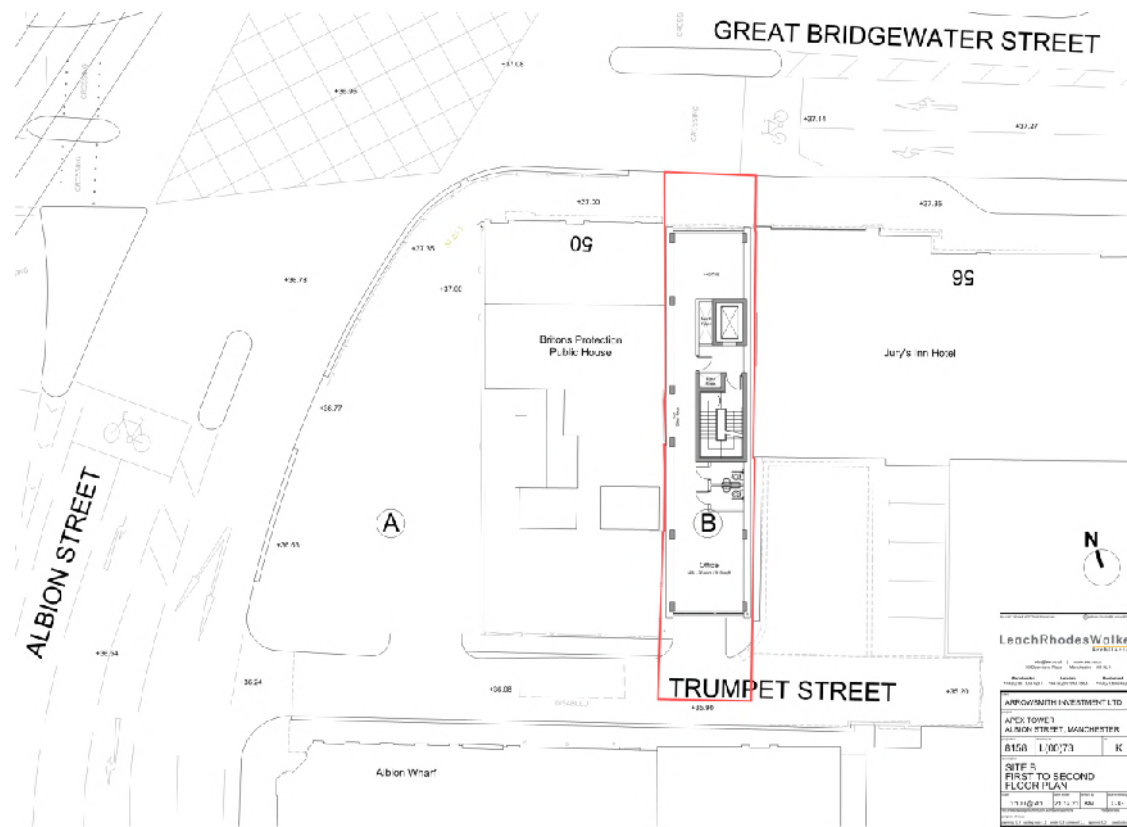


Figure 2-11 First and second floor layout for site B

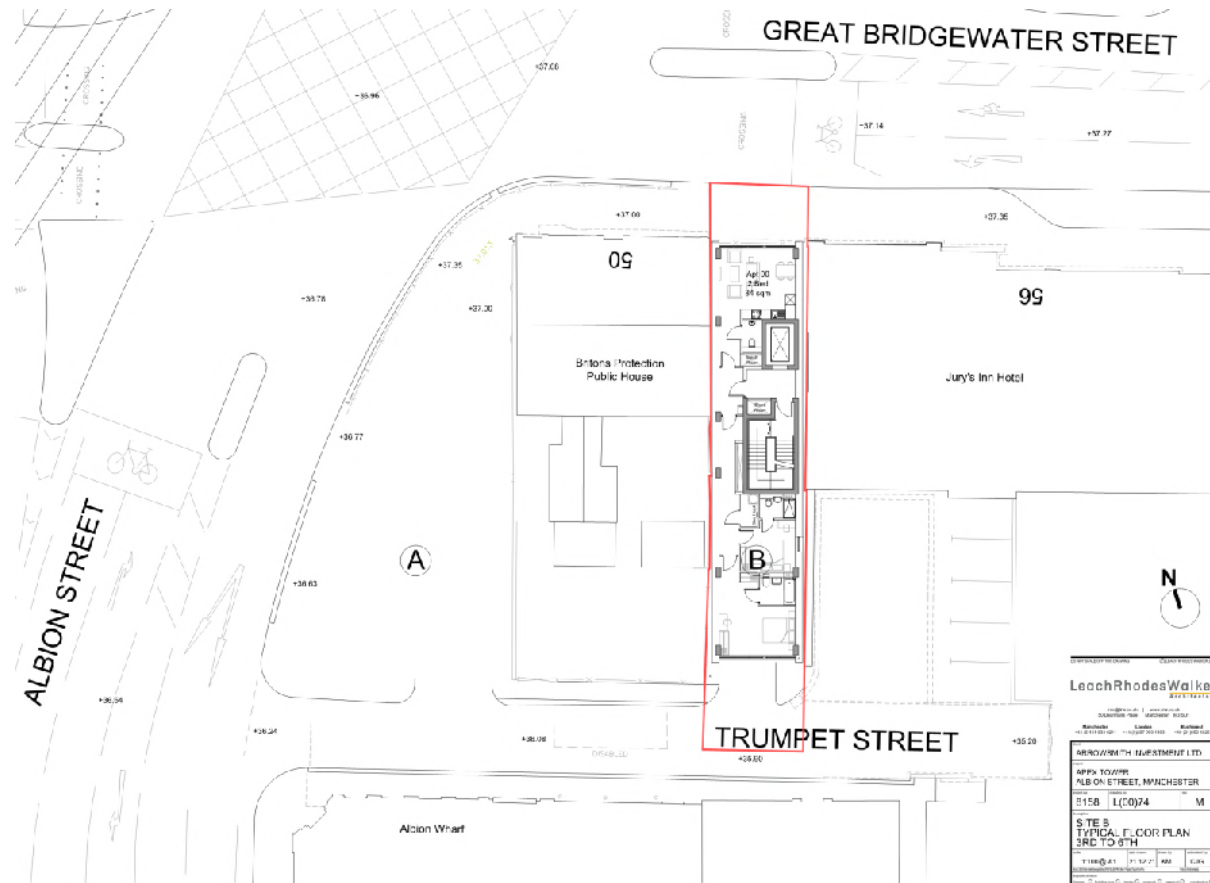


Figure 2-12 Typical residential layout for site B

Access, circulation and parking

- 2.3.11 Vehicular access to the proposed development shall be from the south via Trumpet Street. Along this south side of the proposed development, three car parking spaces are proposed, all of which will provide electric vehicle charging, and one of which will be a disabled space.
- 2.3.12 Pedestrian access to the proposed building on site A shall be from the north, on the intersection between Albion Street and Great Bridgewater Street. Pedestrian access to the proposed building on site B shall be from the north, on Great Bridgewater Street.
- 2.3.13 There will also be cycle provision as part of the proposed development, for use by residents and visitors. There will be three visitor cycle stands outside site A (with a capacity for 6 cycles), and 72 internal resident cycle storage spaces.

Landscape and open space

- 2.3.14 The proposed development contains public realm improvements, which consist of the following and the extents are shown in Figure 2-13:
- 131.4 m² of improvements within site boundary (shown in green in Figure 2-13); and
 - 132.6 m² of improvements to existing footpaths within the red line (shown in blue in Figure 2-13).

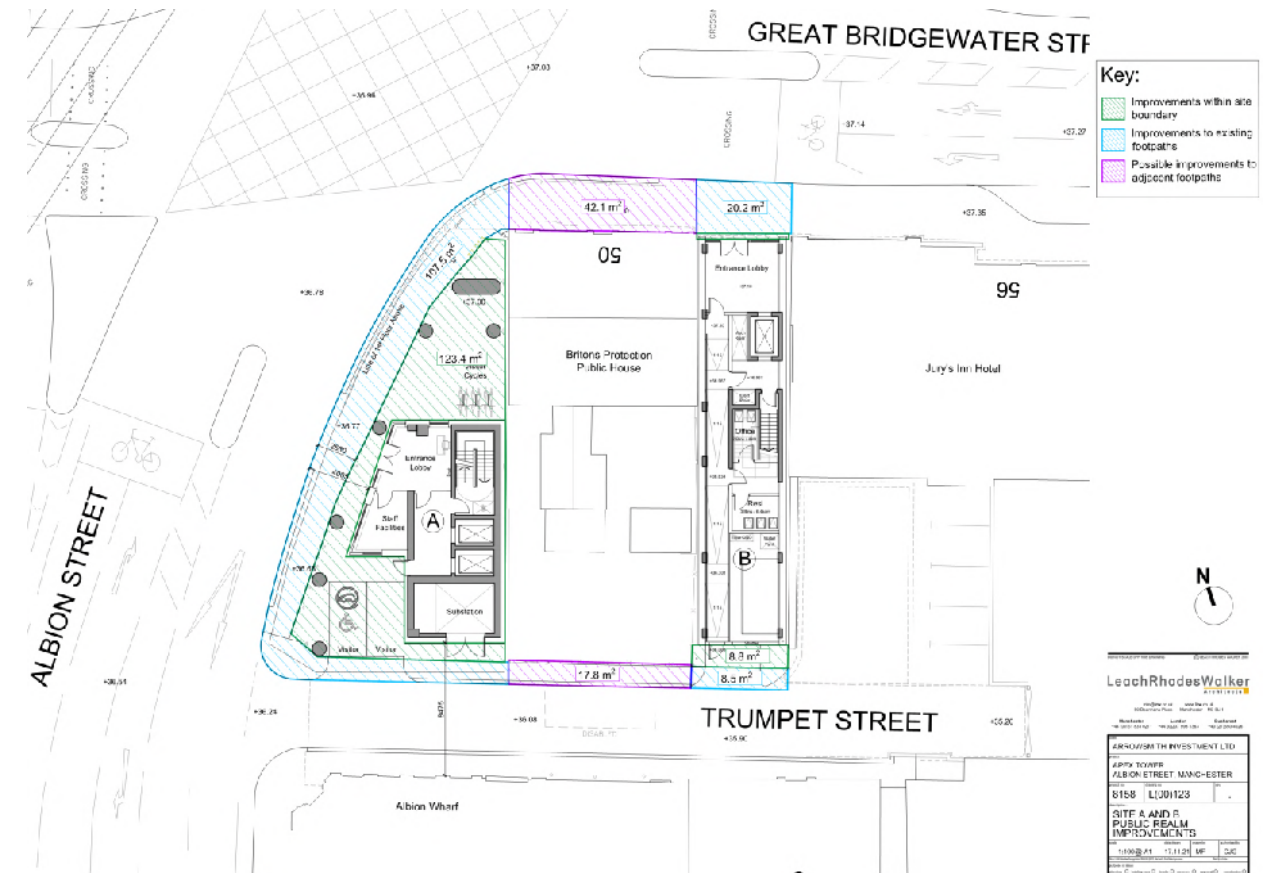


Figure 2-13 Diagram showing the likely public realm improvements as part of the proposed development.

2.4 CONSTRUCTION PROGRAMME

- 2.4.1 An indicative construction programme has been produced for the proposed development. The construction period for site A is likely to begin before site B, but they are likely to finish at a similar time, as outlined in Table 2-3.

Table 2-3 Indicative construction programme for the proposed development

Site	Indicative start date	Indicative end date
Site A	Q3 2022	Q2 2024
Site B	Q2 2023	Q2 2024

2.4.2 The indicative construction programme is further broken down by activity in Table 2-4.

Table 2-4 Indicative construction programme broken down by activity

Activity	Site A			Site B		
	Start week	Finish week	Duration	Start week	Finish week	Duration
Site preparation	1	6	5	43	45	2
Piling	6	9	3	45	48	3
Substructure	9	15	6	48	52	4
Superstructure	15	52	47	52	62	10
Bathroom pods	27	56	28			
Façade	32	63	30	61	68	7
Lift	39	66	27	66	78	10
Fitout	40	102	59	65	98	30
Tower crane and hoist infills	65	86	19			
Landscaping	93	99	6			

2.5 CONSTRUCTION METHODOLOGY

Site preparation

2.5.1 Upon receiving site possession, the contractor intends to setup and secure site boundaries, including the required two-lane road closure to Albion Street (A5103), and temporary welfare facilities which are to be initially positioned within site B. Site preparation to site A will follow with ground clearance and piling mat formation as required by the enabling works contractor.

Piling

2.5.2 Working from north to south, piling will progress to plot A. It is expected one team and piling rig will complete the piling, achieving 30 - 40 piles a week. Tower crane piles will also be completed in this visit. Muck away site haul roads will be introduced and maintained as required during the piling phase.

Substructure

2.5.3 Upon completion of site A piling, substructure works will commence. Tower crane pile caps and base will be firstly constructed to allow sufficient curing time before tower crane erection. In addition, excavation will commence to form the lift core base and pile caps, working from north to south. All excavation works adjacent to the Briton’s Protection public house will be subject to preconstruction survey information to ensure its existing structural integrity is not compromised. It is expected two teams working with a 360 tracked excavator will progressively complete the pile caps by excavating the piles, breaking the piles down and constructing reinforced pile caps. Muck away site haul roads will be introduced and maintained as required during the substructure phase.

2.5.4 Utilising the newly erected tower crane, the traditional construction of the ground floor slab will now progress, working from north to south. It is expected one team will complete the slab in two concrete pours.

Superstructure

2.5.5 Once the ground floor slab is cast, the slipform can be setup and the core can progress with one team. The construction of the columns and succeeding floor slab will now commence. To ensure greater efficiency, the contractor would consider the use of pre-cast columns, which will be delivered to site on a just in time system. Following the erection of the single or double height pre-cast columns the contractor will traditionally cast the floor slab. The slab is to be split into two pours, with all required cast-ins for the succeeding activities, unitised façade panels and lift installation. The concrete is expected to be delivered to the upper levels of the building via a concrete placing pump which is likely to be positioned within the refuse storeroom. The precast columns and traditional floor slab is expected to be completed by two teams. Precast stairs will be installed during the superstructure construction.

Site B

2.5.6 Following site A backprop removals from L00 – L01, the contractor will relocate the temporary welfare from site B to site A ground floor, utilising the visitors cycle and car park areas. Enabling works can now progress to site B beginning with site clearance and piling mat formation as required.

2.5.7 Once ready, a second piling visit will commence to site B. The piling will consist of one team and rig, working from north to south. Muck away site haul roads will be introduced and maintained as required during the piling phase.

2.5.8 Upon completion of site A slip form core, the team will move to site B to construct the lift core base, pile caps and ground floor slab.

2.5.9 To mitigate delays to site A, the contractor has programmed the construction of site B superstructure to commence once the site A superstructure is sufficiently complete. The teams working on site A will move to site B and construct the superstructure using the same principles as site A, with precast columns and traditional floor slab. As the structure is only 7 storeys, traditional formwork will be used to construct the core.

Bathroom pods

2.5.10 As the superstructure progresses and the concrete cures, the back props can be removed. Bathroom pods can then be lifted on the floors via a crane loading platform and temporarily positioned. The contractor expects the first delivery of bathroom pods to L02 to arrive after L06 slab has been cast.

Façade

2.5.11 The unitised façade panel installation is expected to commence once the superstructure reaches L10 slab. Façade units will be loaded onto the floor via the hoist. Once on the floor, they will be lifted via a spider crane, positioned on an upper floor, and fixed to the cast-in channels. Suitable crash decks will be erected, and diversions put in place to ensure safety during the installation process. The panels are expected to be installed in an anticlockwise sequence. Infill panels for the hoist and tower crane will be loaded onto the floor plate in preparation for their installation later in the programme.

2.5.12 Site B façade unit installation is expected to follow from the completion of site A.

Lift

2.5.13 A crash deck will be introduced once the structure reaches L15 slab to allow the lift installation to commence. The lift is critical to the contractor’s hoist removal strategy.

Internals

- 2.5.14
- Internal apartment fit-out commences once the façade panels are installed to L06 and required floor firestopping is complete. Apart from the prefabricated bathroom pods, the internal fit-out consists of traditionally constructed drylining, mechanical and electrical, joinery, kitchens, decorations, and general finishes. The hoist will be the primary feed for the internal finishes until the internal lift is available for use.
- 2.5.15
- Common corridor areas will be completed in-line with the apartments, except for final finishes which will follow completion of the hoist tower crane impacted apartment.
- 2.5.16
- The ground floor entrance lobby will be left as late as possible, to reduce the risk of damage to reception areas while these areas are still being used by site personnel.
- 2.5.17
- Site B internals will be completed within the same overall period as site A.

Hoist and tower crane infill

- 2.5.18
- The south apartment 03 is impacted by the tower crane and hoist. The completion of this apartment has been programmed to commence following the tower crane and hoist access removal. Slab infill works will progress first reaching L07, before façade infill panel installation at L02 commences using a spider crane or roof building maintenance unit. Internal fit-out will follow thereafter.

Temporary and permanent power

- 2.5.19
- As there is no suitable location for a temporary substation, the contractor will initially use on-site generators for power to the tower crane and other on-site requirements. The permanent substation within site A will be advanced at an early stage to enable energisation for site power use, and to serve project welfare, tower crane, hoist and general power and lighting. Following permanent power availability, generators will be removed from site.

External works landscaping

- 2.5.20
- The external works, paving, car parks and reinstating of pavements will commence once the project has reached its finishing stage and resource levels from internals have reduced.

Hours of work

- 2.5.21
- In line with MCC requirements, it is anticipated that the core working hours for construction of the proposed development will be as follows:
 - 07:30 – 18:00 hours on weekdays;
 - 08:30 – 14:00 hours on Saturday; and
 - No working normally undertaken on Sundays or Bank Holidays.
- 2.5.22
- Should any works be required to be undertaken outside these hours, approval from the MCC will be required and certain restrictions may be put in place where the works are in proximity to sensitive businesses or residential properties.

Environmental management

Construction Environmental Management Plan (CEMP)

- 2.5.23
- The commitments made within this ES will be incorporated into a CEMP, which will include roles and responsibilities, detail on control measures and activities to be undertaken to minimise environmental effects, and monitoring and record-keeping requirements. A commitment will be made to periodically review the CEMP and undertake regular environmental audits of its implementation during the construction phase. The CEMP will be prepared and agreed with the MCC prior to commencement of works.

Considerate Constructors Scheme

- 2.5.24
- The site will be registered with the ‘Considerate Constructors Scheme’. This scheme ensures that contractors carry out their operations in a safe and considerate manner with due regard to passing pedestrians and road users.

Management of noise, vibration and dust

- 2.5.25
- The potential for construction related noise, vibration and dust effects have been duly taken into consideration as detailed within Chapter 5: Noise and Vibration and Chapter 6: Air Quality of this ES. A full assessment of activities with the potential to generate high levels of noise, vibration or dust has been undertaken and mitigation strategies confirmed.

2.6 FLOOD RISK AND SURFACE WATER MANAGEMENT

- 2.6.1
- A Flood Risk Assessment (FRA) has been submitted alongside the planning applications, which includes the detailed proposals for managing flood risk for the proposed development. A summary of the proposals is provided here.
- 2.6.2
- Both site A and site B are located within flood zone 1, defined as being at low risk of fluvial and tidal flooding.
- 2.6.3
- The FRA states there are no records of groundwater flooding at either site A or site B, but that the British Geological Survey indicates there is potential for groundwater flooding at both site A and site B, with moderate risk rating.
- 2.6.4
- Both site A and site B are typically at very low risk of surface water flooding; however, a low to high risk exists on the Jurys Inn Hotel site which borders the east side of site B. To mitigate any risk associated with surface water flooding, overland flood flow routing will be considered throughout the design process. This will be achieved by maintaining the set back of the building from the highway with appropriate falls to mitigate any issues.
- 2.6.5
- Both site A and site B are considered to have a medium risk of flooding from sewers. The Level 2 Hybrid Strategic Flood Risk Assessment from Manchester City, Salford City and Trafford Councils indicates both site A and site B to be within the Conurbation Core Critical Drainage Area (CDA). Therefore, new developments are required to provide a minimum 50% reduction in surface water discharge rates from the site. The proposed development intends to reduce the rate of discharge from the site and accommodate the balance of flows up to and including the 1 in 100-year critical event plus climate change allowance. This restriction and attenuation of flows will have a positive impact on the surrounding existing drainage and hence work to mitigate the long-term risk of flooding from sewers.
- 2.6.6
- Neither site A or site B are located within the maximum extent of flooding from reservoirs. The risk of flooding from reservoirs is considered to be low to moderate.
- 2.6.7
- The proposed development should aim for a minimum reduction in surface water runoff rates of 50% for brownfield sites, with an aim of reducing runoff to greenfield rates up to a 1 in 100-year storm event, considering climate change. This will be achieved by providing onsite attenuation through the adoption of sustainable drainage systems (SuDS) features on site.

2.7 ENERGY STRATEGY

- 2.7.1 The process of evaluating the most appropriate and effective energy strategy for the proposed development has considered a number of options, including but not limited to:
 - Photovoltaic (PV) panels;
 - Solar Hot Water (SHW);
 - Air Source Heat Pumps;
 - Waste-water Heat Recovery Systems;
 - Heat Pump Hot Water Cylinders;
 - Heat recovery ventilation systems (MVHR);
 - High levels of thermal insulation;
 - Low air permeability; and
 - Maximising solar control to mitigate overheating risks.
- 2.7.2 To facilitate the proposed development, the following elements have been considered through the design process from both an energy efficiency and thermal comfort perspective:
 - Fabric insulation levels – balancing thermal performance and internal temperatures;
 - Building air permeability – this is a constraint due to the nature of the building;
 - Thermal mass – exploiting the properties of the constructions to benefit the internal environment;
 - Glazing strategy – optimising the use of the sun as a natural resource; and
 - Ventilation strategy – optimising the use of heat recovery ventilation systems.
- 2.7.3 A hierarchy approach has been adopted for the design by looking at passive design methods to reduce energy and provide a high level of energy efficiency.
- 2.7.4 The final iteration of the energy assessment keeps with the ‘fabric first’ approach, however, takes an alternative approach with minimising reliance upon low and zero carbon technologies and improving the efficiency and operation of the heating, ventilation and hot water systems.
- 2.7.5 In the residential units, MVHR will be used, along with electric panel heaters, low energy LED lighting and self-contained heat pump hot water cylinders. The commercial areas will use air source heat pumps (ASHP)/variable refrigerant flow (VRF) and instantaneous point of use water heating.
- 2.7.6 The use of electric ASHPs is in line with the aspirations of MCCs Climate Change Action Plan (MCC, 2020) and offers a significant improvement over Part L of the Building Regulations (UK Government, 2010), using Standard Assessment procedure (SAP) 2012 (BRE, 2012) methodologies, and will take advantage of the electricity grid’s reducing CO₂ emissions intensity.

2.8 References

- Building Research Establishment. (2012). The Government’s Standard Assessment Procedure for Energy Rating of Dwellings;
- Manchester City Council. (2020). Manchester City Council Climate Change Action Plan 2020-2025;
- UK Government. (2010), The Building Regulations 2010.

2.9 GLOSSARY

AOD	Above ordnance datum
CDA	Critical Drainage Area
CEMP	Construction Environmental Management Plan
DAS	Design and Access Statement
EIA	Environmental Impact Assessment
ES	Environmental Statement
FRA	Flood Risk Assessment
MCC	Manchester City Council
SFRA	Strategic Flood Risk Assessment

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 the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects’.
- 3.1.2 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 the proposed 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 The area surrounding the proposed development is undergoing substantial development in line with the relevant planning policies, specifically the Manchester Core Strategy Development Plan Document (MCC 2012). The site falls within the City Centre Regeneration Area, which under Policy H1 of the Manchester Core Strategy needs to have 16,500 new homes between 2012 and 2027. Therefore, the site has a role to play in increasing housing supply in Manchester City Centre. If the proposed development were to not go ahead, then this would impact upon MCC’s ability to meet its housing needs in full during the plan period.

3.4 ALTERNATIVE SITES

- 3.4.1 No other development sites have been considered by the applicant, as the site has been acquired by the applicant for development purposes. The site is appropriate for a mixed-use development and the proposed development has been designed as a direct response to the site’s development potential and to make the most efficient use of brownfield land. As such, no alternative sites were considered for the proposed development.

3.5 MASTERPLAN ALTERNATIVES AND DESIGN EVOLUTION

- 3.5.1 In view of the joint masterplanning process undertaken, the engagement and evolution process described through this section relates to both sites.

Engagement

Pre-application

- 3.5.2 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

- 3.5.3 The pre-application public consultation period ran for three weeks from November 16th 2021 to 8th December 2021.
- 3.5.4 Ahead of and during the public consultation, engagement was undertaken with the two adjacent neighbours – the Briton’s Protection public house and the Jurys inn hotel.
- 3.5.5 A consultation postcard was issued on 15th November 2021 to properties in the vicinity of the site, including Little Peter Street. This postcard promoted the in-person consultation event being held on 25th November 2021.
- 3.5.6 A press release was issued on 16th November 2021, providing introductory information about the proposals and details of the public consultation and how people could provide feedback. A consultation website also went live on 16th November 2021, providing details and 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 were 1920 visits to the consultation website from 1815 unique visitors.

In-person Consultation event

- 3.5.7 A consultation drop in event was held at the Jurys Inn Manchester on 25th November 2021. In total, 17 people attended the event, and one feedback form was submitted.

Methods for receiving feedback

- 3.5.8 There was a project email address, a telephone information line and an online form for providing feedback.

Summary of feedback received

- 3.5.10 In total, 335 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.

Evolution

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

Previous designs for the site

- 3.5.12 This section contains previous designs for the site. It should be noted that none of the proposals outlined below were submitted for planning permission.

2002

- 3.5.13 Initially, an option was explored that involved relocating the Briton's Protection public house, moving it further to the east, thereby making the site larger. 16 storeys were proposed with a glass façade to Albion Street and a solid element facing towards the existing pub. Figure 3-1 shows the previous scheme from 2002.



Figure 3-1 Previous Scheme 2002

2004

- 3.5.14 An option to retain the Briton's Protection public house in its existing location was subsequently explored. The footprint was contained to the boundary of Albion Street and the existing pub. 6 Storeys were presented, but the density of the development blocked views of the pub beyond and lacked presence both from and to the city. Figure 3-2 shows the previous scheme from 2004.



Figure 3-2 Previous Scheme 2004

2015

- 3.5.15 An option to retain the Briton's Protection public house in its existing location was explored further while creating an iconic structure at this major arterial route into and out of the city. The proposal straddled the existing heritage asset and revealed the existing facades of surrounding buildings from the street level. The view to Jurys Inn Hotel was maintained, as well as the finer aspects of the brick façade to the heritage asset on the site (i.e., the Briton's Protection Public House). The design was intended to welcome the future of the city while respecting the past. The building would be a combination of steel and glass façade facing Albion Street, with a masonry element to its opposing and balancing counterpart. Figure 3-3 shows the previous scheme from 2015.



Figure 3-3 Previous Scheme 2015

Evolution of the current design

- 3.5.16 The current sale shape and cut back at ground floor level for site A was developed by the architect based on their previous experience working on the site and their general experience as an architect. This design was intended to mitigate possible wind issues associated with the proposed development.
- 3.5.17 The wind microclimate consultants carried out detailed analysis at an early stage of the design process, showing that there are expected to be no wind safety or comfort issues. This also found that the following two key features of the proposed development significantly lower the wind risk:
- The significant undercut at the base of the tower is allowing space for the wind to disperse; and
 - The curved façade is allowing air to stay attached at high level and reducing the risk of downwash.

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 risk 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	Risk rating
Rainstorm	Low risk
Heavy snow	Low risk
Fog	Low risk
Hail	Low risk
Severe wind	Medium risk
Extra tropical storm	Medium risk
Lightning	Low risk
Extreme winter conditions	Low risk
Cold wave	Low risk
Extreme cold days	Low risk
Heat waves	Medium risk
Extreme hot days	Medium risk
Drought	Medium risk
Flash/surface flood	Medium risk
River flood	Medium risk
Groundwater flood	Low risk
Subsidence	Low risk
Water-borne disease	Low risk
Vector borne disease	Low risk
Air-borne disease	Low risk
Insect infestation	Low risk

3.7 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).

3.8 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

4 METHODOLOGY

4.1 INTRODUCTION

4.1.1 This chapter provides an overview of the Environmental Impact Assessment (EIA) process. It outlines the EIA methodology undertaken to assess the environmental effects of the proposed development.

4.2 APPROACH TO THE ENVIRONMENTAL IMPACT ASSESSMENT

4.2.1 This Environmental Statement (ES), which is a publicly available document, includes an assessment of the likely environmental effects of the proposed development.

4.2.2 The ES will allow Manchester City Council (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.

4.2.3 The ES has been prepared in accordance with the EIA Regulations 2017 (as amended) 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 (most recently amended in 2021);
- Institute of Environmental Management and Assessment (IEMA), Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice (IEMA, 2017);
- 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).

4.3 SCOPE OF THE ENVIRONMENTAL IMPACT ASSESSMENT

2017 EIA Regulations

4.3.1 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.

4.3.2 Table 4-1 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 ES scope is provided in the subsequent sections of this ES chapter.

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

Item	Information specified in Schedule 4	Section of this 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 resources (including water, land, soil and biodiversity) used; and d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases.	ES Volume I: Chapter 2 Development Description
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 3 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 5-10 and ES Volume II Townscape and Visual Impacts Assessment (TVIA) (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 5-10 and ES Volume II TVIA (technical assessments)

Item	Information specified in Schedule 4	Section of this Environmental Statement
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 h) 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 5-10 and ES Volume II TVIA (technical assessments) ES Volume I: Chapter 11 Cumulative 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 5-10 and ES Volume II TVIA (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 5-10 and ES Volume II TVIA (technical assessments) ES Volume I: Chapter 11 (cumulative effects) ES Volume I: Chapter 12 (conclusions)
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 of the EIA during the scoping process. See subsequent sections of this chapter for further details. A flood risk assessment (FRA) has been submitted as a separate standalone planning document.
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 5-10 and ES Volume II TVIA (technical assessments)

Stages of development assessed

- 4.3.3

The EIA has addressed effects arising from the construction and operation of the proposed development as follows:

 - Construction effects may arise directly from construction activities (e.g., emissions of dust and noise), but also from the temporary use of land (e.g., construction sites); and
 - Operational effects may arise from the use of the new or modified buildings, landscape and infrastructure (e.g., the effects of development operations).
- 4.3.4

The significance of the effects that will arise in each phase 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 receptor affected by the changes.
- 4.3.5

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”).
- 4.3.6

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.
- 4.3.7

The EIA scoping report (Appendix 4-A, ES Volume III) summarised the findings of the scoping exercise and set out the proposed scope of the EIA. The report was formally submitted to Manchester City Council (MCC) on the 20th October 2021.
- 4.3.8

Although a formal scoping opinion was not received from MCC, they did confirm that they were happy with the approach set out in the EIA scoping report. Additionally, comments have been provided by the following consultees regarding the scope of the EIA, which are provided in Appendix 4-B, ES Volume III:

 - Greater Manchester Archaeology Advisory Service;
 - Historic England;
 - The Lead Local Flood Authority;
 - Group Aerodrome Safeguarding Officer; and
 - Natural England.
- 4.3.9

In addition to these consultation responses, the authors of the noise and vibration and air quality ES chapters consulted with MCC Environmental Health Officers (EHO) regarding the scope of their assessments, who confirmed that they were happy with the scope of the assessments.
- 4.3.10

Through the EIA scoping process, the following disciplines were scoped out of the ES:

 - Traffic and transportation: it is considered that the proposed development does not have the potential to generate any significant transport effects as the number of car parking spaces provided is reduced compared to the current use, and the site is highly accessible by active travel modes and by public transport. The Transport Statement and Travel Plan submitted with the planning applications provide an appropriate and robust assessment of the transport and highways considerations.

- Water resources and flood risk: a standalone FRA and an appropriately designed Drainage Strategy with integrated sustainable urban drainage systems (SuDS) have been produced for the proposed development. No likely significant effects are anticipated with respect to flood risk, surface water drainage and foul water drainage. No likely significant effects are anticipated to water resources throughout the construction works following the implementation of a Construction Environmental Management Plan and various standard mitigating measures both pre-commencement and throughout the works.
- Ecology: the ecological assessment for this site (carried out by ERAP (Consultant Ecologists) Ltd) confirms that there are no significant ecological constraints at the site/associated with the proposed development. No potential significant adverse effects on statutory and non-statutory designated sites, Priority Habitats, invasive plant species, rare plants and protected species are identified.
- Ground Conditions: the risks and resultant effects arising from the proposed development are sufficiently well understood, and based on information currently available, it is likely that the residual effects associated with ground conditions and groundwater would be insignificant. A Phase 1 Ground Conditions Desk Study has been submitted alongside the planning application and a Preliminary Conceptual Site Model generated. A plot specific detailed intrusive ground investigation will be completed at the next stage of design development.
- Socio-economics: the proposed development will result in the addition of new residents and jobs to the local area. However, given the quantum of the proposed development, comprising 76 residential units and 236.86 sqm of office floor space, significant socio-economic effects are not expected during the construction or operational phases.
- Archaeology: historic mapping indicates that a number of structures that were once present within the site boundary were demolished in the late 20th century. The site is now utilised for private parking. It is therefore unlikely that there will be significant effects. However, an archaeological desk-based assessment has been undertaken and submitted alongside the planning applications.
- Solar glare: the façades of the proposed development will be designed with consideration given to solar glare, and any significant effects will be mitigated throughout the design evolution. There is unlikely to be significant instances of solar glare arising from the building façades with inherent mitigation to mitigate significant solar glare effects should they arise.
- Artificial lighting: any external lighting around the proposed development should be suitably designed and specified, taking on board the ILP recommendations, so that light spillage is minimised. Considering the nature of the proposed development, and nearby receptors, a dedicated ES chapter assessing light spill was not considered necessary.
- Electronic interference: the digital switchover is now complete, meaning that everyone is able to receive digital TV through an aerial. As such, it is considered that there will be no significant risks to television reception in relation to the proposed development and electronic interference was scoped out of the ES.
- Aviation: As aviation is primarily related to health and safety requirements that are not necessarily well aligned to the environmental impact assessment process, it was concluded that aviation would not be included in the ES. In addition, the site is located in an urban area with multiple clusters of tall buildings that exceed the height of the proposed development, and so aviation was not anticipated to be a significant issue. Consultation with the aerodrome safeguarding officer for Manchester airport will be carried out prior to submission of the planning applications.

- Major accidents and/or natural disasters: the proposed development is unlikely to produce a significantly elevated risk of accidents of natural disasters outside of the existing context. The proposed development will be designed in accordance with industry standards, including for drainage and building regulations. An FRA and climate change resilience and adaptation risk assessment have also been carried out for the proposed development. The proposed development itself would not include any potentially dangerous operations such as the use and processing of hazardous chemicals. Construction will adhere to good working practice.
- Human health: potentially significant effects on human health will be directly or indirectly considered across the technical chapters of the ES and non-significant human health aspects will be considered in the relevant standalone reports submitted with the planning applications.
- Waste management: effects associated with waste management will be suitably mitigated through other means. At the construction stage, waste management will be covered under the contractor's waste management and procurement policies. A Construction Environmental Management Plan will also provide suitable mitigation measures for waste in line with industry best practice. For the operational phase of the proposed development, operational waste will be managed in line with relevant policies and building standards. A waste strategy is included in the Design and Access Statement submitted with the planning applications.

4.3.11 It should be noted that a basement level was added to the design of the proposed building on site A after the EIA Scoping Report was submitted. The ground engineers and archaeologists were consulted to provide their professional judgement on whether this addition would likely lead to significant environmental effects. The following responses were received:

- Ground conditions: Reference to the basement will be added into the standalone Phase 1 assessment. From a ground conditions perspective, the inclusion of a basement will have no impact on the ES as no significant effects are anticipated. Any potential ground contamination will be within the top 2-3m of ground which will be removed by the proposed foundations, regardless of the inclusion of a basement level, and measures will be provided to ensure any contamination is appropriately mitigated; and
- Archaeology: The size of the site is small and the amount of significant archaeological potential is also small and limited. Therefore, a standalone archaeological desk based assessment submitted with the planning applications is appropriate, rather than an ES chapter, as the impact upon archaeological assets would not be significant .

Temporal scope

Overview

4.3.12 The temporal scope for the proposed development is considered to include the preparation works, construction works and the operation of the proposed development.

Baseline year

4.3.13 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 2022.

Construction period and operational year

4.3.14 The construction works for the proposed development are planned to start in 2022 and finish in 2024. The future baseline year used in the operational assessment of effects in this ES is therefore 2024 (i.e., when the proposed development is to become operational

Spatial scope

- 4.3.15 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.
- 4.3.16 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.

Assessment of applications in isolation

- 4.3.17 The ES provides an assessment of the proposed development as a whole, including the combination of all planned development proposed under both planning applications. This represents a worst-case position for most disciplines, i.e., the maximum quantum of development occurring at the same time. However, it is recognised that for some disciplines, effects could have the potential to become more adverse or less beneficial in the event that only one of either site A or site B were to be approved and come forward individually.
- 4.3.18 To account for this, a targeted assessment has been included in each technical chapter on the potential for effects to be any less beneficial (or more adverse if one application offsets the effect of the other site) if only site A or site B was to be approved and come forward in isolation.

4.4 Planning context

- 4.4.1 Planning permission is being sought for two full applications (one for site A and one for site B). Reference should be made to ES Chapter 2 Development Description, the Design and Access Statement and the development plans submitted as part of the planning applications for further details.

4.5 Assessment of effects

Types of effect

- 4.5.1 The identification of effects within the EIA process has been completed with reference to the EIA Regulations (2017, as amended) 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);

- Cumulative effects – these arise from the combination of the proposed development in conjunction with other development projects, or 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 resource; of the same nature at different locations; reoccurring over a period of time. The cumulative effect of two or more effects, which may be non-significant by themselves, can be significant on 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.

- 4.5.2 The above types of effects have been assessed for the construction and operational phases of the proposed development.

Determining significance

- 4.5.3 The EU Directive 2014/52/EU and EIA Regulations (2017, as amended) 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 effects 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.
- 4.5.4 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 resource or the receptor affected.
- 4.5.5 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.
- 4.5.6 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 4-2.

Table 4-2 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

4.6 Mitigation and residual effects

- 4.6.1 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 and effects;
 - Finding a way to reverse or repair the effect; and, as a last resort,
 - Compensation (or off-setting).
- 4.6.2 Residual effects (assuming mitigation options are applied) will then be classified by significance, as appropriate.

4.7 Development alternatives

- 4.7.1 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, along with public and stakeholder consultation comments.

4.8 Cumulative effects

- 4.8.1 Whilst effects that occur in isolation may not be significant, it is possible that significant effects could occur when a number of potential effects are combined. In light of this, the EIA process has taken into account the following potential cumulative effect scenarios:
- Inter-project cumulative effects – from the proposed development interacting with other existing and/or approved projects in the local area; and
 - Intra-project cumulative effects – generated as a result of the interaction of two or more predicted effects on a receptor/resource.
- 4.8.2 The schemes to be addressed as part of the inter-project cumulative effects assessment are discussed in detail in Chapter 11 Cumulative and Interactive Effects.

4.9 Climate Change projections

- 4.9.1 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.
- 4.9.2 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 3 Alternatives and Design Evolution (see Appendix 3-A, ES Volume III); 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.
- 4.9.3 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 London. 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 4-3. Timescales up to the 2090s have been reviewed, considering the potential lifespan of the proposed development.

Table 4-3 Projected change in selected climate variables for North-West England, based on UKCP18 data.

Season	Variable	Time Period	Projected Change At		
			10 th percentile	50 th percentile	90 th 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
Summer	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	5 to 6
		2080 – 2099	1 to 2	4 to 5	6 to 7
	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

4.9.4 Chapter 10, Greenhouse Gas Emissions, considers the effects of the proposed development with respect to climate change mitigation and carbon dioxide equivalent emissions.

4.10 Human health

4.10.1 As agreed through the EIA scoping process, potentially significant effects on human health have been considered across a number of the technical chapters, rather than in a dedicated ES chapter.

4.10.2 Exposure to contamination and disturbance has been assessed within the noise and vibration and air quality ES chapters. Visual amenity has been assessed within the townscape and visual impact assessment (ES Volume II).

4.11 References

- Department for Communities and Local Government Planning Practice Guidance: EIA, (2021).
- 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);
- Institute of Environmental Management and Assessment, EIA Guide to Climate Change Resilience and Adaptation (2020); and
- UKCP18, Environment Agency. Accessed July 2020 at <https://ukclimateprojections-ui.metoffice.gov.uk/ui/home>.

4.12 Glossary

Term	Definition
CEMP	Construction Environmental Management Plan
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
FRA	Flood Risk Assessment
IEMA	Institute of Environmental Management and Assessment
MCC	Manchester City Council
MHCLG	Ministry of Housing and Local Government
RCP	Representative Concentration Pathways
SuDS	Sustainable Drainage Systems
UKCP	The UK Climate Projections
UKCP18	UK Climate Projections 2019

4.13 APPENDICES (ES VOLUME III)

Term	Definition
4-A	EIA Scoping Report 2021
4-B	EIA Scoping Consultation Responses

5 NOISE AND VIBRATION

5.1 INTRODUCTION

- 5.1.1 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. This chapter of the ES was produced by Hydrock.
- 5.1.2 This ES chapter is supported by the following appendices within ES Volume III:
- Appendix 5-A – Monitoring locations;
 - Appendix 5-B – Noise rising curve assessment – Briton’s Protection public house;
 - Appendix 5-C – Noise rising curve assessment – Tower of Light; and
 - Appendix 5-D – Legislative framework, policy and guidance documents.
- 5.1.3 Cumulative effects associated with noise and vibration have additionally been considered within the ES and can be found in Chapter 11 Cumulative and Interactive Effects.

5.2 METHODOLOGY AND ASSESSMENT CRITERIA

- 5.2.1 This ES chapter considers the following:
- The potential effects of noise and vibration associated with the construction phase, at Existing Sensitive Receptors (ESRs);
 - The potential effects associated with existing noise and vibration sources, on Proposed Sensitive Receptors (PSRs) at the proposed development; and
 - The potential impact of changes in noise environment, as a result of the proposed development, at ESRs and PSRs.

EIA scoping

- 5.2.2 Although a formal scoping opinion was not received from MCC, they did confirm that they were happy with the approach set out in the EIA Scoping Report (Appendix 4-A, ES Volume III), which was submitted to MCC on 20th October 2021.
- 5.2.3 The potential noise and vibration impacts outlined within the scoping document, together with the noise survey methodology, were agreed with Laura Miller (Environmental Health Officer) of MCC via email consultation (15th October), as set out below:

Construction phase

- 5.2.4 An assessment has been undertaken to determine the impact of noise and vibration associated with construction activities on nearby ESRs. The assessment has been carried out in accordance with guidance provided within British Standards 5228:2009 + A1:2014 ‘Code of practice for noise and vibration control on construction’^{5.4} and open sites – Part 1: Noise (BSI, 2009).

- 5.2.5 The significance of construction noise and vibration effects will be determined through the guidance of BS5228 Part 1 Annex E and BS5228 Part 2 (BSI, 2009). The assessment of noise levels due to construction activity and their significance of effects is dependent on the prevailing ambient and construction noise levels, as well as the magnitude, duration, time of occurrence and frequency of the noise change.

Operational phase

- 5.2.6 An assessment of the impact of operational noise sources, such as external fixed plant, external exhausting plant and any equipment associated with the proposed development at existing noise sensitive receptors and the proposed development itself has been undertaken using site noise survey data, and available design documentation for any fixed equipment proposed.
- 5.2.7 Consideration has been given to existing road traffic noise with regard to impact on existing receptors and those within the proposed development. The proposed development includes three parking spaces only, the transport consultant has confirmed that the trips generated will be less than the current use of the site. Due to this no assessment of potential increase in road traffic noise levels is required.
- 5.2.8 Vibration in the operational phase has been screened out as agreed with Laura Miller from MCC. It is anticipated that vibration from the Metrolink located to the west of the site will not impact the proposed development during the operational phase due to the tramline being located on a viaduct in this location.

Baseline study methodology

Study Area

- 5.2.9 The study area for the assessment is based on nearby ESRs that are likely to be affected by the proposed development. The study area for the assessment includes the ESRs identified in Table 5-1.

Table 5-1: Existing Sensitive Receptors

Receptor	Description	Building occupancy	Bearing from the site	Distance from site
ESR1	AXIS Manchester	Residential	South-west	50m
ESR2	Briton’s Protection public house	Commercial/Residential	Located in-between the two sites	0m
ESR3	Lock 90	Office	South	5m
ESR4	Jurys Inn	Hotel	East	0m
ESR5	Bridgewater Hall	Commercial/Entertainment	North-east	55m

- 5.2.10 For the purposes of this assessment, the occupants of ESRs in the vicinity of the proposed development are considered to be the receptors most likely to be affected by noise associated with the construction and operation phases of the proposed development.

Surveys

Desk Based

- 5.2.11 The potential major sources of noise contributing to baseline conditions were identified through a desktop study of the site and surrounding land uses using available maps and aerial photography. Road traffic on Great Bridgewater Street and Albion Street, tram movements on the nearby Metrolink Line, and the remainder of the local transport network were identified as major sources of noise contributing to the baseline environment.

Noise Surveys

5.2.12 Attended noise monitoring was undertaken at the site by a competent noise specialist, between 0500 and 1300 on 27th October 2021 at monitoring location (ML) 1 and ML2. Attended monitoring was carried out between 0100 and 0400, and 1000 and 1300 on 28th October at ML3. ML4 was a spot measurement of audible fixed plant located to the rear of the pub. ML5 was chosen to measure any noise from the patrons of The Britons Protection Pub. This location was carried out over a busy period and closing period to capture a range of noise. Noise MLs locations were undertaken in five locations, as shown in Figure 5.1 and described below:

- ML1: Adjacent to the north of the site boundary on Great Bridgewater Street. This location was selected to be representative of the northern façade of the proposed development (site A and B), to monitor traffic noise from Great Bridgewater Street and any commercial noise from surrounding businesses. Monitoring was carried out to cover peak transportation periods during the daytime (0700 to 1000) and night-time (0500 to 0700) together with three consecutive hours during the quiet daytime period (1000 to 1700) in accordance with the shortened measurement procedure set out in Control of Road Traffic Noise (CRTN).
- ML2: Adjacent to the west of the site boundary and Albion Street. This location was selected to be representative of the western façade of the proposed building (site A), to monitor traffic noise from Albion Street and noise from tram movements on the viaduct. Monitoring was carried out to cover peak transportation periods during the daytime (0700 to 1000) and night-time (0500 to 0700) together with three consecutive hours during the quiet daytime period (1000 to 1700) in accordance with the shortened measurement procedure set out in CRTN. Noise monitoring here gathered a suitable level from the combined heat and power engine (CHP) ductwork and outlet associated with Manchester's Tower of Light.
- ML3: Located to the south of the site on Trumpet Street. This location was selected to monitor the quiet daytime (1000 to 1600) and night time (0100 to 0500) transportation periods, to provide robust levels suitable for assessment of industrial and construction noise at ESRs, should the upper floors of Bliss Club be used for any domestic purposes. Monitoring at this location was carried out to establish the ambient (BS5228) and background (BS4142) noise levels. Monitoring at this location was carried out between 0100 and 0400hrs (night time) and 1000 and 1300hrs (daytime).
- ML4: Located adjacent to the western boundary of the Briton's Protection public house to monitor the specific noise level of fixed plant that was audible during the night-time period upon arriving at site (2345 on 12th November). Attended noise monitoring was carried out for approximately one-minute at 1m away from the source.
- ML5: Located to the south boundary of Briton's Protection public house to monitor noise from the beer garden during what is considered to be the peak Friday night-time hours. Attended noise monitoring was carried out between approximately 0000 to 0130 on the 13th November 2021.



Figure 5-1: Approximate Noise Monitoring Locations

5.2.13 Weather conditions recorded during the survey were suitable for a noise survey and were as follows:

- Wind speed between 0ms⁻¹ and 1.5ms⁻¹;
- Negligible precipitation; and
- Temperature between 4°C and 16°C.

Assessment approach

- 5.2.14 The predicted noise levels incident upon the proposed development have been derived from the measured noise levels via application of general principles of acoustics, national guidance and current industry best practice.
- 5.2.15 Glazing and ventilation requirements, in order to achieve suitable internal noise levels, have then been determined based on British Standards 8233: 2014 'Sound insulation and noise reduction for buildings – Code of practice' (BSI, 2014) , World Health Organisation (WHO) Guidelines for Community Noise (1999) and British Standard 4142:2014 + A1:2019 'Methods for rating and assessing industrial and commercial sound (BSI, 2019) guidance. Outline glazing and ventilation configurations are subsequently provided in section 5.6.

Assessment of effects

Significance criteria

Construction phase noise

5.2.16 The generic construction sequence of works which are considered to be the most likely to give rise to significant noise effects can be divided into four specific activities:

- Enabling works;
- Piling;
- Building construction; and,
- Landscaping and external infrastructure works.

- 5.2.17 The likely significant effects of noise from the construction works have been assessed in accordance with the 'ABC Method' of BS5228-1 (BSI, 2009).
- 5.2.18 This method defines category threshold values which are determined by the time of day and existing monitored ambient noise levels in the vicinity of ESRs (rounded to the nearest 5dB). Noise likely to be generated by construction activities, known as the 'total noise level', is then compared with the 'threshold value'. If the total noise level exceeds the 'threshold value', a significant effect is deemed likely to occur.
- 5.2.19 Table 5-2 summarises the significance effect threshold values at receptors, recommended by BS5228-1 (BSI, 2009).

Table 5-2: Thresholds of significant effect at residential receptors in accordance with the ABC method of BS5228-1 (BSI, 2009)

Assessment Category and Threshold Value Period (L _{Aeq,T})	Threshold Value, dB		
	Category A *1	Category B *2	Category C *3
Weekday Daytime (07:00 to 19:00) and Saturdays (07:00 to 13:00)	65	70	75
*1 Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than this value. *2 Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values. *3 Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are more than this value.			

Construction phase vibration

- 5.2.20 Damage to buildings associated solely with ground borne vibration is uncommon, and although vibration may be noticeable, there is little evidence to suggest that cosmetic damage can occur, such as a crack in plaster, unless the magnitude of the vibration is extremely high. The most likely impact, where elevated levels of vibration do occur during the construction phase of the proposed development, is associated with perceptibility.
- 5.2.21 Where ground borne vibration is of a relatively continuous nature, there is a greater likelihood of structural damage occurring, compared to transient vibration; for example, that caused by transiting vehicles or piling. The only current national guidance document which provides a methodology for predicting levels of vibration from construction activities is BS5228- 2 (BSI, 2009). The prediction method provided relates specifically to percussive, or vibratory, rolling and piling only.
- 5.2.22 Therefore, it is not possible to accurately predict levels of vibration during the site preparation and the construction phase of proposed development. However, vibration impacts during site activities, other than piling, are uncommon. As such, to control the impact of vibration during site preparation and construction of the proposed development, limits relating to the perceptibility of vibration are typically set.
- 5.2.23 As stated in BS5228-2 (BSI, 2009) and as generally accepted, the threshold of vibration perception for humans is typically in the Peak Particle Velocity (PPV) range of 0.14 mm/s-1 to 0.3 mm/s, which forms the basis of the recommend maximum permitted vibration levels of 1 mm/s-1 PPV within occupied residential dwellings.
- 5.2.24 BS5228-2 (BSI, 2009) also sets out the distances (based on historical field measurements) at which certain activities could give rise to a just perceptible level of vibration. These distances are presented in Table 5-3.

Table 5-3: Distance at which vibration may just be perceptible

Construction Activity	Distance from activity when vibration may just be perceptible, meters
Excavation	10 – 15
Heavy Vehicles (e.g. dump trucks)	5 – 10
Hydraulic Breaker	15 – 20
Rotary Bored Piling	20 – 30

Operational phase road traffic

- 5.2.25 The Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7, 2011 (DMRB) provides guidance on defining the magnitude of noise impacts associated with changes in road traffic flows, related to the proposed development.
- 5.2.26 The magnitude of effect can be determined on the basis of a change in road traffic noise level, in terms of L_{Aeq,18hour}, as detailed in Table 5-4. However, it is considered that the absolute level of road traffic noise is also relevant in determining noise impacts.

Table 5-4: Short-term and long-term magnitude of change in road traffic noise, according to DMRB

Level of Magnitude	Short-Term Change in Noise Level L _{A10,18hour} dB	Long-Term Change in Noise Level L _{A10,18hour} dB	Significance of Impact – as described in DMRB
High	≥0.5	≥10.0	Major
Moderate	0.3 – 4.9	5.0 – 9.9	Moderate
Low	1.0 – 2.9	3.0 – 4.9	Minor
Negligible	0.1 – 0.9	0.1 – 2.9	Negligible
	0.0	0.0	No change

Operational phase building services noise

- 5.2.27 Noise levels from building services plant associated with the proposed development would need to be controlled to ensure that it would not have an adverse effect on ESRs or PSRs, relative to the background noise level. Criteria for the assessment are set in accordance with BS 4142:2014 (BSI, 2014). Using the baseline noise levels recorded at existing and future sensitive receptors, noise limits for building services plant have been calculated to ensure the requirements are met.

Receptor sensitivity

- 5.2.28 The criteria used to assess receptor sensitivity is described in Table 5-5.

Table 5-5 Criteria for determining receptor sensitivity

Sensitivity	Criteria
High	Receptor/resource has little ability to absorb change without fundamentally altering its present character, or of international or national importance. For example, hospitals, residential care homes, and internationally and nationally designated nature conservation sites which are also known to contain noise sensitive species (i.e. noise may change breeding habits or threaten species in some other way).
Moderate	Receptor/resource has moderate capacity to absorb change without significantly altering its present character. For example, residential dwellings, offices, schools, and play areas. Locally designated nature conservation sites which are also known to contain noise sensitive species (i.e. noise may change breeding habits or threaten species in some other way).
Low	Receptor/resources is tolerant of change without detriment to its character or is of low or local importance, for example, industrial estates.
Negligible	Receptor/resource is not sensitive to noise.

Magnitude of impact

- 5.2.29 Table 5-6 describes the magnitude of noise and vibration impacts. These magnitude descriptors are based upon Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment (IEMA, 2014), and the descriptors based on the Noise Exposure Hierarchy in Planning Practice Guidance (PPG) -Noise (2019).

Table 5-6: Magnitude of Impact

Descriptor	Description
Large	Impact resulting in considerable change in baseline environmental conditions predicted either to cause statutory objectives to be significantly exceeded or to result in severe undesirable/desirable consequences on the receiving environment
Medium	Impact resulting in a discernible change in baseline environmental conditions predicted either to cause statutory objectives to be marginally exceeded or to result in undesirable/desirable consequences on the receiving environment.
Small	Impact resulting in a change in baseline environmental conditions with undesirable/desirable conditions that can be tolerated.
Negligible	No discernible change in baseline environmental conditions.

Significance evaluation

- 5.2.30 The criteria used to assess how far an effect deviates from the baseline condition, i.e. the magnitude of change, are described in **Error! Reference source not found.** The significance of effect is determined by the interaction between magnitude of impact (Table 5-6) and sensitivity of receptor (Table 5-5). Magnitude descriptors are based upon IEMA Guidelines for Environmental Noise Impact Assessment (IEMA, 2014), and the descriptions based on the Noise Exposure Hierarchy in PPG-Noise (2019).

Table 5-7 Criteria for determining magnitude of change/impact

Magnitude	Sensitivity of Receptors			
	High	Medium	Low	Negligible
Large	Major	Major	Moderate/Minor	Negligible
Medium	Major	Moderate	Minor	Negligible
Small	Moderate/Minor	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

- 5.2.31 The threshold between non-significant and significant noise effects lies between 'minor' and 'moderate' as identified in Table 5-7. Minor impacts may be noticeable and intrusive but may cause a small change in behaviour. Whereas moderate impacts are likely to be noticeable and disruptive and might cause a material change in behaviour or attitude.
- 5.2.32 Effects can also be described, for example, as:
- Beneficial or adverse;
 - Permanent or reversible;
 - Short, medium or long term; and
 - Significant (major or moderate) or insignificant (negligible or minor).

5.3 Legislation and policy which has influenced assessment or mitigation

- 5.3.1 More detailed policy and guidance can be found in Appendix 5-D.

National policy and guidance

- 5.3.2 The following national planning policy is considered applicable:
- National Planning Policy Framework, 2021^{5.1}; and,
 - Noise Policy Statement for England, 2010^{5.2}.
 - World Health Organisation (WHO) – Guidelines for Community Noise (1999)
- 5.3.3 The following national guidance is considered applicable:
- Planning Practice Guidance (Live Document)^{5.3};
 - British Standards 5228:2009 + A1:2014 'Code of practice for noise and vibration control on construction^{5.4} and open sites – Part 1: Noise and Part 2: Vibration (BS5228-1 and -2);
 - BRE Controlling particles, vapour and noise pollution from construction sites (Part 1 to 5), 2003^{5.5};
 - Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7, 2011 (DMRB)^{5.6};
 - British Standards 8233: 2014 'Sound insulation and noise reduction for buildings – Code of practice' (BS8233)^{5.7};
 - Professional Practice Guidance: Planning and Noise, 2017 (ProPG)^{5.8};
 - British Standard 4142:2014 + A1:2019 'Methods for rating and assessing industrial and commercial sound' (BS4142)^{5.9};
 - British Standard 6472-1:2008 'Guide to evaluation of human exposure to vibration in buildings. Part 1: Vibration sources other than blasting' (BS6472)^{5.10};
 - Department of Transport – Calculation of Road Traffic Noise ,1988 (CRTN)^{5.11};
 - Institute of Environmental Management and Assessment (IEMA) – Guidelines for Environmental Noise Impact Assessment, 2014^{5.12}.

Regional policy and guidance

- Places for Everyone – Joint Development Plan Document (2021).

Local policy and guidance

- 5.3.4 The following local planning policy is considered applicable:
- Manchester's Local Development Framework – Core Strategy, 2012^{5.13}; and,
 - Manchester Unitary Development Plan – Extant Policies, 1995^{5.14}.
- 5.3.5 The following local guidance is considered applicable:
- Manchester City Council Planning and Noise – Technical Guidance, 2015^{5.15}.

Limitations and Assumptions

- 5.3.6 To reduce the level of uncertainty within the assessment, the following steps have been taken:
- All noise sources measured during the survey are considered to be typical of the surrounding noise environment;

- Rail noise predictions do not account for any potential future changes to the adjacent rail network;
- The noise and vibration measurement locations were selected to be representative of the noise level at the closest point of the receptors to existing sources;
- The distance between the source and nearest receptors has been measured from scale plans;
- Noise measurements were undertaken during suitable weather conditions, during the proposed operational hours of the proposed development; and,
- Noise measurements were made using Class 1, integrating sound level meters, which are accurate to 0.1dB.

5.3.7 Further consideration of potential construction noise and vibration impacts will be required, with a more detailed assessment to be conditioned and carried out once construction phasing and equipment proposals are available. However, at this stage, we did have enough information to provide an indication of potential significant effects for the purposes of this ES chapter.

5.4 BASELINE CONDITIONS

Current baseline (2022)

- 5.4.1 Observations made at the site during the noise and vibration surveys allowed any significant existing noise sources which contribute to the measured levels, to be identified. The observations identified the following:
- Road traffic noise: Noise from road traffic on Great Bridgewater Street and Albion Street was dominant across the site during the day-time.
 - Metrolink noise: Noise from the Metrolink was occasionally dominant across the site when present during the day-time.
 - Commercial noise: Plant noise from the Tower of Light was dominant during the night-time periods in the absence of other sources. During the day-time, noise from the Tower of Light was masked heavily and inaudible.
 - Noise from Briton's Protection public house: Noise from the Briton's Protection public house was occasionally audible on-site but not dominant during the day for deliveries and during the night for patrons using the venue. Noise from the Briton's Protection public house and other surrounding commercial use buildings, such as the Jurys Inn hotel, was not observed to be dominant during the survey.
- 5.4.2 Measured noise levels at each ML have been separated into daytime and night-time categories, as appropriate.
- 5.4.3 Note: Measurements carried out at ML4 were used to gather a specific noise level from a fixed plant unit observed at the rear of The Britons Protection Pub. This was used to model the impact that this could potentially have on habitable rooms that have a line of sight to the source.

Table 5-8: Summary of noise levels

Monitoring Location	Date	Time	L _{Aeq,T} dB	L _{A90,T} dB
ML1	27 th October 2021	23:00 – 07:00 07:00 – 23:00	64 67	57 60
ML2	27 th October 2021	23:00 – 07:00 07:00 – 23:00	64 67	59 61
ML3	28 th October 2021	23:00 – 07:00 07:00 – 23:00	56 60	55 55
ML4	12 th November 2021	Specific Level	68	-
ML5	13 th November 2021	00:00 – 1:30	60	54

- 5.4.4 The typical measured night time maxima at MLs, with the exception of ML4, are summarised in Table 5-9. Measured night time L_{AFmax} levels which are not representative of typical noise environment, including passing emergency vehicles, have been eliminated from this assessment, in accordance with ProPG and BS8233. ML4 has not been considered within this table as the purpose of this measurement was to gather specific noise levels from fixed plant associated with The Briton's Protection public house.

Table 5-9: Summary of typical night time maxima

Monitoring Location	Typical Night Time L _{AFmax}
ML1	81
ML2	81
ML3	64
ML5	82

Future baseline (2024)

Operation (2024)

- 5.4.5 Traffic flow data for the section of Great Bridgewater Street adjacent to the site has been obtained from the Department for Transport (DfT) website (site number: 38034). Manual traffic counts undertaken by DfT in 2019 indicate that this section of road facilitates 8,716 vehicles, in terms of Annual Average Weekday Traffic (AAWT), 2% of which are heavy goods vehicles (HGVs).
- 5.4.6 Traffic flow data for the section of Albion Street adjacent to the site has been obtained from the DfT website (site number: 57700). Manual traffic counts undertaken by DfT in 2019 indicate that this section of road facilitates 16,913 vehicles, in terms of AAWT, 0.8% of which are HGVs.
- 5.4.7 2024 baseline AAWT traffic data has been predicted based on the 2019 AAWT data described above, with the application of a TEMPro growth factor for that region (1.0603), which represents a 5% increase in AAWT traffic flow. A change in average traffic flows of 5% would be imperceptible and equate to a change of <0.5dB.
- 5.4.8 Therefore, the measured noise levels are considered to be representative of the future noise environment when the proposed development is operational.

Identified Existing Sensitive Receptors and their sensitivity

Table 5-10 Identified receptors and their sensitivity

Receptor	Sensitivity	Justification
ESR1	High	AXIS Manchester is a residential building located approximately 50m south-west of the site. Due to the residential nature and close proximity to the site, the sensitivity of this ESR is considered to be high.
ESR2	High	Briton’s Protection public house is a commercial use pub located in-between site A and B. It is understood that the upper floors of the Briton’s Protection public house comprise residential dwellings. This information was gathered from the pub owners and from witnessing coming and goings from the area whilst on site. Due to the close proximity of the building to the site and residential usage on the upper floors, the ESR is considered to be high.
ESR3	Moderate	Lock 90 is an office block containing approximately three companies. The office is in close proximity to the site (approximately 5m), however is seen to be less sensitive due to the nature of its usage.
ESR4	Moderate/High	The Jurys Inn,a hotel located to the eastern boundary of the site, is categorised as temporary residential. The sensitivity is outlined as medium/high as, often people will not be using their hotel room during the day and generally will stay for short periods of time in Manchester City Centre. The Jurys Inn is located in close proximity to the site.
ESR5	Moderate	The Bridgewater Hall is a concert hall/commercial use building located approximately 50m north-east of the site. The concert hall occasionally holds matinee performances, however is considered medium sensitivity due to the concert hall having its own set of acoustic solutions to isolate the sensitive areas of the building from the surrounding buildings and transport infrastructure.

5.5 CONSTRUCTION EFFECTS

Relevant aspects of the proposed development

5.5.1 All activities associated with the construction phase of the proposed development have the potential to generate noise and vibration that propagates beyond the site boundary. The magnitude of the effect depends upon the distance between the noise and/or vibration source and the ESRs, together with any acoustic screening.

Potential effects of the proposed development and their significance

Noise from construction activities

5.5.2 At this stage, a contractor has not been appointed, and detailed information regarding the nature and timescales of activities likely to take place during the construction phase is not known. Typical construction activities, which could give rise to construction noise impacts include (but are not limited to):

- Site clearance and preparation (i.e. ground excavation, levelling of ground, trenching, trench filling, unloading and levelling of hardcore and compacting filling;
- Groundworks and earthworks (including drainage);
- Superstructure (including envelope and roof and fit out);
- Substructure;
- Landscaping; and
- Site support activities.

5.5.3 The daytime measured noise levels representative of the ESRs and their corresponding BS8233 (BSI, 2014) construction noise threshold values are provided in Table 5-11.

Table 5-11: Guidance on effects of Vibration Levels

Receptor	Measured Noise Levels (dB LAeq)	Ambient Noise Level Rounded to the nearest 5dB(A) (dB LAeq)	Appropriate Category Value A, B or C in accordance with BS5228-1	Noise level above which activities of the construction phase may cause a significant impact at the receptor (dB LAeq)
ESR2	67	70	B	70
ESR4	67	70	B	70

- 5.5.4 Construction phase activities have the potential to generate short-term increases in noise levels. The levels of noise received at ESRs closest to the proposed development would depend on the sound power levels of equipment used, the distance to the receptors, the presence of screening or reflective surfaces and the ability of the intervening ground to absorb propagating noise. Furthermore, these factors will vary over the course of the construction period, depending on the activities taking place.
- 5.5.5 Given the potentially small distances between activities and ESRs, noise levels at the receptors may occur above the threshold values determined by BS5228 (BSI, 2009), as detailed in Table 5-11, when in the immediate vicinity.
- 5.5.6 Noise effects of the construction phase on existing and proposed residential properties are likely to be minor adverse for the majority of the construction schedule, however there is potential for short-term moderate adverse effects and in some cases major adverse effects during high-risk construction activities, which take place in the immediate vicinity of ESRs.
- 5.5.7 Therefore, it is recommended that mitigation measures be put in place in order to avoid and/or reduce potential effects where possible.

Vibration from construction activities

- 5.5.8 The nearest ESRs to the proposed construction works, as detailed in Table 5-1 would vary depending upon the part of the proposed development under construction. As a worst-case scenario, earthworks and construction works may potentially take place at a distance less than 10m from existing residential properties that are located on the upper floors of The Britons Protection public house. At this distance, it is considered possible that vibration due to the operation of construction machinery may be above the threshold of complaint. This is likely to be transient only and for very limited periods during the works.
- 5.5.9 It is considered that piling is likely to be required given the nature of the proposed development. At this time, the type(s) of piling to be used during the construction phase is not known and it is likely that the contractor responsible for undertaking construction works at the site would decide the appropriate method of piling required.
- 5.5.10 BS5228-2 (BSI, 2009) recognises that the most common form of vibration associated with piling is the intermittent type derived from conventional driven piling. The intensity of vibration disturbance, which may be registered at a receptor, would be a function of many factors. These are set out in BS5228-2 (BSI, 2009) and include:
- Energy per blow or cycle;
 - Distance between source and receptor;
 - Soil structure interaction (i.e. nature of connection between soil and structure being monitored); and
 - Construction of structure and location of measuring points (e.g. soil surface, building foundation and internal structural element).

- 5.5.11 As the responsible contractor has not yet been appointed, detailed information regarding the above is not known.
- 5.5.12 Typically, modern construction methods would implement either Continuous Flight Auger (CFA) piling or rotary bored piling techniques. These methods use trawler mounted drill rigs to insert the pile into the ground, and do not use vibratory hammers. These methods therefore don't emit high intensity transient vibration and generally emit low level constant vibration, which poses significantly lower risk of adverse impacts.
- 5.5.13 The vibration effects of the construction phase on existing and proposed residential properties is likely to be negligible to minor adverse for the majority of the construction schedule, however there is potential for short-term moderate adverse effects and in some cases major adverse effects during high-risk construction activities which take place in the immediate vicinity of ESRs.
- 5.5.14 Therefore, it is recommended that mitigation measures be put in place in order to avoid and/or reduce potential effects where possible.

Climate change and adaptation

- 5.5.15 Climate change is not considered likely to have a material effect on the assessment of noise and vibration reported in this chapter.

Summary of effects

Table 5-12 Summary of effects during construction

Receptor	Sensitivity	Description of effect	Magnitude of change/impact	Effect significance
ESR2	High	Construction noise	Small to large adverse	Minor to major adverse
		Construction vibration	Negligible to large adverse	Negligible to major adverse
ESR4	Moderate/high	Construction noise	Small to large adverse	Minor to major adverse
		Construction vibration	Negligible to large adverse	Negligible to major adverse

Supplementary mitigation measures

Construction noise and vibration mitigation

- 5.5.16 Percussive piling is not considered to be appropriate for the site in noise and vibration terms and should not form part of the construction methodology as far as possible. Rotary, CFA or alternative lower noise/vibration piling methods should be adopted as a minimum.
- 5.5.17 Best Practicable Means (as defined in Section 72 of the Control of Pollution Act 1974) will be used to reduce noise levels at all locations at all times. Where practicable, the control measures set out in BS 5228: Part 1:2009+A1 2014 Section 8 will be implemented. Generic noise and vibration measures to be adopted include:
- All plant, equipment and noise control measures applied to plant and equipment shall be maintained in good and efficient working order and operated such that noise emissions are minimised as far as reasonably practicable;
 - Equipment will be shut down when not in use;
 - Equipment fitted with enclosures shall be operated with such enclosures in place at all times;
 - Specific measures will be implemented to ensure that any risk to the structural integrity of nearby buildings in close proximity to the works as a result of vibration are avoided;

- Choice of methodology/technique for operations (including site layout) will be considered in order to eliminate or reduce emissions at sensitive locations;
- Fixed items of construction plant will be electrically powered where practicable in preference to diesel or petrol driven;
- Noisy plant will be kept as far away as possible from sensitive areas;
- Where possible, equipment will be used in the mode of operation that minimises noise;
- A temporary builder's power supply will be applied for in advance if no existing supply is available;
- All materials will be handled in a manner that minimises noise;
- Static and semi-static plant/equipment (e.g. compressors and generators) will be fitted with suitable enclosures where practicable;
- Choice of methodology/technique for operations (including site layout) will be considered in order to eliminate or reduce emissions at sensitive locations;
- Where powered tools are required; they are to be screened as far as reasonably practicable to reduce potential impact;
- Spoil will be loaded into lorries in a such a manner as to minimise impact noise, i.e:
 - Where possible softer materials (such as soils) will be loaded into lorries first to form a cushioning barrier to rubble and other hard materials to reduce impact noise.
- The nominated contractor will liaise with the local community, when necessary, to ensure they are aware of the programme of works and to give advance notice of any noisy or disruptive works. Community engagement and notification measures include:
 - A site board, shall be erected outside the site, which shall identify the main contractor's name and address, and site manager's name and contact phone number. The board shall also state the working hours of the site;
 - Letter drops to neighbouring residents before work begins;
 - Establish contact with the relevant residents' association, meetings with residents at appropriate intervals, minutes of meeting and agreed actions circulated to residents;
 - Site will keep an observations, investigations and complaints log, to be made available to MCC on request; and
 - All complaints will be responded to.

- 5.5.18 With regards to mobile plant and site vehicles:

- Equipment will be shut down when not in use or throttled down to a minimum during waiting periods;
- Vehicles shall not wait or queue on the public highway with engines running (unless the engine is required to power the operation of the vehicle, e.g., concrete wagon);
- Deliveries will be co-ordinated to prevent vehicles queuing outside site; and
- Noise from reversing alarms will be controlled and as follows:

- The site layout will be designed to limit and, where reasonably practicable, avoid the need for the reversing of vehicles. The nominated undertaker will seek to ensure that drivers are familiar with the worksite layout;
- Banksmen will be utilised to avoid, as far as reasonably practicable, the use of reversing alarms;
- Reversing alarms incorporating one of more of the features listed below or any other comparable system will be used where reasonably practicable;

1. Highly directional sounders;
2. Use of broadband signals;
3. Self-adjusting output sounders; and/or
4. Flashing warning lights.

- Reversing alarms will be set to the minimum output noise level required for health and safety compliance.

5.5.19 With the inclusion of best practicable mitigation measures, noise and vibration associated with the construction phase is likely result in minor adverse effects for the majority of the time, however there is potential for short-term moderate adverse effects when construction takes place in the immediate vicinity of sensitive receptors.

5.5.20 It is recommended that a more detailed assessment of construction noise and vibration is conditioned and carried out when more detailed information becomes available, in order to provide a more specific mitigation strategy, to be secured via a suitably worded Construction Environmental Management Plan (CEMP). While the mitigation provided is non-specific at this stage, the proposed development is considered to be feasible based on Hydrock experience with similar sites.

5.5.21 Furthermore, given the proximity of ESRs and potential for significant adverse effects, the implementation of a construction noise and vibration monitoring scheme may be appropriate, depending upon the findings of more detailed assessment works, which should be conditioned and carried out once further information becomes available. Particular consideration should be given to potential building damage of the Grade II listed Britons Protection public house, as a result of construction vibration.

Site A/application A

Table 5-13 Summary of construction supplementary mitigation measures for Application A

Adverse effect	Mitigation measure	Responsibility/mechanism for implementation	Timing
Construction Noise	More detailed assessment and scheme of Best Practicable Means via CEMP	Secured via planning condition/implemented by contractor	Pre-construction phase until construction end
	Construction noise monitoring scheme	Secured via planning condition/implemented by contractor	During construction phase
Construction Vibration	More detailed assessment and scheme of Best Practicable Means via CEMP	Secured via planning condition/implemented by contractor	Pre-construction phase until construction end
	Construction noise monitoring scheme	Secured via planning condition/implemented by contractor	During construction phase

Site B/application B

5.5.22 The supplementary mitigation measures for site B/application B are the same as those set out for site A/application.

5.6 OPERATIONAL EFFECTS

Relevant aspects of the proposed development and designed-in mitigation

5.6.1 Relevant operation aspects and designed-in mitigation that effect the acoustic environment are as follows:

- Daytime and night time internal levels;
- Noise from Briton's Protection public house beer garden;
- Commercial noise from Britons Protection public house and the Tower of Light; and
- Noise from proposed ancillary equipment/building services.

5.6.2 Each aspect is outlined in more detail within this section of the ES chapter.

Potential effects of the proposed development and their significance

Daytime internal noise levels

5.6.3 Table 5-8 shows the daytime $L_{Aeq,T}$ noise levels affecting the proposed development, and Table 5-14 summarises the attenuation requirements for living rooms and bedrooms during the daytime period.

Table 5-14: Daytime facade noise levels at proposed development and required attenuation

Proposed Sensitive Receptors	Daytime Façade Level, $L_{Aeq,T}$ dB	Minimum Composite Sound Reduction of Façade, D_w dB
Habitable Rooms on Northern Façade – Noise levels measured at ML1	67	33
Habitable Rooms on Western/Southern Façade – Noise levels measured at ML2	67	33
Habitable Rooms on Eastern Façade - Noise levels measured at ML1/2	67*	33
* Noise levels for the Eastern façade have been selected using data gathered at ML1/2. This allows for a more robust assessment.		

5.6.4 Without the implementation of mitigation measures, i.e. a suitable glazing and ventilation scheme, the potential impacts within living rooms and bedrooms during the daytime would be major adverse. Therefore, mitigation measures are required to reduce potential effects to an acceptable level.

Night time internal noise levels

5.6.5 Table 5-8 and Table 5-9 shows the night time $L_{Aeq,T}$ noise levels affecting the proposed development, and Table 5-15 summarises the attenuation requirements for living rooms and bedrooms during the night time period.

Table 5-15: Night time façade noise levels at proposed development and required attenuation

Proposed Sensitive Receptors	Night Time Façade Level, $L_{Aeq,T}$ dB	Maximum Night Time Façade Noise Level, $L_{Aeq,T}$ dB	Minimum Composite Sound Reduction of Façade, D_w dB
Habitable Rooms on Northern Façade - Noise levels measured at ML1	64	81	36
Habitable Rooms on Western/Southern Façade - Noise levels measured at ML2	64	81	36
Habitable Rooms on Eastern Façade – Average noise levels measured at ML1/2 and Maximum levels from ML5	64*	82**	37
*Noise levels for night time façade levels have been selected using data gathered at ML1/2. This allows for a more robust assessment. **Maximum noise levels for night-time include levels associated with Britons Protection public house beer garden, measured at ML5. This allows for a more robust assessment.			

- 5.6.6 Without the implementation of mitigation measures, i.e. a suitable glazing and ventilation scheme, the potential impacts within bedrooms during the night time would be moderate adverse. Therefore, mitigation measures are required to reduce potential effects to an acceptable level.

Noise from Briton's Protection public house beer garden

- 5.6.7 It has been identified that entertainment noise from the Briton's Protection public house beer garden has the potential to cause significant impacts at the proposed development. Monitoring of the external beer garden was carried out on a Friday night between 2345 to 0130, which is considered to be a busy period and representative of a worst-case scenario, with respect to night-time noise.
- 5.6.8 The measured L_{AFmax} noise levels associated with the beer garden have been used to determine the minimum composite sound reduction levels of each façade, as outlined in Table 5-14, to ensure that any potential impact from the Briton's Protection public house beer garden is accounted for.
- 5.6.9 Without the implementation of mitigation measures, the potential impacts within bedrooms during the night time would be moderate adverse. Therefore, mitigation measures are required to reduce the potential effect of noise from the Briton's Protection public house beer garden to an acceptable level.

Commercial noise from Briton's Protection public house and Tower of Light

- 5.6.10 The eastern façade of site A and the western façade of site B have the potential to be affected by noise generated from the plant at the rear of the Briton's Protection public house.
- 5.6.11 The proposed development does not include private external gardens or balconies. Due to this, the external noise impact from the Briton's Protection public house does not need to be considered externally.
- 5.6.12 When considering the site in context, in accordance with BS4142 (BSI, 2014) and the layout of the proposed development, it is appropriate to assess noise from fixed plant at Briton's Protection public house and the Tower of Light internally within proposed dwellings. Habitable rooms on the eastern façade of site A, and the western façade of site B are most likely to be affected by noise from the Briton's Protection public house and the Tower of Light, respectively.

- 5.6.13 BS4142 (BSI, 2014) highlights that the standard is generally not intended to be applied to the assessment of indoor sound levels. However, it is recognised that the sensitivity of residential premises can be reduced, and that good internal acoustic conditions can be achieved, via the implementation of design measures including façade insulation treatment, and ventilation strategy.

- 5.6.14 Paragraph 8.5 of BS4142 (BSI, 2014) states:

"Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it should be recognised that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation."

- 5.6.15 Therefore, the Noise Rating (NR) methodology, outlined within BS8233 (BSI, 2014) has been adopted for this assessment, which is designed to assess commercial/industrial type noise from building services and ancillary equipment. Internal octave-band noise levels have been predicted within habitable rooms on each façade of the proposed development, in order to determine appropriate façade insulation.
- 5.6.16 NR30 generally represents a good standard for internal noise levels within living rooms and bedrooms during the daytime period and corresponds to an internal level approximately equal to the 35 dB $L_{Aeq,T}$ guideline value, as recommended by BS8233 (BSI, 2014). However, in practice internal levels are typically less.
- 5.6.17 Similarly, NR25 generally represents a good standard for internal noise levels within bedrooms during the night-time period and corresponds to an internal level approximately equal to the 30 dB $L_{Aeq,T}$ guideline value, recommended by BS8233 (BSI, 2014). However, in practice internal levels are typically less.
- 5.6.18 Appendix 5-B and 5-C, ES Volume III provide a summary of NR calculations for living rooms and bedrooms most likely to be affected by noise from fixed plant at the Briton's Protection public house and Tower of Light.

Climate change and adaptation

- 5.6.19 Climate change is not considered likely to have a material effect on the assessment of noise and vibration reported in this chapter.
- 5.6.20 In the future, as the electric car initiative comes into effect, there will be less diesel and petrol cars on the road and therefore the noise levels within cities centres is expected to reduce, resulting in lower impacts with respect to BS8233 (BSI, 2014) and WHO (1999) guidance.

Summary of effects

Table 5-16 Summary of effects during operation

Receptor	Sensitivity	Description of effect	Magnitude of change/impact	Effect significance
All habitable rooms of the proposed development	High	Noise from Manchester City Centre – Road Traffic Noise	Medium adverse	Moderate adverse
All habitable rooms of the proposed development	High	Noise from Manchester City Centre – Plant Noise (Briton's Protection public house and Tower of Light)	Medium adverse	Moderate adverse
All habitable rooms of the proposed development	High	Noise from Manchester City Centre – Entertainment Noise from Briton's Protection public house	Medium adverse	Moderate adverse

Supplementary mitigation measures

Glazing and Ventilation

- 5.6.21 The noise attenuation requirements for living rooms and bedrooms, are summarised in Table 5-14 and Table 5-15. The requirements show that enhanced acoustic glazing is required to ensure that internal noise levels in proposed living rooms and bedrooms during the daytime and night time period, will achieve guideline noise levels, as recommended by BS8233 (BSI, 2014) and WHO (1999)guidance, with windows closed.
- 5.6.22 At this early stage of the project, detailed information has not yet been developed regarding façade construction, however it is understood that the ventilation strategy comprises mechanical ventilation, via MVHR.
- 5.6.23 The preliminary ventilation guidance outlined below is based on the understanding that the preferred approach, would be to continuous mechanical extract and supply with heat recover i.e. MVHR (Building Regulations Approved Document F - System 3).
- 5.6.24 When carrying out internal noise level predictions, the following assumptions have been made:

• Windows are closed;

• A reverberation time of 0.5 seconds in habitable rooms;

• External walls will provide a sound reduction performance that is at least 5 dB better than the specified glazing; and

• Mechanical ventilation i.e. MVHR units.
- 5.6.25 Internal noise level predictions indicate that the inclusion of enhanced acoustic glazing, such as 6mm/16mm argon/8.8mm laminated double-glazed unit in suitable frame, will ensure internal noise levels achieve 35dB $L_{Aeq, T}$ during the daytime, together with 30dB $L_{Aeq, T}$ and 45dB L_{AFmax} during the night time, in habitable rooms, as recommended by BS8233 (BSI, 2014) and WHO (1999).

Commercial noise from Briton’s Protection public house and Tower of Light

- 5.6.26 Appendix 5-B, ES Volume III provides a summary of NR calculations for living rooms and bedrooms most likely to be affected by noise from fixed plant at the Briton’s Protection public house. Enhanced acoustic glazing, such as 8.8mm/16mm argon/12.8mm is required to achieve NR25 with respect to fixed plant at the Briton’s Protection. This represents a more robust glazing system than otherwise required for transportation noise in accordance with BS8233 (BSI, 2014) and WHO (1999). The enhanced acoustic glazing described here should be adopted for the east façade of site A and west façade of site B i.e., facades with a direct line of sight to Briton’s Protection public house.
- 5.6.27 As discussed previously in this section, enhanced acoustic glazing, such as 6mm/16mm argon/8.8mm is required to achieve suitable internal noise levels which accord with the recommendations of BS8233 (BSI, 2014) and WHO (1999), which also ensures NR25 is achieved with respect to noise from the Tower of Light, as demonstrated in Appendix 5-C, ES Volume III.

Plant noise limits

- 5.6.28 Noise from any potential proposed plant can be controlled via the use of standard mitigation measures, such as acoustics attenuators, enclosures and louvres with sizing and performance established at a later design phase.
- 5.6.29 It is recommended that noise emissions associated with any ancillary equipment should be limited to the values in Table 5-17, in order to ensure any commercial noise does not exceed the existing background noise level at the site.

Table 5-17: Plant noise emission limits

Propose Development	Maximum Noise Rating Levels, $L_{A,Tr}$	
	Daytime (07:00 to 23:00) $L_{Ar, 15mins}$	Night Time (23:00 to 07:00) $L_{Ar, 15mins}$
	50	50

- 5.6.30 However, impacts associated with commercial noise sources should be determined on a case-by-case basis, taking in to account the context, including factors such as exceedance of sound over background level, absolute level of sound, character of sound and sensitivity of receptors.

Summary of Mitigation Measures

Site A/application A

Table 5-18 Summary of operational supplementary mitigation measures for Application A

Adverse effect	Mitigation measure	Responsibility/mechanism for implementation	Timing
Internal noise levels	The use of suitable glazing and ventilation strategies	Secured via planning/implemented by contractor	Design phase
Plant noise	Plant noise limits – to be controlled via acoustic attenuators, screening, enclosures and/or louvres	Secured via planning/implemented by contractor	Design phase

Site B/application B

- 5.6.31 The supplementary mitigation measures for site B/application B are the same as those set out for site A/application.

5.7 RESIDUAL EFFECTS AND CONCLUSIONS

Table 5-19 Summary of residual effects during construction

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
ESR2	Construction noise	Minor to major adverse	Further assessment works, suitably worded CEMP and implementation of BPM. Potential construction monitoring.	Minor to short-term moderate adverse
	Construction vibration	Negligible to major adverse	Further assessment works, suitably worded CEMP and implementation of BPM. Potential construction monitoring.	Negligible to short-term moderate adverse
ESR4	Construction noise	Minor to major adverse	Further assessment works, suitably worded CEMP and implementation of BPM.	Negligible to short-term moderate adverse
	Construction vibration	Negligible to major adverse	Further assessment works, suitably worded CEMP and implementation of BPM. Potential construction monitoring.	Negligible to short-term moderate adverse

Table 5-20 Summary of residual effects during operation

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
Proposed habitable rooms	Noise from Manchester City Centre – Transportation and Community Noise	Moderate adverse	Enhanced acoustic glazing and mechanical ventilation	Negligible
	Plant Noise (Britons Protection public house and Tower of Light)	Moderate adverse	Enhanced acoustic glazing and mechanical ventilation	Negligible
	Britons Protection public house beer garden	Moderate adverse	Enhanced acoustic glazing and mechanical ventilation	Negligible

5.8 ASSESSMENT OF ONE APPLICATION COMING FORWARD IN ISOLATION

- 5.8.1 The ES provides an assessment of the proposed development combined across the site. This will be the combination of all planned development proposed under both planning applications. This represents a robust assessment in terms of potential noise and vibration impacts due to consideration of the maximum quantum of development occurring at the same time. The conclusions of this assessment would not change should only one of the sites be accepted.

5.9 FUTURE MONITORING OF SIGNIFICANT RESIDUAL ENVIRONMENTAL EFFECTS

- 5.9.1 The assessment of potential construction noise and vibration impacts highlights that there is potential for short-term moderate adverse effects following the implementation of mitigation, due to the close proximity of ESRs. Therefore, the implementation of a construction noise and vibration monitoring scheme may be appropriate, depending upon the findings of more detailed assessment works, which are to be conditioned and carried out once further information pertaining to construction methodology becomes available.
- 5.9.2 Construction noise and vibration monitoring should be carried out when activities considered to have a high-risk of potential noise and vibration impacts are taking place, such as piling, as a minimum. Particular consideration should be given to potential building damage of the Grade II listed Briton's Protection public house, as a result of construction vibration.

5.10 REFERENCES

- Association of Noise Consultants (ANC) (2017), Professional Practice Guidance: Planning and Noise (ProPG), Association of Noise Consultants (ANC).
- B Berglund, T Lindvall, D H Schwela (1999), World Health Organisation (WHO) – Guidelines for Community Noise, Stockholm University and Karolinska Institute.
- British Standards Institution (2008), British Standard 6472-1:2008 'Guide to evaluation of human exposure to vibration in buildings. Part 1: Vibration sources other than blasting' (BS6472), BSI Standards Limited.
- British Standards Institution (2014), 'Sound insulation and noise reduction for buildings – Code of practice' (BS8233), BSI Standards Limited.
- British Standards Institution (2014), Code of practice for noise and vibration control on construction^{5.4} and open sites – Part 1: Noise and Part 2: Vibration (BS5228-1 and -2), BSI Standards Limited.

- British Standards Institution (2019), British Standard 4142:2014 + A1:2019 'Methods for rating and assessing industrial and commercial sound' (BS4142), BSI Standards Limited.
- Department for Environment, Food and Rural Affairs (Defra) (2010), Noise Policy Statement for England, Department for Environment, Food and Rural Affairs.
- Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (2016), Planning Practice Guidance (Live Document), Ministry of Housing, Communities and Local Government.
- Department of Transport (1988), Department of Transport – Calculation of Road Traffic Noise, HMSO Publications Centre.
- Environmental Protection, Environmental Health, The Neighbour Hood Service (2015), Manchester City Council Planning and Noise – Technical Guidance, Manchester City Council
- Greater Manchester Council (2021), Places for Everyone: Joint Development Plan Document – Bolton, Burnley, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, Wigan, Greater Manchester Council.
- Institute of Environmental Management and Assessment (IEMA) (2014), Guidelines for Environmental Noise Impact Assessment, IEMA.
- Ministry of Housing, Communities and Local Government (2019), National Planning Policy Framework, Ministry of Housing, Communities and Local Government.
- Planning Strategy Team (1995), Manchester Unitary Development Plan – Extant Policies, Manchester City Council
- Planning Strategy Team (2012), Manchester's Local Development Framework – Core Strategy, Manchester City Council.
- The Highways Agency (2011), Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7, 2011 (DMRB), The Highways Agency.
- V Kukadia, S Upton, C Grimwood (2003), BRE Controlling particles, vapour and noise pollution from construction sites (Part 1 to 5), BRE Electronic Publications.
- The Highways Agency (2011), Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7, 2011 (DMRB), The Highways Agency.
- P Dennett (2021), Places for Everyone – Joint Development Plan Document, Greater Manchester.

5.11 GLOSSARY

Term	Definition
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2×10^{-5} Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq,T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.

Term	Definition
L _{Amax}	L _{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L _{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L _{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L ₁₀ and L ₉₀	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L _n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L ₁₀ is the level exceeded for 10% of the time, and the L ₉₀ is the level exceeded for 90% of the time.
R _w	R _w is the single-number quantity which characterizes the sound insulating properties of a given material over a range of frequencies. This is typically measured in a laboratory in accordance with BS EN ISO 717-1.
D _{n,e,w}	D _{n,e,w} is the single number quantity which characterizes the airborne sound insulation performance across a given 'element' and is typically used to describe the acoustic performance of trickle ventilators etc.
C _{tr}	C _{tr} is a correction term applied to single-number sound insulation values (R _w , D _{n,e,w} etc.) to afford additional weighting against low frequency performance.

5.12 LIST OF APPENDICES (ES VOLUME III)

Reference	Title
Appendix 5-A	Approximate Site Location and Monitoring Locations
Appendix 5-B	Noise Rating Curve Assessment – Britons Protection Plant - Proposed Habitable Rooms (Site A: Eastern, Site B: Western facades)
Appendix 5-C	Noise Rating Curve Assessment – Tower of Light - Proposed Habitable Rooms (Remaining Facades)
Appendix 5-D	Legislative Framework, Policy and Guidance Documents

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. This chapter of the ES was produced by Redmore Environmental.
- 6.1.2 This ES chapter is supported by the following appendix within ES Volume III:
- Appendix 6-A – Air quality assessment input data.
- 6.1.3 Cumulative effects associated with Air Quality have additionally been considered within the ES and can be found in Chapter 11 Cumulative and Interactive Effects.

6.2 METHODOLOGY AND ASSESSMENT CRITERIA

EIA Scoping

- 6.2.1 Although a formal scoping opinion was not received from MCC, they did confirm that they were happy with the approach set out in the EIA Scoping Report (Appendix 4-A, ES Volume III), which was submitted to MCC on 20th October 2021.
- 6.2.2 The EIA Scoping Report was supplemented by consultation with Lisa Jones, Environmental Health Officer at MCC, in order to agree the specific assessment methodology. This is summarised in Table 6-1.

Table 6-1 Summary of consultation responses

Consultee	Date	Comments	Actions
Lisa Jones, Environmental Health Officer at MCC	19 th November 2021	The proposed methodology for the air quality assessment is acceptable	Undertook assessment in accordance with agreed methodology
Natural England	8 th December 2021	The ES should take account of the risks of air pollution and how these can be managed or reduced	The assessment considered the potential risks of air quality impacts at ecological designations as a result of the development

Baseline study methodology

- 6.2.3 Baseline air quality conditions in the vicinity of the proposed development were defined through a desk-top study utilising the following sources:
- The Department for Food, Environment and Rural Affairs (DEFRA) air quality resource website (DEFRA, no date);
 - Consultation with the Environmental Health Department at MCC;
 - Greater Manchester Combined Authority (GMCA) Air Quality Annual Status Report (GMCA, 2020);
 - Aerial photography available from Google Maps (Google, no date);
 - Ordnance Survey feature maps (Ordnance Survey, no date); and,

- The Multi Agency Geographic Information for the Countryside (MAGIC) website (Natural England, no date).

- 6.2.4 It is acknowledged that the wider EIA considers 2022 as a baseline, to align with the submission of the planning application. However, for the purposes of the Air Quality Assessment, a historical base year is necessary to allow predicted pollutant levels to be verified against monitored concentrations. As such, a base year of 2019 was adopted. This was the most recent year with representative survey results at the time of assessment and for the purpose of the ES is considered representative of the 2022 baseline year.

Assessment approach

- 6.2.5 The proposed development has the potential to cause air quality impacts during the construction and operational phases. These have been assessed in accordance with the following methodology.
- 6.2.6 The proposed development includes two separate applications, a description of which can be found in Chapter 2 Development Description.
- 6.2.7 It should be noted that assessment of these sites independently was not considered relevant to the construction phase as both site A and site B would result in the same impacts.

Construction phase assessment

- 6.2.8 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V1.1' (IAQM, 2016).
- 6.2.9 Activities on the site during the construction period have been divided into three types to reflect their different potential impacts. These are:
- Earthworks;
 - Construction; and,
 - Trackout.
- 6.2.10 The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:
- Annoyance due to dust soiling;
 - Harm to ecological receptors; and
 - The risk of health effects due to a significant increase in exposure to particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀).
- 6.2.11 The first stage screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment proceeds to the next stage. Additionally, should ecological receptors be identified within 50m of the site, or the construction vehicle route up to 500m from the site entrance, then the assessment also proceeds to the next stage.
- 6.2.12 The second stage of the assessment screens the risk of potential dust impacts. It should be noted that the standard IAQM terminology of risk has been replaced with significance criteria, and the magnitude of dust emissions 'small', 'medium' and 'large' have been replaced with 'minor', 'moderate' and 'major', respectively, to allow continuity throughout the Environmental Statement (ES) and comparison of various effects. A site is initially allocated an effect significance (risk) category based on two factors:

- The sensitivity of the area to dust impacts, which can be defined as low, moderate or high sensitivity; and,
- The scale and nature of the works, which determines the magnitude of dust arising as large, medium or small.

6.2.13 The two factors are combined in order to determine the potential effect significance without the mitigation applied.

6.2.14 The influencing factors that define the sensitivity of the area around a proposed development to potential impacts are shown in Table 6-2.

Table 6-2 Construction dust - examples of factors defining sensitivity of an area

Examples			
Receptor sensitivity	Human receptors		Ecological receptors
	High	Users would expect to enjoy high levels of amenity; High aesthetic or value property; People expected to be present continuously for extended periods of time; and Locations where members of the public are exposed over a time period relevant to the Air Quality Objective (AQO) for PM ₁₀ e.g. residential properties, hospitals, schools and residential care homes.	Internationally or nationally designated site e.g. Special Area of Conservation.
	Moderate	Users would expect to enjoy a reasonable level of amenity; Aesthetics or value of their property could be diminished by soiling; and People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work.	Nationally designated site e.g. Sites of Special Scientific Interest.
	Low	Enjoyment of amenity would not reasonably be expected; Property would not be expected to be diminished in appearance; and Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, playing fields, farmland, footpaths, short term car park and roads.	Locally designated site e.g. Local Nature Reserve.

6.2.15 The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and,
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

6.2.16 These factors were considered in the undertaking of this assessment.

6.2.17 The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 6-3.

Table 6-3 Construction dust - sensitivity of the area to dust soiling effects on people and property

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
High	More than 100	High	High	Moderate	Low
	10 – 100	High	Moderate	Low	Low
	1 -10	Moderate	Low	Low	Low
Moderate	More than 1	Moderate	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

6.2.18 Table 6-4 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 6-4 Construction dust - sensitivity of the area to human health impacts

Receptor sensitivity	Background annual mean PM ₁₀ concentration	Number of receptors	Distance from the source (m)			
			Less than 20	Less than 50	Less than 100	Less than 350
High	Greater than 32µg/m ³	More than 100	High	High	High	Moderate
		10 - 100	High	High	Moderate	Low
		1 - 10	High	Moderate	Low	Low
	28 - 32µg/m ³	More than 100	High	High	Medium	Low
		10 - 100	High	Moderate	Low	Low
		1 - 10	High	Moderate	Low	Low
	24 - 28µg/m ³	More than 100	High	Moderate	Low	Low
		10 - 100	High	Moderate	Low	Low
		1 - 10	Moderate	Low	Low	Low
	Less than 24µg/m ³	More than 100	Moderate	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Moderate	Greater than 32µg/m ³	More than 10	High	Moderate	Low	Low
		1 - 10	Moderate	Low	Low	Low
	28 - 32µg/m ³	More than 10	Moderate	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	24 - 28µg/m ³	More than 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	Less than 24µg/m ³	More than 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	-	More than 1	Low	Low	Low	Low

6.2.19 Table 6-5 outlines the criteria for determining the sensitivity of the area to ecological impacts.

Table 6-5 Construction dust - sensitivity of the area to ecological impacts

Receptor sensitivity	Distance from the source (m)	
	Less than 20	Less than 50
High	High	Moderate
Moderate	Moderate	Low
Low	Low	Low

6.2.20 The scale and nature of the construction works determine the magnitude of dust impacts arising from each activity. The relevant criteria are summarised in Table 6-6.

Table 6-6 Construction dust - Magnitude of emission

Magnitude	Activity	Criteria
Large	Earthworks	Total site area greater than 10,000m ² Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) More than 10 heavy earth moving vehicles active at any one time Formation of bunds greater than 8m in height More than 100,000 tonnes of material moved
	Construction	Total building volume greater than 100,000m ³ On-site concrete batching Sandblasting
	Trackout	More than 50 Heavy Duty Vehicle (HDV) trips per day Potentially dusty surface material (e.g. high clay content) Unpaved road length greater than 100m
Medium	Earthworks	Total site area 2,500m ² to 10,000m ² Moderately dusty soil type (e.g. silt) 5 to 10 heavy earth moving vehicles active at any one time Formation of bunds 4m to 8m in height Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	Total building volume 25,000m ³ to 100,000m ³ Potentially dusty construction material (e.g. concrete) On site concrete batching
	Trackout	10 to 50 HDV trips per day Moderately dusty surface material (e.g. high clay content) Unpaved road length 50m to 100m
Small	Earthworks	Total site area less than 2,500m ² Soil type with large grain size (e.g. sand) Less than 5 heavy earth moving vehicles active at any one time Formation of bunds less than 4m in height Total material moved less than 20,000 tonnes Earthworks during wetter months
	Construction	Total building volume less than 25,000m ³ Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	Less than 10 HDV trips per day Surface material with low potential for dust release Unpaved road length less than 50m

6.2.21 The dust emission magnitude and the sensitivity of the area were combined to determine the significance of the unmitigated impacts.

6.2.22 Table 6-7 outlines the effect significance from earthworks and construction activities.

Table 6-7 Construction dust – Effect significance from earthworks and construction activities

Receptor sensitivity	Dust emissions magnitude		
	Large	Medium	Small
High	Major	Moderate	Minor
Moderate	Moderate	Moderate	Minor
Low	Minor	Minor	Negligible

6.2.23 Table 6-8 outlines the effect significance from trackout activities.

Table 6-8 Construction dust - Effect significance from trackout activities

Receptor sensitivity	Dust emissions magnitude		
	Large	Medium	Small
High	Major	Moderate	Minor
Moderate	Moderate	Minor	Negligible
Low	Minor	Minor	Negligible

6.2.24 It should be noted that all construction dust impacts are classified as adverse as they relate to a deterioration in baseline air quality.

6.2.25 Site specific mitigation measures were identified from the IAQM guidance (IAQM, 2016) to reduce potential dust impacts based upon the predicted effect significance. For sites with negligible effects, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

6.2.26 The significance of residual impacts was determined based on professional judgment. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible, hence the residual effect will normally be negligible. A negligible effect is regarded as not significant with respect to the Town and Country Planning (Environmental Impact Assessment) Regulations (UK Government, 2017, as amended).

Operational phase assessment

Potential future exposure

6.2.27 The proposed development has the potential to expose future residents to poor air quality. Pollutant concentrations were therefore quantified across both site A and site B using dispersion modelling. The results were subsequently compared with the relevant AQOs and Air Quality Limit Values (AQLV) to determine the potential for any exceedence. Reference should be made to Appendix 6-A, ES Volume III for a full description of the assessment input data.

6.2.28 Should the AQOs or AQLVs be exceeded, then the IAQM guidance (IAQM, 2017) considers potential air quality impacts associated with a proposed development to be significant and mitigation is required. Should compliance with the AQOs be indicated, then impacts would be considered to be not significant with respect to the Town and Country Planning (EIA) Regulations (UK Government, 2017, as amended).

Potential development impacts

- 6.2.29 There is potential for road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase to impact on existing air quality at sensitive receptor locations. An assessment was therefore undertaken in accordance with the IAQM guidance 'Land-use Planning & Development Control: Planning for Air Quality' (IAQM, 2017). This involved comparing the predicted total daily vehicle trip generation from the site during operation with the following thresholds:
- A change of Light Duty Vehicle (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; and,
 - A change of HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere.
- 6.2.30 Should these criteria not be met, then the IAQM guidance (IAQM, 2017) indicates potential road traffic exhaust emission impacts associated with a proposed development are negligible and no further assessment is required. These effects would be considered to be not significant.

6.3 Legislation and policy which has influenced assessment or mitigation

Legislation

The Air Quality Standards Regulations (UK Government, 2010)

- 6.3.1 The Air Quality Standards Regulations (UK Government, 2010) came into force on 11th June 2010 and include AQLVs for the following pollutants:
- NO₂;
 - Sulphur dioxide;
 - Lead;
 - PM₁₀;
 - Particulate matter with an aerodynamic diameter of less than 2.5µm (PM_{2.5});
 - Benzene; and,
 - Carbon monoxide.
- 6.3.2 Target values have also been provided for several additional pollutants.

The Environment Act (UK Government, 1995)

- 6.3.3 Part IV of the Environment Act (UK Government, 1995) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007 (DEFRA, 2007). The AQS sets out AQOs that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.
- 6.3.4 Table 6-9 presents the AQOs and AQLVs for pollutants considered within the assessment.

Table 6-9 Air quality objective/air quality limit value

		Air quality objective/Air quality limit value	
		Concentration (µg/m ³)	Averaging period
Pollutant	NO ₂	40	Annual mean
		200	1-hour mean, not to be exceeded on more than 18 occasions per annum
	PM ₁₀	40	Annual mean
		50	24-hour mean, not to be exceeded on more than 35 occasions
	PM _{2.5}	20 ^(a)	Annual mean

Note: (a) The annual mean AQLV for PM_{2.5} was amended on 18th November 2020 within The Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020)

- 6.3.5 Table 6-10 summarises the advice provided in DEFRA Local Air Quality Management Technical Guidance (TG16) (DEFRA, 2021) on where the AQOs for pollutants considered with this ES chapter apply.

Table 6-10 Examples of where the air quality objectives apply

Averaging period	Where objectives should apply	Where objectives should not apply
Annual mean	All locations where members of the public might be regularly exposed. Building facades 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.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives 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.

Local air quality management

- 6.3.6 Under Section 82 of the Environment Act (Part IV) (UK Government, 1995) Local Authorities are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure are likely to be exceeded, the local authority is required to declare an AQMA. For each AQMA the local authority is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

The Environment Act (UK Government, 2021)

6.3.7 The Environment Act was updated on 10th November 2021. The new legislation establishes a legally binding duty on government to bring forward at least two new air quality targets into secondary legislation by 31st October 2022. It should be noted the AQOs and AQLV outlined in Table 6-9 was the most up to date criteria at the time of assessment.

Environmental Protection Act (UK Government, 1990)

6.3.8 The main requirements with respect to dust control from industrial or trade premises which are not regulated under the Environmental Permitting (England and Wales) Regulations (UK Government, 2016) and subsequent amendments, such as construction sites, is provided in Section 79 of Part III of the Environmental Protection Act (UK Government, 1990). The Act defines nuisance as:

"any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance,"

6.3.9 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the local authority is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (UK Government, 1990). The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

National policy and guidance

National Planning Policy Framework (MHCLG, 2021)

6.3.10 The revised NPPF was published in July 2021 and sets out the Government's planning policies for England and how these are expected to be applied.

6.3.11 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives, including the following of relevance to air quality:

"c) An environmental objective - to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

6.3.12 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

"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 [...]"

6.3.13 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, 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. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

6.3.14 The implications of the NPPF have been considered throughout this assessment.

Planning Practice Guidance (MHCLG, 2021)

6.3.15 The PPG web-based resource was launched on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

- What air quality considerations does planning need to address?;
- What is the role of plan-making with regard to air quality?;
- Are air quality concerns relevant to neighbourhood planning?;
- What information is available about air quality?;
- When could air quality considerations be relevant to the proposed development management process?;
- What specific issues may need to be considered when assessing air quality impacts?;
- How detailed does an air quality assessment need to be?; and
- How can an impact on air quality be mitigated?

6.3.16 This information was reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

Regional policy and guidance

Places For Everyone – Joint Development Plan Document, Publication Stage (GMCA, 2021)

6.3.17 The plan (GMCA, 2021) sets out a strategic policy framework for the nine boroughs and helps these areas to meet their local housing and employment needs by identifying land and infrastructure to support growth. A review of the document indicated the following policy of relevance to the assessment:

Policy JP-S 6 Clean Air

A comprehensive range of measures will be taken to support improvements in air quality, focusing particularly on locations where people live, where children learn and play, where there are impacts on the green infrastructure network and where air quality targets are not being met, including:

1. Locating and designing development, and focusing transport investment, so as to reduce reliance on forms of transport that generate air pollution;

2. Determining planning applications in accordance with the most recent development and planning control guidance published jointly by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), and the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction, or relevant successor guidance, including the requirement for developers to submit construction management plans as appropriate;

3. Requiring applications for developments that could have an adverse impact on air quality to submit relevant air pollution data and, if approved, to make appropriate provision for future monitoring of air pollution;

4. Restricting and carefully regulating developments that would generate significant point source pollution such as some types of industrial activity and energy generation;

5. Significantly expanding the network of electric vehicle charging points, both for public and private use, including as part of new developments;

6. Implementing the charging Clean Air Zone within the Plan area, as directed by Government and associated measures;

7. Facilitating the more sustainable distribution of goods within the urban area, including through accommodating urban consolidation centres and urban distribution centres that use ultra-low-emission vehicles, and local delivery facilities to reduce repeat delivery attempts;

8. Designing streets to avoid trapping air pollution at ground level, including through the appropriate location and scale of buildings and trees;

9. Controlling traffic and parking within and around schools and early years sites;

10. Promoting actions that help remove pollutants from the air, such as enhancing the green infrastructure network and using innovative building materials that capture air pollutants; and,

11. Development should be located in areas that maximise the use of sustainable travel modes and be designed to minimise exposure to high levels of air pollution, particularly for vulnerable users.

6.3.18 Although not formally adopted, the implications of the above policy were taken into consideration throughout the undertaking of the assessment.

Local policy and guidance

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

6.3.19 The Manchester Local Development Framework consists of a series of planning documents of which the Core Strategy (MCC, 2012) is central. This was adopted by MCC on 11th July 2012 and provides policies which guide the determination of planning applications within the city.

6.3.20 A review of the Core Strategy indicated the following policies of relevance to the assessment:

Policy EN 16 Air Quality

“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 effect 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 plant.

When assessing the appropriateness of locations for new development the Council will consider the effects on air quality, alongside other plan objectives. This includes cumulative effects, particularly in Air Quality Management Areas.”

Policy DM 1 Development Management

“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.”

6.3.21 The implications of the above policies were taken into consideration throughout the undertaking of the assessment.

Other relevant policy, standards and guidance

6.3.22 The following air quality related guidance was utilised throughout the assessment:

- Guidance on the Assessment of Dust from Demolition and Construction Version 1.1 (IAQM), 2016);
- Guidance of Land-Use Planning & Development Control: Planning for Air Quality (IAQM, 2017);
- Local Air Quality Management Technical Guidance (TG16) (DEFRA, 2021);
- Design Manual for Roads and Bridges (DMRB) LA105: Air Quality (Highways England, 2019);
- Mitigation of Development Air Quality Impacts V1.1. (IAQM, 2018); and,
- Town and Country Planning (Environmental Impact Assessment) Regulations (UK Government, 2017, as amended).

Assessment limitations and assumptions

6.3.23 A number of air quality factors are likely to change in future years and therefore act as limitations to the assessment, these include:

- Background pollutant concentrations are predicted to decrease in future years as a result of Government policies and legislation to reduce pollutant emissions. Although there is uncertainty over the level of likely decrease, DEFRA have modelled anticipated air quality conditions. The results from 2024 were therefore utilised to represent future background conditions on the assumption that current Government forecasts are reasonable; and
- Road traffic exhaust emissions are predicted to decrease in future years with changes to the UK’s vehicle fleet in line with Government legislation. Although there is uncertainty over the level of likely decrease, DEFRA have predicted future emission factors. The data for 2024 were therefore utilised to represent future emission factors on the assumption that current Government forecasts are reasonable.

6.3.24 A number of assumptions have been made in the undertaking of the assessment. These include the following:

- The meteorological data used for the assessment is representative of the conditions at the site;
- The background concentrations used for the assessment are representative of future annual mean pollutant concentrations at the site;
- The traffic data obtained for the purpose of the assessment is accurate;

- The road widths and speeds applied to traffic data are accurate;
- The emissions factors obtained from the Emission Factor Toolkit, as described in Appendix 6-A, ES Volume III and used in the assessment of operational phase road traffic exhaust emissions, are representative of future vehicle emissions;
- The monitoring data used in the assessment was accurate; and,
- The unpaved length of roads on-site during the construction phase will be less than 50m.

6.3.25 The above assumptions are similar to those required for any project of this nature and the adoption of worst-case parameters where necessary has ensured the assessment results can be considered sufficiently robust.

6.4 BASELINE CONDITIONS

Current baseline

Introduction

6.4.1 Existing air quality conditions in the vicinity of the site were identified in order to provide a baseline for assessment. These are detailed in the following sections.

Local air quality management

6.4.2 As required by the Environment Act (UK Government, 1995), MCC has undertaken a review and assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO₂ are above the AQO within the city. As such, a number of roads within Manchester have been included within the GMCA AQMA.

6.4.3 The site is located within the AQMA. As such, there is potential for the exposure of future residents to poor air quality and vehicles travelling to and from the site to increase pollution levels in this sensitive area. This has been considered throughout the assessment.

6.4.4 MCC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMA's have been designated.

Background concentrations

6.4.5 Predictions of background pollutant concentrations on a 1km-by-1km grid basis have been produced by DEFRA for the entire UK to assist local authorities in their review and assessment of air quality. The site is located in grid square National Grid Reference (NGR): 384500, 397500. Data for this location was downloaded from the DEFRA website (DEFRA, 2021) for the purpose of the assessment and is summarised Table 6-11.

Table 6-11 2019 background pollutant concentration predictions

Pollutant	2019 Predicted background pollutant concentrations (µg/m³)
NO ₂	26.07
PM ₁₀	13.47
PM _{2.5}	8.69

6.4.6 As shown in Table 6-11, predicted background NO₂, PM₁₀ and PM_{2.5} concentrations are below the relevant AQOs and AQLV at the site in 2019.

Local air quality monitoring data

6.4.7 Monitoring of pollutant concentrations is undertaken by MCC throughout their area of jurisdiction. Recent results from the closest survey position to the site are shown in Table 6-12.

Table 6-12 Monitoring results - NO₂

			Monitored NO ₂ concentrations (µg/m³)		
			2017	2018	2019
Monitoring site	MAN1	Manchester, Oxford Road	65.0	62.0	59.0
	MA29ANO	Oxford Street	57.7	58.8	55.4
	MA77NO	Hewitt Street	38.8	41.0	43.7
	MA82/83/84NO	Manchester, Oxford Road	56.2	54.0	52.0

6.4.8 As shown in Table 6-12, annual mean NO₂ concentrations were above the relevant AQO of 40µg/m³ at all monitoring locations in recent years. As these monitors are located adjacent to the roadside within the AQMA, elevated concentrations would be expected.

6.4.9 Recent annual mean PM₁₀ results recorded in the vicinity of the site are shown in Table 6-13.

Table 6-13 Monitoring results - PM₁₀

			Monitored PM ₁₀ concentrations (µg/m³)		
			2017	2018	2019
Monitoring site	MAN1	Manchester, Oxford Road	27.0	30.0	26.0

6.4.10 As shown in Table 6-13, the annual mean AQO for PM₁₀ was achieved at the MAN1 monitor in recent years. Reference should be made to Figure 6-1 for a map of the survey positions in comparison to the site.

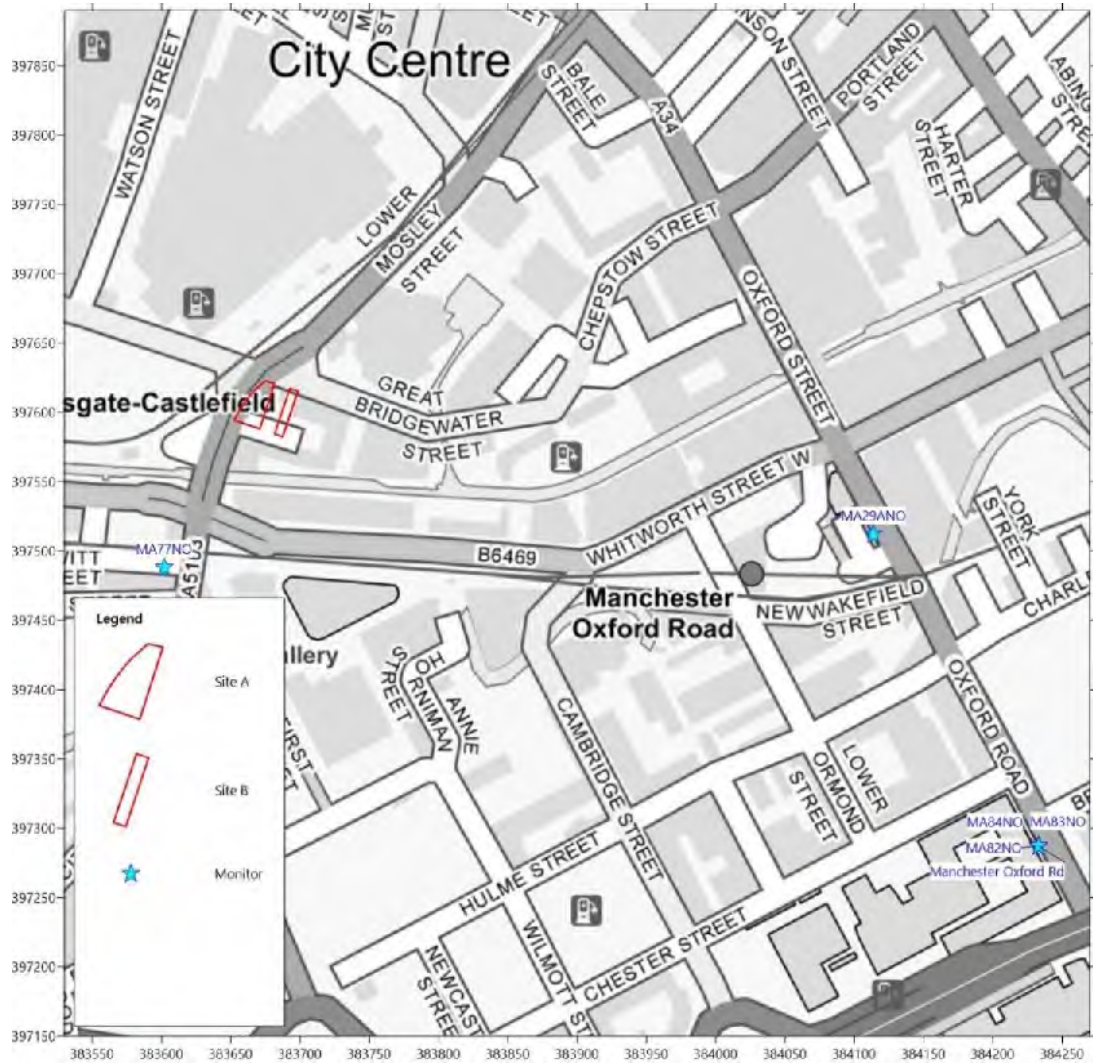


Figure 6-1 Monitoring Locations

6.4.11 Monitoring of PM_{2.5} concentrations is not undertaken within the vicinity of the site.

Future baseline

6.4.12 Predicted 2024 annual mean NO₂, PM₁₀ and PM_{2.5} background concentrations were taken from the DEFRA mapping study for the grid square containing the site in order to provide a future baseline for assessment. These concentrations are summarised in Table 6-14.

Table 6-14 2024 Background pollutant concentration predictions

Pollutant	2014 Predicted background pollutant concentrations (µg/m³)
NO ₂	23.13
PM ₁₀	13.55
PM _{2.5}	8.55

6.4.13 As shown in Table 6-14, predicted background NO₂, PM₁₀ and PM_{2.5} concentrations are predicted to be below the relevant AQOs and AQLV at the site in 2024.

6.4.14 It is currently predicted that air quality will improve in future years. The DEFRA ‘Air Pollution in the UK 2020’ report published in September 2021 indicates that ambient concentrations of NO₂, as measured by the Automatic Urban and Rural Network (AURN), have demonstrated a downward trend since the AURNs inception in 1992. In addition, in January 2019 the UK Government launched the Clean Air Strategy (DEFRA, 2019) which included a commitment to end the sale of new diesel and petrol cars and vans by the end of 2030. This will continue to aid the reduction of road vehicle exhaust emissions from combustion engines, including nitrogen oxides (NO_x) and PM₁₀. As such, utilising 2024 background concentrations and emission factors in the assessment is considered to be representative of future baseline conditions within the vicinity of the site.

Identified receptors and their sensitivity

6.4.15 A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a proposed development. These have been defined for the construction phase in the following sections.

Construction phase sensitive receptors

6.4.16 Receptors sensitive to potential dust impacts earthworks and construction were identified from a desk-top study of the area up to 350m from the site boundary. These receptors are summarised in Table 6-15.

Table 6-15 Construction dust - earthworks and construction dust sensitive receptors

Distance from the site boundary (m)	Approximate number of human receptors	Approximate number of ecological receptors
Up to 20	More than 100	0
Up to 50	More than 100	0
Up to 100	More than 100	N/A
Up to 350	More than 100	N/A

6.4.17 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the site access. These receptors are summarised in Table 6-16.

Table 6-16 Construction dust - trackout dust sensitive receptors

Distance from the site access route (m)	Approximate number of human receptors	Approximate number of ecological receptors
Up to 20	More than 100	0
Up to 50	More than 100	0

6.4.18 There are no ecological receptors within 50m of the site boundary, or 50m of the access route within 500m of the site entrance. As such, ecological impacts have not been assessed further within this report.

6.4.19 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 6-17.

Table 6-17 Additional area dust sensitivity factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	The desk top study did not indicate any dust generating activities in the local area.
The likelihood of concurrent dust generating activity on nearby sites	A review of the cumulative schemes list (see ES Chapter 11) indicated a number of developments within 700m of the site have been granted planning permission. It is therefore possible that these may result in concurrent dust generation should the construction phases overlap with that of the proposed development.

Guidance	Comment
Pre-existing screening between the source and the receptors	There is no screening around the site boundary.
Conclusions drawn from analysing local meteorological data which accurately represents the area and if relevant the season during which the works will take place	As shown in Figure 6-2, the predominant wind bearing at the site is from the south. As such, receptors to the north of the site are most likely to be affected by dust releases.
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion.
Duration of the potential impact, as a receptor may become more sensitive over time	Development construction is estimated to take approximately 94 weeks. It is considered unlikely that receptor sensitivity would change significantly over this time period.
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment.

- 6.4.20
- Based on the criteria shown in Table 6-16, the sensitivity of the receiving environment to potential dust soiling and health impacts is classified as high. This was because identified receptors included residential properties.
- 6.4.21
- The sensitivity of the receiving environment to specific dust impacts, based on the criteria shown in Section 6.2, is shown in Table 6-18.

Table 6-18 Sensitivity of the surrounding areas to specific dust impacts

		Sensitivity of the surrounding area		
		Earthworks	Construction	Trackout
Potential impact	Dust soiling	High	High	High
	Human health	Moderate	Moderate	Moderate

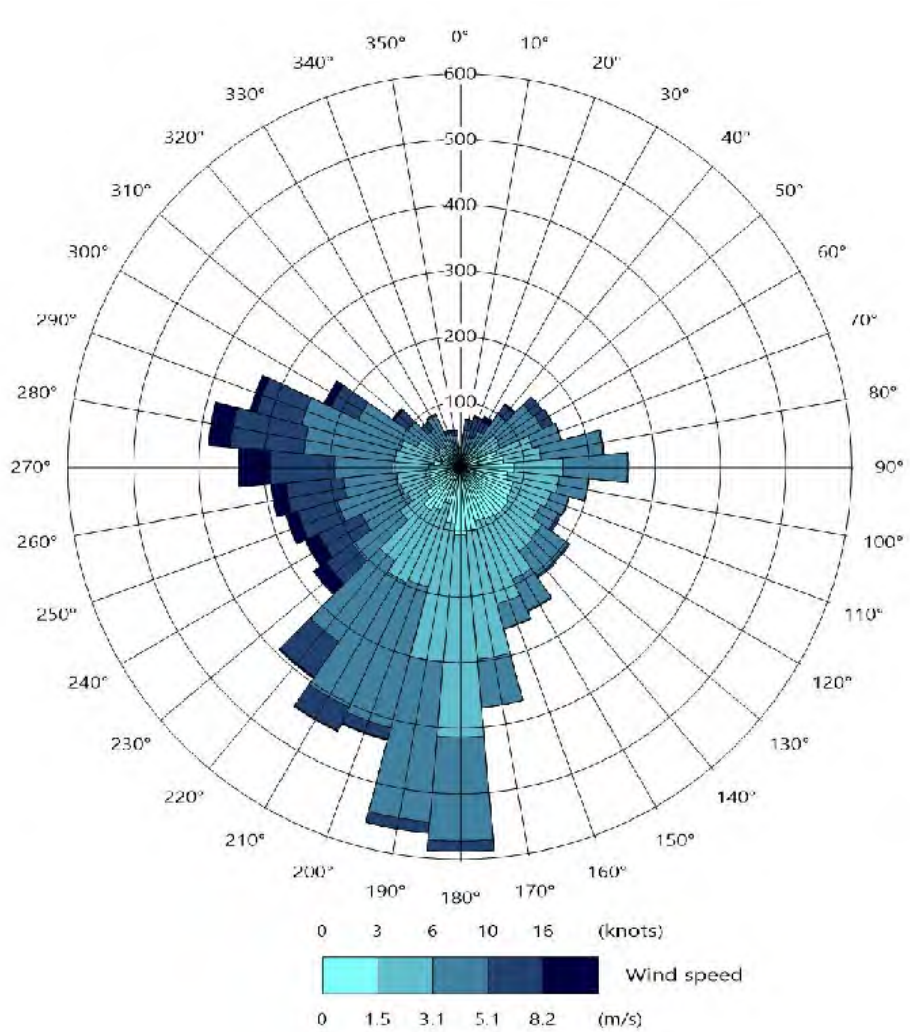


Figure 6-2 Wind Rose of 2019 Manchester Airport Meteorological Data

Operational phase sensitive receptors

- 6.4.22
- Receptors sensitive to potential road vehicle exhaust emission impacts were identified from a desk top study. These include locations of residential occupation along the A5103, Lower Mosley Street and Great Bridgewater Street in the vicinity of the site, as well as future occupants of the development itself. The closest off-site sensitive receptors are residents at AXIS tower and the Hacienda apartments which are positioned approximately 35m south west and 40m south of the proposed development, respectively.

6.5 CONSTRUCTION PHASE EFFECTS

Relevant aspects of the proposed development

- 6.5.1
- There is no proposed embedded mitigation included within the proposed development to control air quality impacts during the construction phase.

Potential effects of the proposed development and their significance

- 6.5.2 The undertaking of activities such as excavation, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicles movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from haul roads and highway surfaces.
- 6.5.3 The potential impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.
- 6.5.4 The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 350m of the site boundary. As such, a detailed assessment of potential dust impacts has been undertaken.
- 6.5.5 It should be noted that predicted environmental impacts from construction phase activities are considered to be adverse but temporary in nature.

Earthworks

- 6.5.6 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. Both site A and site B cover an area less than 2,500m². In accordance with the criteria outlined in Table 6-6, the magnitude of potential dust emissions from earthworks is therefore small.
- 6.5.7 Table 6-18 indicates the sensitivity of the area to dust soiling effects on people and property is high. In accordance with the criteria outlined in Table 6-7, the significance of unmitigated dust soiling effects as a result of earthworks is predicted to be minor adverse, which is considered to be not significant.
- 6.5.8 Table 6-18 indicates the sensitivity of the area to human health impacts is moderate. In accordance with the criteria outlined in Table 6-7, the unmitigated effects at human health receptors as a result of earthworks is predicted to be minor adverse, which is considered to be not significant.

Construction

- 6.5.9 Based on initial site layout designs, the new buildings at site A and site B are anticipated to have a volume of less than 25,000m³. In accordance with the criteria outlined in Table 6-6, the magnitude of potential dust emissions from construction is therefore small.
- 6.5.10 Table 6-18 indicates the sensitivity of the area to dust soiling effects on people and property is high. In accordance with the criteria outlined in Table 6-7, the significance of unmitigated dust soiling effects as a result of construction activities is predicted to be minor adverse, which is considered to be not significant.
- 6.5.11 Table 6-18 indicates the sensitivity of the area to human health impacts is medium. In accordance with the criteria outlined in Table 6-7, the unmitigated effects at human health receptors as a result of earthworks is predicted to be minor adverse, which is considered to be not significant.

Trackout

- 6.5.12 Based on the area of site A and site B, it is anticipated that the unpaved road length will be less than 50m. In accordance with the criteria outlined in Table 6-6, the magnitude of potential dust emissions from trackout is therefore small.
- 6.5.13 Table 6-18 indicates the sensitivity of the area to dust soiling effects on people and property is high. In accordance with the criteria outlined in Table 6-8, the significance of unmitigated dust soiling effects as a result of trackout activities is predicted to be minor adverse, which is considered to be not significant.

- 6.5.14 Table 6-18 indicates the sensitivity of the area to human health impacts is medium. In accordance with the criteria outlined in Table 6-8, the unmitigated effects at human health receptors as a result of earthworks is predicted to be negligible, which is considered to be not significant.

Climate change and adaptation

- 6.5.15 Changes in climate can result in impacts on local air quality. For example, atmospheric warming associated with climate change has the potential to increase ground-level ozone. However, the impact of climate change on other air pollutants, such as particulate matter, is less certain. Given this uncertainty, it is not feasible to incorporate the effects of climate change within the air quality assessment at this time.
- 6.5.16 Overall, the effects of climate change are considered unlikely to materially affect the results of the construction phase assessment. Furthermore, it is considered that should the effects of climate change have the potential to result in any worsening of air pollutant levels at the site in the future, any such effect would be counterbalanced by the forecasted reduction in polluting vehicles on the road network in the future due to the introduction of electric vehicles. This is supported by the UK target to cut the purchasing of new petrol and diesel fuelled cars by 2030 (Business, Energy and Industrial Strategy Committee (2018) Fourteenth Report of Session 2017-2019).

Summary of effects

- 6.5.17 A summary of the construction phase effect significance from each dust generating activity is provided in Table 6-19.

Table 6-19 Summary of potential unmitigated effect significance

Potential impact		Sensitivity of the surrounding area		
		Earthworks	Construction	Trackout
	Dust soiling	Minor adverse/Not significant	Minor adverse/Not significant	Minor adverse/Not significant
	Human health	Minor adverse/Not significant	Minor adverse/Not significant	Negligible/Not significant

Supplementary mitigation measures

Site A/Application A

- 6.5.18 Due to the size and nature of the proposed development, a Construction Environmental Management Plan (CEMP) will be produced to control potential impacts during the construction phase. The mitigation measures outlined in Table 6-20 should be included within the CEMP to mitigate fugitive dust emissions during construction. These measures are based on the advice provided within IAQM guidance (IAQM, 2016) and are therefore considered suitable for the site.

Table 6-20 Fugitive construction dust emissions mitigation measures for application A

Adverse effect	Mitigation measure	Responsibility/Mechanism for implementation	Timing
Fugitive dust emissions associated with earthworks, construction and trackout activities	Communication: - Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or site manager. - Display the head or regional office contact information. - Develop and implement a Dust Management Plan (DMP) as part of the CEMP, which may include measures to control other emissions, approved by the local authority.	Mitigation measures implemented through a CEMP.	Ahead of and during the construction process.

Adverse effect	Mitigation measure	Responsibility/Mechanism for implementation	Timing
	Site Management - Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. - Make the complaints log available to the local authority upon request. - Record any exceptional incidents that cause dust and/or air emissions, either on- or off site, and the action taken to resolve the situation in the logbook.	Mitigation measures implemented through a CEMP.	Ahead of and during the construction process.
	Monitoring - Undertake daily on-site and off-site visual inspections to monitor dust, record inspection results, and make the log available to the local authority upon request. - Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority upon request. - Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	Mitigation measures implemented through a CEMP.	Ahead of and during the construction process.
	Site Preparation - Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. - Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. - Fully enclose specific operations where there is a high potential for dust production, and they are active for an extensive period. - Avoid site runoff of water or mud. - Keep site fencing, barriers and scaffolding clean using wet methods. - Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used. - Cover, seed or fence stockpiles to prevent wind whipping.	Mitigation measures implemented through a CEMP.	Ahead of and during the construction process.
	Operating vehicle/machinery and sustainable travel - Ensure all vehicles switch off engines when stationary - no idling vehicles. - Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	Mitigation measures implemented through a CEMP.	Ahead of and during the construction process.
	Operations - Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques. - Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate. - Use enclosed chutes and conveyors and covered skips. - Minimise drop heights and use fine water sprays wherever appropriate.	Mitigation measures implemented through a CEMP.	Ahead of and during the construction process.

Adverse effect	Mitigation measure	Responsibility/Mechanism for implementation	Timing
	Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods.		
	Waste Management Avoid bonfires and burning of waste materials.	Mitigation measures implemented through a CEMP.	Ahead of and during the construction process.
	Construction - Avoid scabbing (roughening of concrete surfaces) if possible. - Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out.	Mitigation measures implemented through a CEMP.	Ahead of and during the construction process.
	Trackout - Use water-assisted dust sweeper on access and local roads, if required. - Avoid dry sweeping of large areas. - Ensure vehicles entering and leaving site are covered to prevent escape of materials. - Implement a wheel washing system, if required.	Mitigation measures implemented through a CEMP.	Ahead of and during the construction process.

Site B/Application B

- 6.5.19 The supplementary mitigation measures for site B/application B are the same as those set out for site A/application.

6.6 OPERATIONAL PHASE EFFECTS

Relevant aspects of the proposed development and designed-in mitigation

- 6.6.1 The IAQM have released a position statement 'Mitigation of Development Air Quality Impacts' (IAQM, 2018) which provides guidance on determining appropriate mitigation measures for new development. This states:
- "The IAQM position is that the appropriate mitigation solution for the operational air quality impact of any given general development scheme should be principle-led rather than specified by detailed prescription."*
- 6.6.2 The following hierarchy of principles is provided for use when determining an appropriate level of mitigation:
- Prevent or avoid;
 - Reduction and minimisation; and,
 - Off-setting.
- 6.6.3 The air quality assessment has shown that impacts associated with additional vehicle emissions produced by the proposed development are predicted to be negligible. As such, mitigation to reduce potential impacts is not considered necessary. However, a number of measures have been included within the proposed development in accordance with the requirements of the IAQM guidance (IAQM, 2017) to encourage the use of sustainable transport modes, manage vehicle flow and reduce pollution around the site. Table 6-21 describes the good practice principles detailed in the IAQM guidance (IAQM, 2017) along with how each has been addressed with regards to the proposed development.

Table 6-21 Good practice design principles

Phase	Principle	Action
Design phase	New developments should not contravene the Council's Air Quality Action Plan (GMCA, 2016) or render any of the measures unworkable	It is confirmed that the proposed development will not contravene MCC's Air Quality Action Plan, or render any of the measures unworkable
	Wherever possible, new developments should not create a new "street canyon", or a building configuration that inhibits effective pollution dispersion	Although site A will create a new street canyon along Albion Street and site B will extend the existing street canyon along Great Bridgewater Street the results of the dispersion modelling indicated that future occupants were unlikely to be exposed to exceedences of the relevant AQOs and AQLV as a result of the proposed development
	Delivering sustainable development should be the key theme of any application	The proposed development has been designed to encourage sustainable behaviours, such as active and public transport, due to its close proximity to local bus, rail and tram routes and amenities
	New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads, or directing combustion generated pollutants through or chimney stacks	The results of the dispersion modelling, as well as the inclusion of mechanical ventilation, indicated that residents are not predicted to be exposed to exceedences of the relevant AQOs and AQLV with the proposed development in place
Operational phase	The provision of at least 1 EV "rapid charge" point per 10 residential dwellings and/or 1,000m ² of commercial floor space. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made	It is proposed to provide three EV charging points, one for each car parking space across the proposed development.
	Where development generates significant additional traffic, provision of a detailed Travel Plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety	A Travel Plan for the proposed development, produced by Mosodi, will be submitted with the planning applications
	All gas-fired boilers to meet a minimum standard of <40mgNO _x /kWh. All gas-fired CHP plant to meet a minimum emissions standard of: - Spark ignition engine: 250mgNO_x/Nm³; - Compression ignition engine: 400mgNO_x/Nm³; - Gas turbine: 50mgNO_x/Nm³. A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of: - Solid biomass boiler: 275mgNO_x/Nm³ and 25mgPM/Nm³	There will be no gas fired energy plant on site.

6.6.4 Several features have been included in the plans for the proposed development that will provide mitigation against air quality effects during the operational phase. These include provision of three Electric Vehicle (EV) charging points, one for each car parking space, as well as cycle storage. The measures are anticipated to promote the use of sustainable modes of transport and minimise road traffic exhaust emission impacts. The location of the proposed development also promotes sustainable travel due to the accessibility of bus, train and tram services, as well as pedestrian and cycle connections. Local amenities including health centres, education facilities and retail stores have also been identified within approximately 1km of the site, allowing residents to use them within the need of a private car.

6.6.5 It is proposed to install mechanical ventilation within the proposed development to serve all apartments across site A and site B, as well as the proposed commercial units, to ensure a supply of clean air for future occupants. The air intakes for site A will be positioned at roof level from the glazed façade on Albion Street and at roof level from the façade along Trumpet Street for site B. Mechanical ventilation is suggested within the IAQM guidance document (IAQM, 2017) and is considered suitable for a development of this size and nature.

Potential effects of the proposed development and their significance

Potential future exposure

6.6.6 The proposed development has the potential to cause the exposure of future residents to elevated pollution levels. Dispersion modelling was therefore undertaken with the inputs described in Appendix 6-A, ES Volume III to quantify air quality conditions at the site. Reference should be made to Figure 6-3, Figure 6-4, Figure 6-5 and Figure 6-6 for a graphical representation of the results across site A and Figure 6-7, Figure 6-8 and Figure 6-9 for results across site B.

Site A

6.6.7 As shown in Figure 6-3, annual mean NO₂ concentrations were predicted to be above the AQO of 40µg/m³ across a portion of site A at ground floor level. The maximum level at the site boundary was 50.37µg/m³.

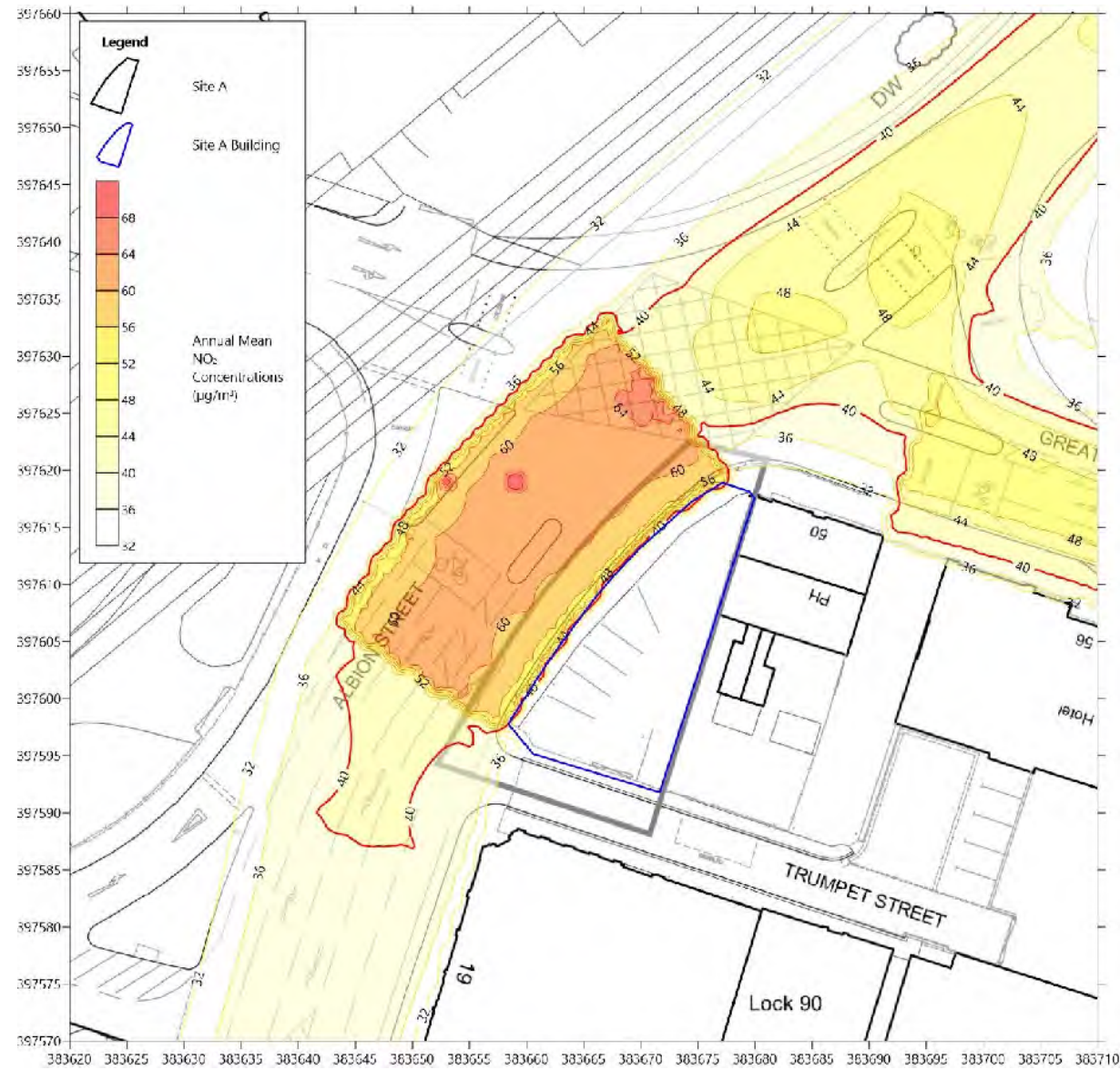


Figure 6-3 Predicted annual mean NO₂ concentrations (µg/m³) at ground floor level - site A

6.6.8 As shown in Figure 6-4, annual mean NO₂ concentrations were predicted to be below the AQO of 40µg/m³ at all locations across site A at roof level. The maximum level at the site boundary was 37.74µg/m³.



Figure 6-4 Predicted annual mean NO₂ concentrations (µg/m³) at roof level - site A

- 6.6.9 Although exceedences of the annual mean AQO for NO₂ were predicted at ground floor, concentrations were predicted to be below 40µg/m³ at roof level where the proposed mechanical ventilation system inlets to feed the building and associated apartments will be located.
- 6.6.10 As shown in Figure 6-5, annual mean PM₁₀ concentrations were predicted to be below the AQO of 40µg/m³ at all locations across site A at ground floor level. The maximum level at the site boundary was 19.32µg/m³.

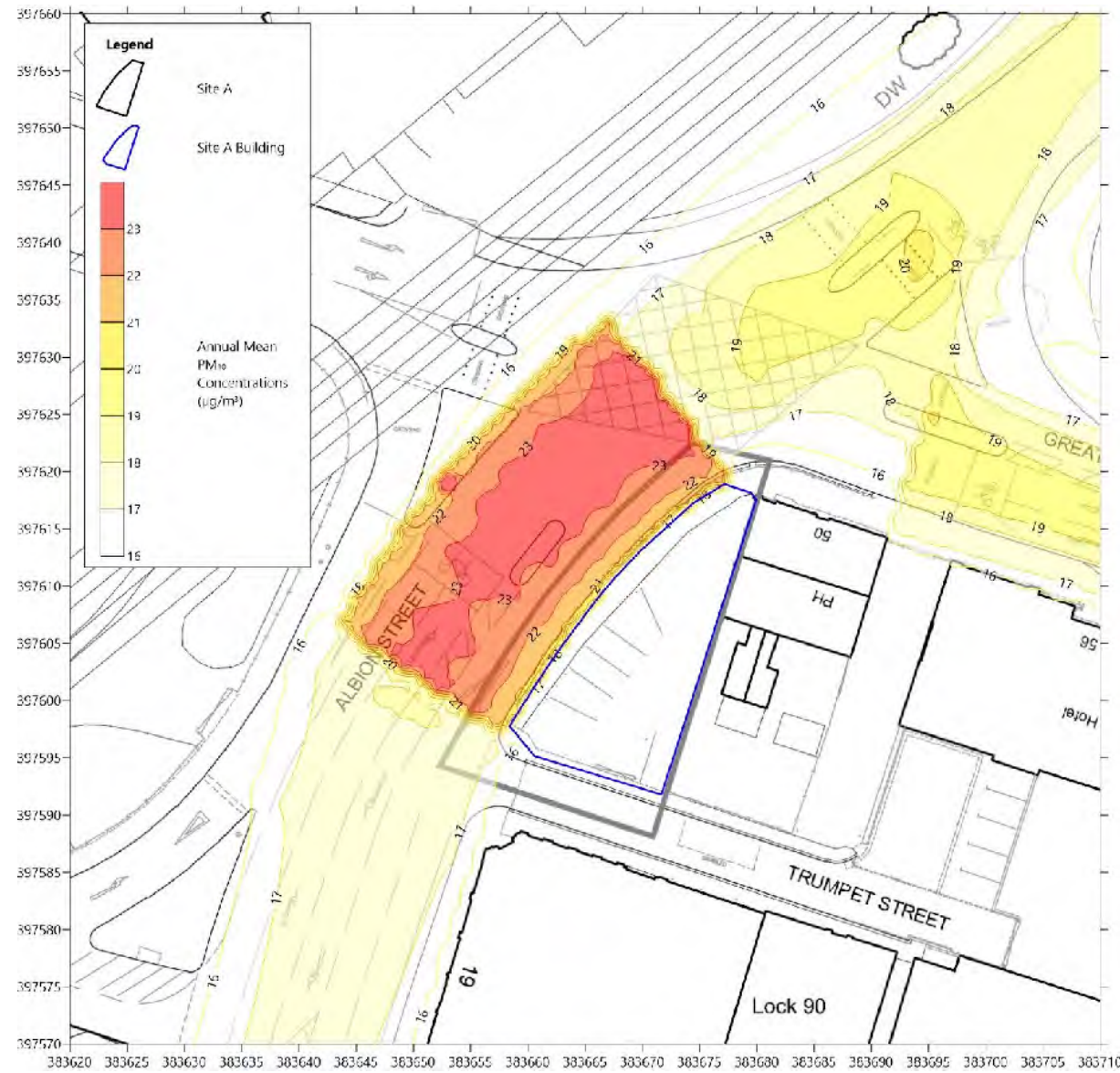


Figure 6-5 Predicted annual mean PM₁₀ concentrations (µg/m³) at ground floor level - site A

6.6.11 As shown in Figure 6-6, annual mean PM_{2.5} concentrations were predicted to be above the AQLV of 20µg/m³ at all locations across site A at ground floor level. The maximum level at the site boundary was 12.13µg/m³.

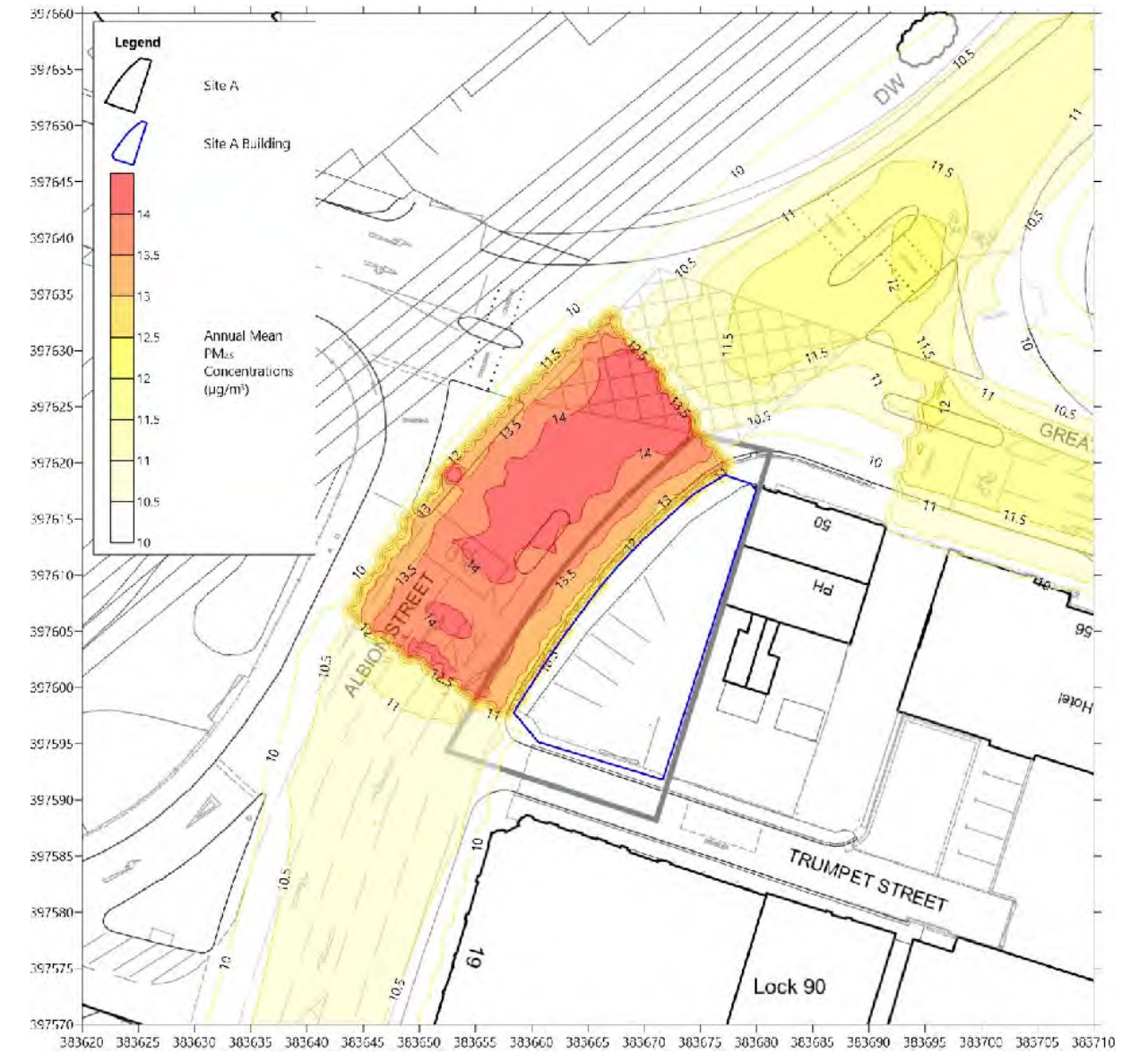


Figure 6-6 Predicted annual mean PM_{2.5} concentrations (µg/m³) at ground floor level - site A

Site B

6.6.12 As shown in Figure 6-7, annual mean NO₂ concentrations were predicted to be below the AQO of 40µg/m³ at all locations across site B at ground floor level. The maximum level at the site boundary was 38.30µg/m³. Pollutant levels decrease with distance from sources, such as roads. As annual mean NO₂ concentrations were predicted to be below the relevant AQO at ground floor level across site B, further assessment above this height was not considered necessary.

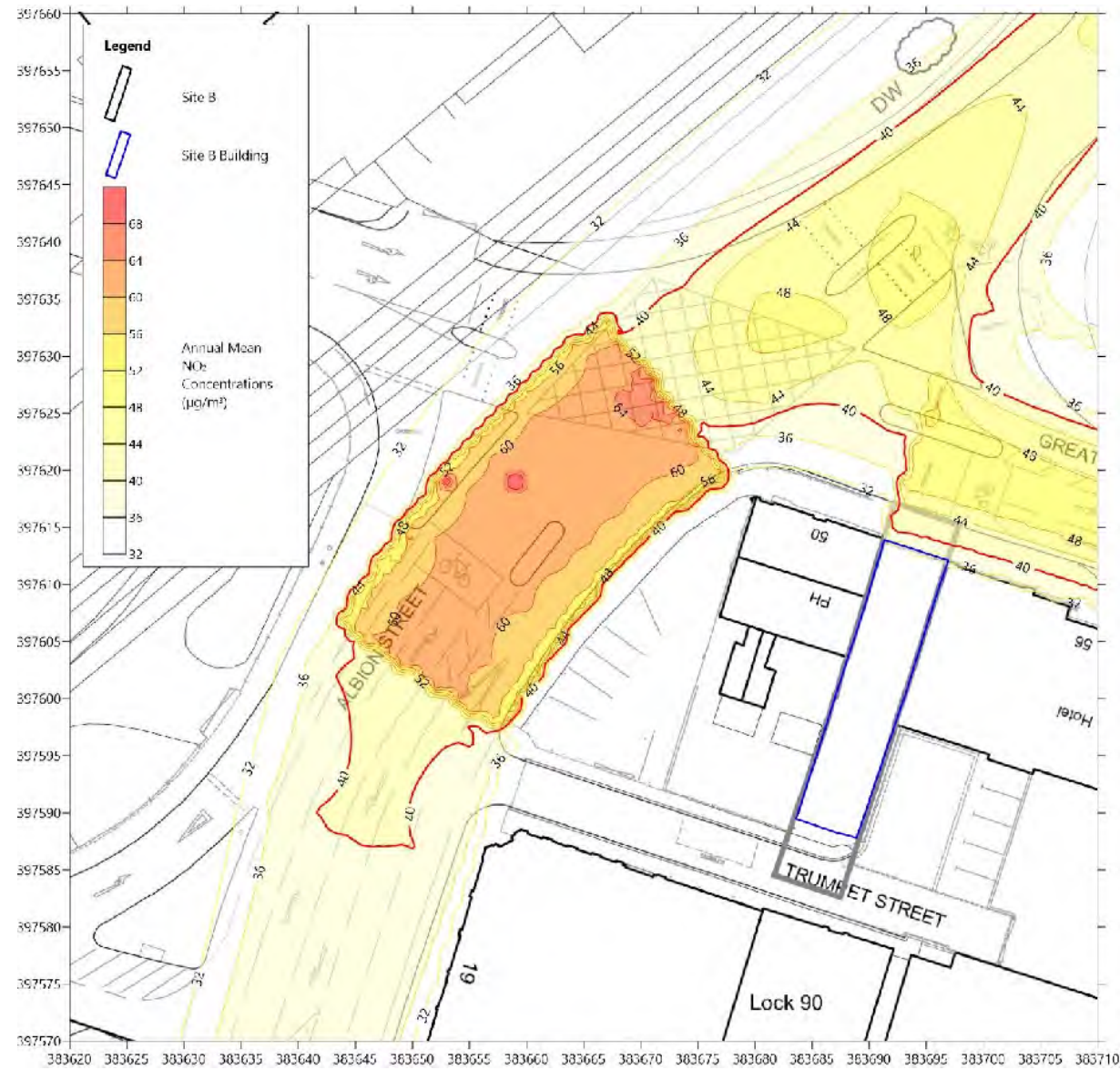


Figure 6-7 Predicted annual mean NO₂ concentrations (µg/m³) at ground floor level - site B

6.6.13 As shown in Figure 6-8, annual mean PM₁₀ concentrations were predicted to be below the AQO of 40µg/m³ at all locations across site B at ground floor level. The maximum level at the site boundary was 16.68µg/m³. Similarly to NO₂, concentrations above this height were not assessed.

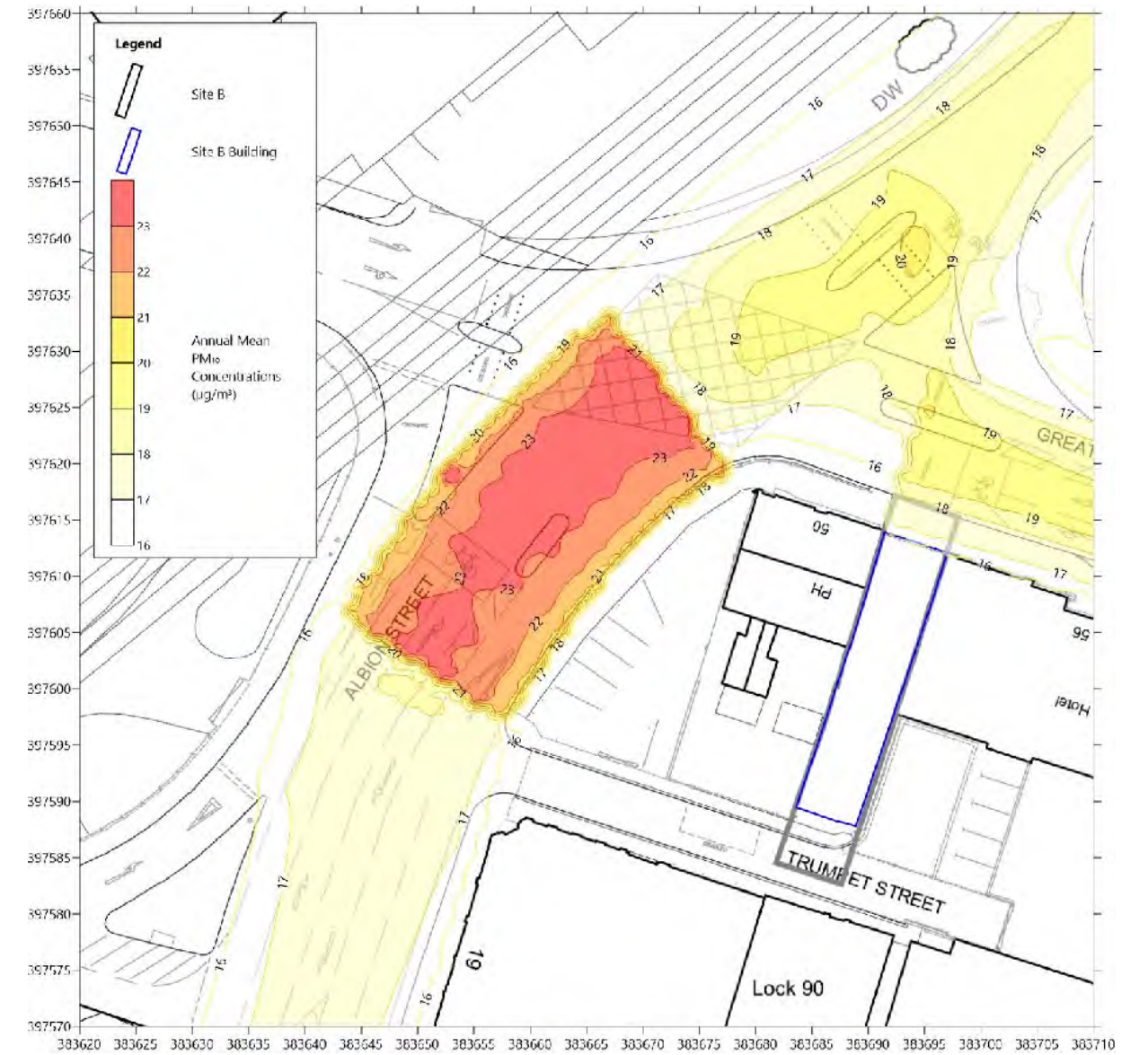


Figure 6-8 Predicted annual mean PM₁₀ concentrations (µg/m³) at ground floor level - site B

6.6.14 As shown in Figure 6-9, annual mean PM_{2.5} concentrations were predicted to be below the AQLV of 20µg/m³ at all locations across site B at ground floor level. The maximum level at the site boundary was 10.30µg/m³. Similarly to NO₂ and PM₁₀, concentrations above this height were not assessed.

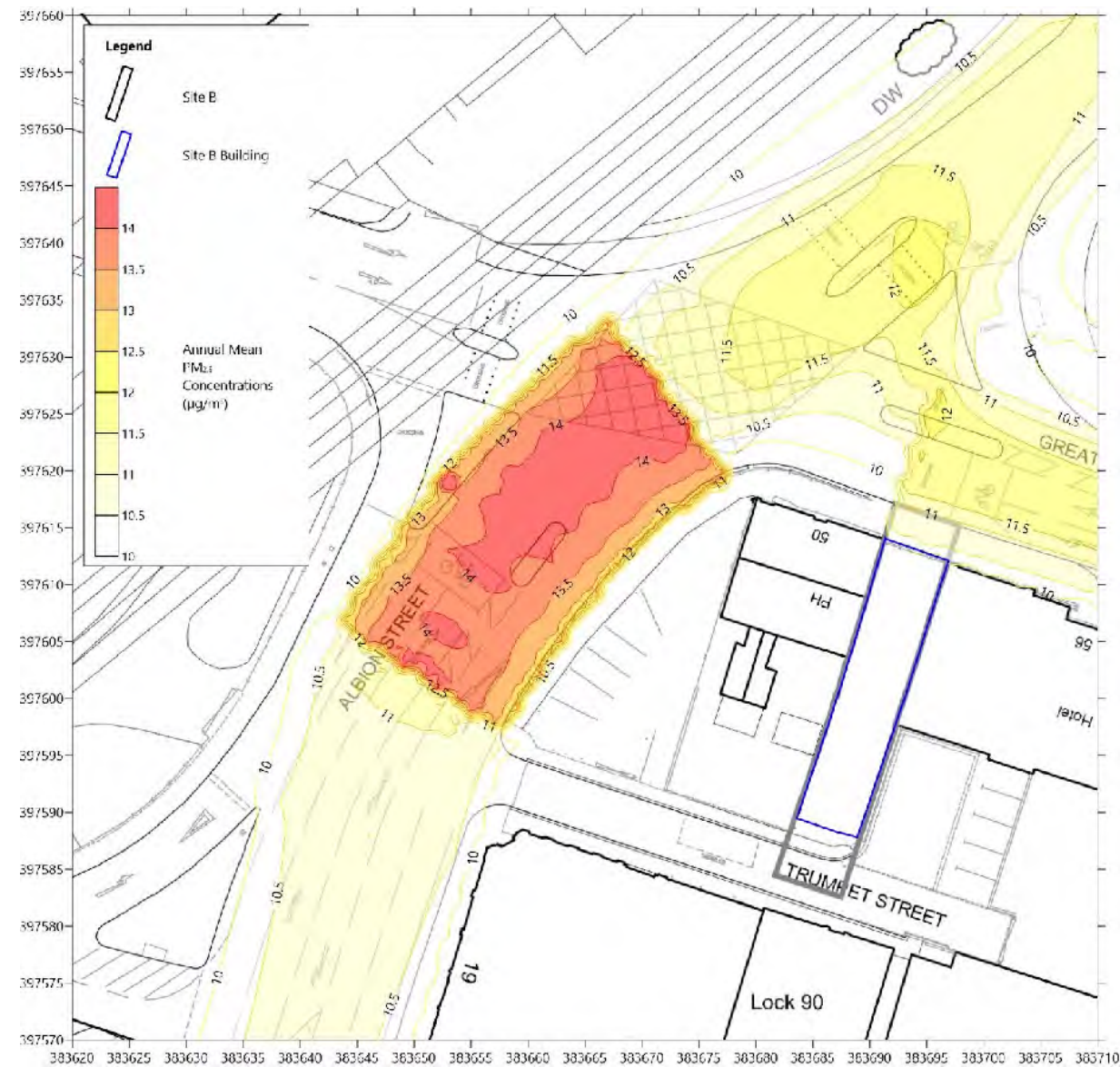


Figure 6-9 Predicted annual mean PM_{2.5} concentrations (µg/m³) at ground floor level - site B

- 6.6.15 Annual mean NO₂, PM₁₀ and PM_{2.5} concentrations were predicted to be below the relevant AQO and AQLV at ground floor level across site B. Additionally, as the proposed mechanical ventilation system at site B will extract air from roof level, this will ensure the air supply for the building is taken from a location where pollutant concentrations are the lowest possible.

Summary

- 6.6.16 Based on the assessment results, exceedences of the annual mean AQO for NO₂ were predicted across a portion of site A. However, concentrations of NO₂ were predicted to be below 40µg/m³ at roof level where the proposed mechanical ventilation system inlets will be located. This will ensure a clean supply of air to all apartments. As such, the overall impact in relation to exposure at site A is predicted to be not significant.
- 6.6.17 Concentrations of NO₂, PM₁₀ and PM_{2.5} were below the relevant AQO and AQLV at all locations across the ground floor at site B. As such, the overall impact in relation to exposure at site B is predicted to be not significant.

Potential development impacts

- 6.6.18 Any vehicle movements associated with the proposed development will generate exhaust emissions on the local and regional road networks. Information provided by the transport consultant Mosodi indicated that the proposed development does not have the potential to generate significant vehicle movements on the local highway network due to the low level of car parking associated with the proposed development and the fact that the site it currently used for commuter car parking.
- 6.6.19 Based on the provided information, the proposed development is not anticipated to result in an increase of LDV flows of more than 100 AADT or HDV flows of more than 25 on any individual road link. Additionally, the proposed development does not include significant highway realignment or the introduction of a junction. As such, potential air quality impacts as a result of operational phase road vehicle exhaust emissions are predicted to be negligible, which is considered not significant, in accordance with the methodology shown in Section 6.2.

Climate change and adaptation

- 6.6.20 Changes in climate can result in impacts on local air quality. For example, atmospheric warming associated with climate change has the potential to increase ground-level ozone. However, the impact of climate change on other air pollutants, such as particulate matter, is less certain. Given this uncertainty, it is not feasible to incorporate the effects of climate change within the air quality assessment at this time.
- 6.6.21 Overall, the effects of climate change are considered unlikely to materially affect the results of the operational phase assessment. Furthermore, it is considered that should the effects of climate change have the potential to result in any worsening of air pollutant levels at the site in the future, any such effect would be counterbalanced by the forecasted reduction in polluting vehicles on the road network in the future due to the introduction of electric vehicles. This is supported by the UK target to cut the purchasing of new petrol and diesel fuelled cars by 2030 (Business, Energy and Industrial Strategy Committee (2018) Fourteenth Report of Session 2017-2019).

Summary of effects

- 6.6.22 A summary of the operational phase effect significance is provided in Table 6-22.

Table 6-22 Summary of effects during operational phase

Receptor	Sensitivity	Description of effect	Magnitude of impact	Effect significance
Proposed residential receptors across proposed development	High	Exposure of future residents to elevated pollution levels associated with road traffic vehicles exhaust emissions. These will be mitigated through inclusion of a mechanical ventilation system	Negligible	Not significant
Receptors located within the vicinity of roads local to proposed development	High	Road traffic vehicles exhaust emissions associated with vehicles travelling to and from the site	Negligible	Not significant

6.7 RESIDUAL EFFECTS AND CONCLUSIONS

- 6.7.1 Residual effects during the construction phase are summarised in Table 6-23.

Table 6-23 Summary of residual effects during construction phase

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
Sensitive receptors located within the vicinity of proposed development	Fugitive dust emissions associated with earthworks, construction and trackout activities	Earthworks: Minor in the short term at local level. This is considered to be not significant	Suitable mitigation measures identified in Table 6-20 would be detailed in the CEMP to control effects to an acceptable level	Not significant
		Construction: Minor in the short term at local level. This is considered to be not significant		
		Trackout: Minor in the short term at local level. This is considered to be not significant		

6.7.2 Residual effects during the operational phase are summarised in Table 6-24.

Table 6-24 Summary of residual effects during operational phase

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
Proposed residential receptors across proposed development	Exposure of future residents to exceedances of relevant air quality standards	Not significant in the long term at a local level	Further mitigation to reduce potential impacts is not considered necessary	Not significant in the long term at a local level
Receptors located within the vicinity of roads local to proposed development	Road traffic vehicles exhaust emissions associated with vehicles travelling to and from the site	Negligible (not significant) in the long term at a local level	Further mitigation to reduce potential impacts is not considered necessary	Negligible (not significant) in the long term at a local level

6.8 ASSESSMENT OF ONE APPLICATION COMING FORWARD IN ISOLATION

6.8.1 In the event that only one of either site A or site B were to be approved and come forward individually, there would be no significant change to the effects outlined in this ES chapter.

6.9 FUTURE MONITORING OF SIGNIFICANT RESIDUAL ENVIRONMENTAL EFFECTS

Construction phase

6.9.1 Visual monitoring and inspections will be carried out as detailed in Table 6-20 in line with the IAQM guidance (IAQM, 2016). This will ensure residual air quality impacts during the construction phase are not significant.

Operational phase

6.9.2 During the operational phase, it is predicted the residual effect will be not significant. As such, future monitoring is not required.

6.10 REFERENCES

- Business, Energy and Industrial Strategy Committee, 2018. Fourteenth Report of Session 2017-2019.

- Department for Food, Environment and Rural Affairs, 2007. Air Quality Strategy for England, Scotland, Wales and Northern Ireland.
- Department for Food, Environment and Rural Affairs, n.d. Background Mapping Data for Local Authorities – 2018.
- Department for Food, Environment and Rural Affairs, 2019. Clean Air Strategy.
- Department for Food, Environment and Rural Affairs, 2021. Local Air Quality Management (TG16).
- Google. Google Maps <https://maps.google.co.uk>;
- Greater Manchester Combined Authority, 2016, Greater Manchester Air Quality Action Plan (GMAQAP) 2016-2021.
- Greater Manchester Combined Authority (2020). Air Quality Annual Status Report
- Highways Agency, 2019. Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, LA 105.
- Institute of Air Quality Management, 2016. Guidance on the Assessment of Dust from Demolition and Construction.
- Institute of Air Quality Management, 2017. Land-Use Planning & Development Control: Planning for Air Quality.
- Institute of Air Quality Management, 2018. Mitigation of Development Air Quality Impacts V1.1.
- Manchester City Council (MCC) (2012). Manchester's Local Development Framework – Core Strategy Development Plan
- Ministry of Housing, Communities & Local Government, UK Government (2019). NPPF.
- Ministry of Housing, Communities & Local Government, UK Government (2019). NPPG.
- Natural England, Multi Agency Geographical Information for the Countryside. Magic Map <http://magic.defra.gov.uk/MagicMap.aspx>
- Ordnance Survey. OS Open Map Local.
- UK Government, 2010. Air Quality Standards Regulations.
- UK Government, 2016. Environmental Permitting (England and Wales) Regulations.
- UK Government, 1995. The Environment Act
- UK Government, 1990. The Environmental Protection Act 1990.
- UK Government, 2017. Town and Country Planning (Environmental Impact Assessment) Regulations.

6.11 GLOSSARY

Term	Definition
Air Quality Limit Value	Legally binding parameters defined in European Union air quality legislation that must not be exceeded. Limit values are set for individual pollutants and are a combination of a concentration value, an averaging time over which it is measured, the number of exceedances allowed per year, and a date by which it must be achieved
Air Quality Management Area	An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives

Air Quality Objective	The name given to the maximum ambient pollutant concentration that is not to be exceeded either without exception or within a permitted number of exceedences over a specified timescale for a pollutant outlined in the nation Air Quality Strategy
Air Quality Strategy	A national government document which contains standards, objectives and measures for improving ambient air quality
Annual Average Daily Traffic	The number of traffic movements on a given road in a 24-hour period as an average across one year
Background Concentration	The pollutant concentration assumed to represent baseline concentrations in the atmosphere across the modelled area
Diffusion Tube Monitoring	A passive, periodic monitoring method. The tubes contain a substance which absorb the pollutant of interest at a known rate and from the period exposed and subsequent analysis an ambient pollutant concentration can be calculated
Dust	Dust is a generic term covering particles of different compositions, shapes and sizes. These can have different impacts and effects: • Those particles up to 10µm (micrometres) in diameter (known as PM₁₀) remain suspended in air for long periods and because they are fine enough to be breathed in and can, potentially, cause health effects; and, • The particles that are larger (and maybe visible to the naked eye) are not thought to cause health effects to the same extent, but can cause disamenity through soiling and staining when they deposit onto window ledges, cars, laundry and plants etc.
Dust Management Plan	A document that describes the site specific methods to be used to control dust emissions.
Heavy Duty Vehicle	Vehicles with a gross weight of greater than 3.5 tonnes
Light Duty Vehicle	Vehicles with a gross weight under 3.5 tonnes
Roughness Length	A measure of the surface roughness of the area
Trackout	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 HDVs leave the construction/demolition site with 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

6.12 LIST OF APPENDICES (ES VOLUME III)

Reference	Title
Appendix 6-A	Air Quality - Assessment Input Data

7 WIND MICROCLIMATE

7.1 INTRODUCTION

7.1.1 This chapter of the ES assesses the likely environmental effects of the proposed development with respect to wind microclimate. 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. This chapter of the ES was produced by GIA.

7.1.2 This ES chapter is supported by the following appendix within ES Volume III:

- Appendix 7-A – Wind microclimate detailed methodology.

7.1.3 Cumulative effects associated with wind microclimate have additionally been considered within the ES and can be found in Chapter 11 Cumulative and Interactive Effects.

7.2 METHODOLOGY AND ASSESSMENT CRITERIA

EIA Scoping

7.2.1 Although a formal scoping opinion was not received from MCC, they did confirm that they were happy with the approach set out in the EIA Scoping Report (Appendix 4-A, ES Volume III), which was submitted to MCC on 20th October 2021.

Baseline study methodology

7.2.2 Baseline conditions were established using a high-resolution Computational Fluid Dynamics (CFD) model, extending in a 400m radius from the site. CFD is a digital modelling technique, which simulates the effect of wind for the built environment. A full description of the test methodology is included in Appendix 7-A, ES Volume III.

7.2.3 The assessment was performed using full-scale CFD modelling to predict the air flow patterns and wind velocities around the proposed development. The assessment was conducted using a digital model of the site and a 400m radius of its surroundings with a resolution of 0.05-0.25m around the proposed development, divided into between 101 million and 122 million “cells”, and tested from 18 wind angles.

7.2.4 The baseline surrounds consist of buildings which are either complete or expected to be complete at the time of the planning application (2022).

Assessment approach

7.2.5 The model was run at full scale from 18 wind angles, spaced using 10° or 30° increments such that no sector contributes more than 10% of the annual wind. The wind angles which were run are provided in Appendix 7-A, ES Volume III.

7.2.6 Wind speeds were measured at 1.5m above any surfaces expected to be used for pedestrian activity.

7.2.7 On-site and local wind speeds were combined with 30 years-worth of weather data for Manchester International Airport, corrected for terrain local to the airport and the site, to obtain annual and seasonal frequency and magnitude of wind speeds across the model. This allows the ‘grading’ of the pedestrian level winds according to the Lawson Comfort Criteria, which are explained later in this ES chapter.

7.2.8 Seasonal wind roses for the airport are shown in Figure 7-1. The dominant wind direction is from the south.

7.2.9 The correction factors between the airport (measured 10m above ground) and the site (at a reference height of 120m, chosen to represent the freestream wind speed away from near-ground obstructions) are shown in Table 7-1. It should be noted that the terrain analysis has been performed using sectors of 30°.

Table 7-1 Site Wind Correction Factors

0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°
1.56	1.46	1.46	1.43	1.35	1.32	1.32	1.32	1.34	1.29	1.44	1.41

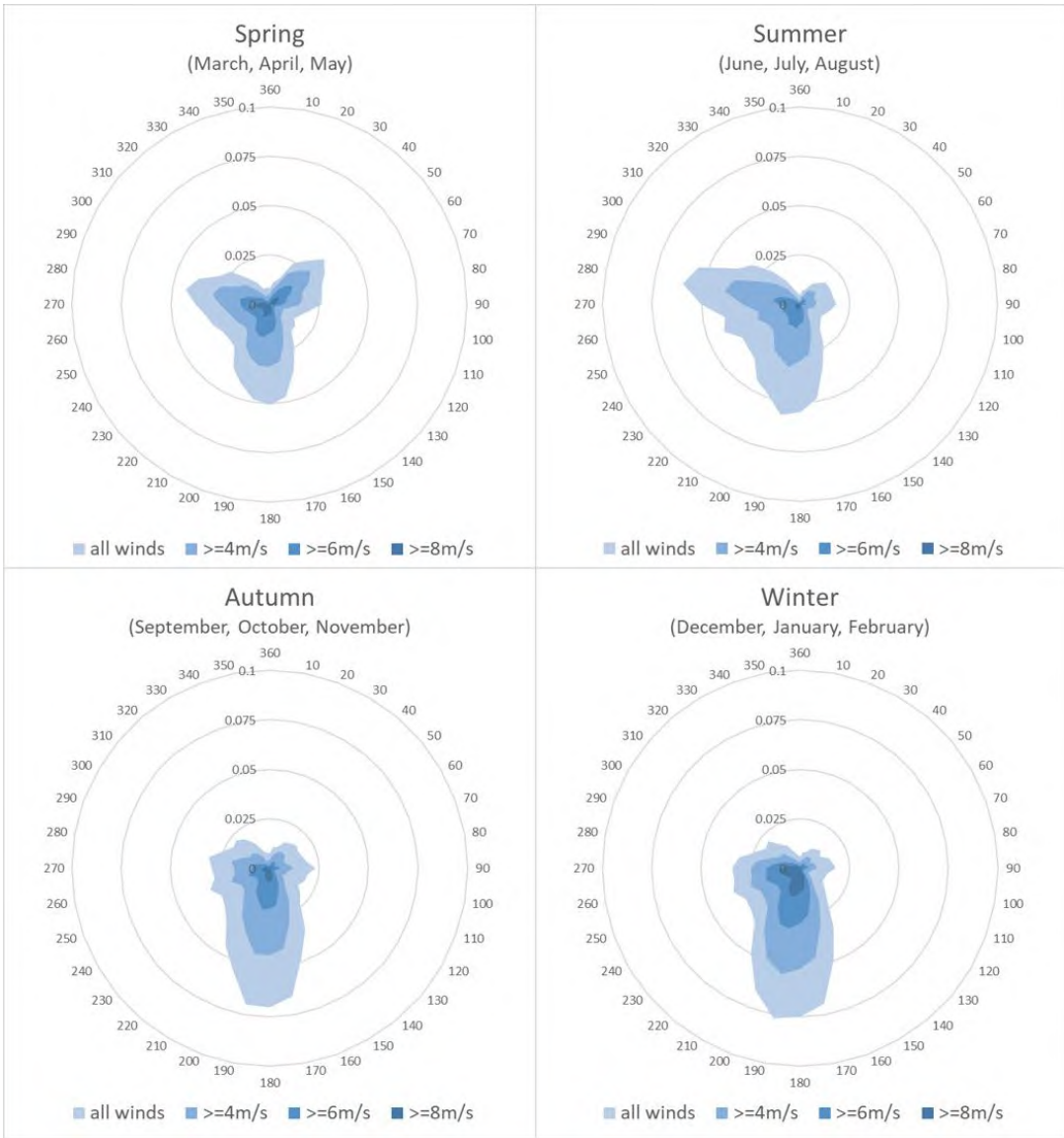


Figure 7-1 Seasonal Wind Roses for Manchester International Airport (1990-2021)

7.2.10 The following scenarios were tested as part of the assessment:

- Scenario 1: Baseline for site and surrounds;
- Scenario 2: Proposed development in baseline surrounds; and
- Scenario 3: Proposed development in cumulative surrounds.

7.2.11 The following consented schemes were included in the cumulative surrounds, as these are the identified cumulative schemes which are within 400m of the proposed development (the study area) and the construction of which is assumed to overlap with that of the proposed development.:

- Plot 9A First Street (1201462/FO/2018);
- 10-12 Whitworth Street (111003/FO/2016/C);
- 2-4 Whitworth Street (126308/FO/2020);
- 325-327 Deansgate (125804/FO/2019);
- 1 Alpha Place (120113/FO/2018);
- One City Road (128002/FO/2020);
- 70 Bridgewater Street (129081/FO/2021); and
- Viadux (115871/FO/2017).

Assessment of effects

7.2.12 The assessment was performed using the London Docklands Development Corporation (LDDC) variant of the Lawson Comfort Criteria. The Lawson Criteria are well-established in the UK for quantifying wind conditions in relation to built developments and, although not a UK ‘standard’, the criteria are recognised by local authorities as a suitable benchmark for wind assessments. The LDDC variant is established as the most practically applicable variant of the Lawson criteria, and is used industry wide.

7.2.13 Lawson devised a scale for assessing the suitability of wind conditions in the urban environment based upon threshold values of wind speed and frequency of occurrence. This guidance will be used to inform the assessment. The commonly used London Docklands Development Corporation (LDDC) method of the Lawson Criteria (as described in Lawson, T (2001), Building Aerodynamics) is set out in Table 7-2 and Table 7-3 below.

Table 7-2 Lawson Comfort Criteria (LDDC variant)

Comfort Category	Mean Wind Speed (5% exceedance)	Description
Sitting	4m/s	Acceptable for outdoor sitting use (e.g., cafes, benches, balconies).
Standing	6m/s	Acceptable for main building entrances, pick-up/drop-off points and bus stops.
Walking (leisure)	8m/s	Acceptable for strolling.
Walking (business)	10m/s	Acceptable for external pavements, walking purposefully without lingering.
Uncomfortable	>10m/s	Not comfortable for regular pedestrian access.

Table 7-3 Lawson Safety Criteria (LDDC variant)

Safety Category	Mean Wind Speed (2hrs/year exceedance)	Description
No Safety Exceedance	<15m/s	No significant risk of strong winds for any users.
S15 (distress)	>15m/s	Unsafe for frail individuals, or cyclists.
S20 (safety)	>20m/s	Wind conditions considered unsafe for all users.

7.2.14 For a mixed-use urban area such as one within which the site is located, the desired wind microclimate would typically need to have areas acceptable for sitting, standing (including at entrances of buildings) and walking use.

7.2.15 During operation, exceedance of either S15 or S20 will be classified as unsafe.

7.2.16 During the construction phase, it can be reasonably assumed that the site will be occupied by construction workers, who are unlikely to be frail individuals. As such, only S20 exceedances would be classified as unsafe for on-site effects during this phase.

7.2.17 Any areas which show up as either unsafe (annually) or uncomfortable (for winter) are considered unsuitable, unless they are in locations where pedestrian access can be controlled in the event of strong winds. This applies to all thoroughfares (for pedestrians) and roads (for cyclists) around the proposed development.

7.2.18 There are existing amenity spaces in the form of the beer garden of the Briton’s Protection public house, as well as the towpath of the Rochdale canal to the south of the site, which are targeted to be suitable for a mixture of sitting and standing during the summer months.

7.2.19 There are bus stops along Great Bridgewater Street, as well as the taxi drop-off outside the neighbouring Jurys Inn hotel, which are targeted to be suitable for standing.

7.2.20 The areas immediately outside any building entrances should be suitable for standing use during winter to provide a “buffer” between the still conditions in interior spaces and the general thoroughfare. This applies both to the entrances of the proposed development and also off-site entrances.

Receptor sensitivity

7.2.21 The criteria used to assess receptor sensitivity is described in Table 7-4.

Table 7-4 Criteria for determining receptor sensitivity

Sensitivity	Criteria
High	Any amenity spaces, public realm, footpaths or entrances to buildings
Moderate	Any general thoroughfares through or around the proposed development.
Low	Locations which are not accessible to the general public
Negligible	Locations which are not accessible to any pedestrians

Magnitude of change/impact

7.2.22 The criteria used to assess how far an effect deviates from the baseline condition, i.e., the magnitude of change, are described in Table 7-5.

7.2.23 Additionally, any exceedance of the safety criteria is counted as an effect of large magnitude.

Table 7-5 Criteria for determining magnitude of change/impact

Magnitude	Criteria
Large	Wind conditions which are three categories windier/calmer than the target conditions
Medium	Wind conditions which are two categories windier/calmer than the target conditions
Small	Wind conditions which are one categories windier/calmer than the target conditions
Negligible	Conditions are those required for their intended use

Significance evaluation

7.2.24 The significance of a potential effect is derived by considering both the sensitivity of the feature and the magnitude of change, as demonstrated in Table 7-6.

Table 7-6 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

7.2.25 Note that moderate and major effects are considered to be ‘significant’.

7.3 Legislation and policy which has influenced assessment or mitigation

National policy and guidance

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

7.3.1 The NPPF was revised in July 2021 by the Ministry for Housing, Communities and Local Government (MHCLG). Paragraph 130 of the NPPF states that:

“Planning policies and decisions should ensure that developments:...create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users”.

7.3.2 There is no specific planning policy guidance dealing with microclimate in terms of pedestrian comfort set out in the revised NPPF.

The Planning Practice Guidance (PPG) (MHCLG, 2021)

7.3.3 The PPG identifies the potential for tall and large buildings to affect wind microclimate. The National Design Guide (2021) states in Paragraph 71 that:

“Proposals for tall buildings (and other buildings with a significantly larger scale or bulk than their surroundings) require special consideration. This includes their [...] environmental impacts, such as [...] wind. These need to be resolved satisfactorily”

Regional policy and guidance

‘Places for Everyone’ Joint Development Plan Document (GMCA, 2021)

‘Policy JP-P-1 Sustainable Places’ states that “all development [...] should be consistent with: [...] comfortable and inviting, with indoor and outdoor environments: [...] addressing microclimate issues such as sunlight, indoor air quality, overheating, shade, wind and shelter”.

Local policy and guidance

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

7.3.4 ‘Policy EN2 Tall Buildings’ states that, by their very size, tall buildings can have a significant impact on the local environment and its microclimate. It is therefore expected that this impact be modelled and that submissions for tall buildings also include appropriate measures to create an attractive, pedestrian friendly local environment.

Guide to Development in Manchester – Supplementary Planning Document (SPD) and Planning Guidance (MCC, 2007)

7.3.5 The Guide to Development in Manchester SPD states that, when considering development quality; *“Key questions will be the quality and interest of the roofline; the design of the lower floors; the relationship to the surrounding streets; the impact of servicing and parking requirements; the microclimate, including overshadowing and air turbulence effects, created by the relationship of the building to those adjacent; and the quality and usability of the spaces surrounding the building.”*

Assessment limitations (technical deficiencies or lack of knowledge)

7.3.6 The accuracy of the results is dependent upon the accuracy of the architectural CAD plans used to construct the model (although it is expected that the plans used will be sufficiently accurate that this is not a problem for the assessment)).

7.3.7 There is an inherent assumption that on-site wind speeds will scale linearly with the measured wind speeds at the airport (Manchester International Airport), and therefore all worst-case wind speeds will be captured.

7.3.8 It is assumed that, during the construction process, wind conditions will gradually change from the baseline conditions to the conditions for the completed development.

7.3.9 It is assumed that on-site activity during construction will be able to withstand a higher category of pedestrian comfort level than for the completed development.

7.3.10 It is assumed that site hoarding does not have a significant impact on wind conditions during construction.

7.4 BASELINE CONDITIONS

Current baseline (2022)

7.4.1 Conditions for the baseline scenario for the site and surrounds (Scenario 1) are shown in Figure 7-2, Figure 7-3 and Figure 7-4

7.4.2 Winter conditions are suitable for a mixture of sitting, standing, leisure walking and business walking.

7.4.3 Summer conditions are suitable for a mixture of sitting, standing and leisure walking.

7.4.4 There are some localised safety exceedances (S15) to the west of the study area, adjacent to the Axis Tower and the Deansgate-Castlefield Metrolink building.

7.4.5 Conditions on local thoroughfares are suitable for business walking at worst, which is suitable for the intended use.

7.4.6 Conditions in the Briton’s Protection public house beer garden are suitable for sitting in both winter and summer. This is suitable for the intended use.

7.4.7 Conditions on the Rochdale Canal towpath are suitable for a mixture of sitting and standing in winter and for sitting in summer. This is suitable for the intended use.

7.4.8 Conditions at the Great Bridgewater Street bus stops and taxi drop-off outside the Jurys Inn hotel are suitable for either sitting or standing in winter, and for sitting in summer. This is suitable for the intended use.

7.4.9 All off-site building entrances are adjacent to regions of standing or sitting, which is suitable for the intended use.

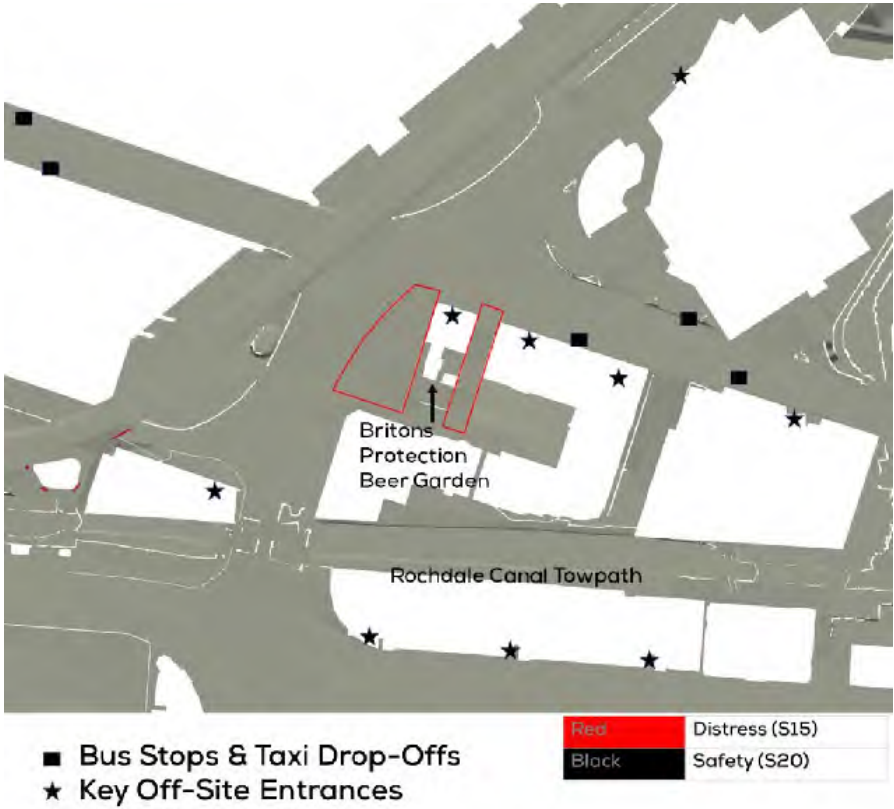


Figure 7-2 Scenario 1 (baseline), wind safety

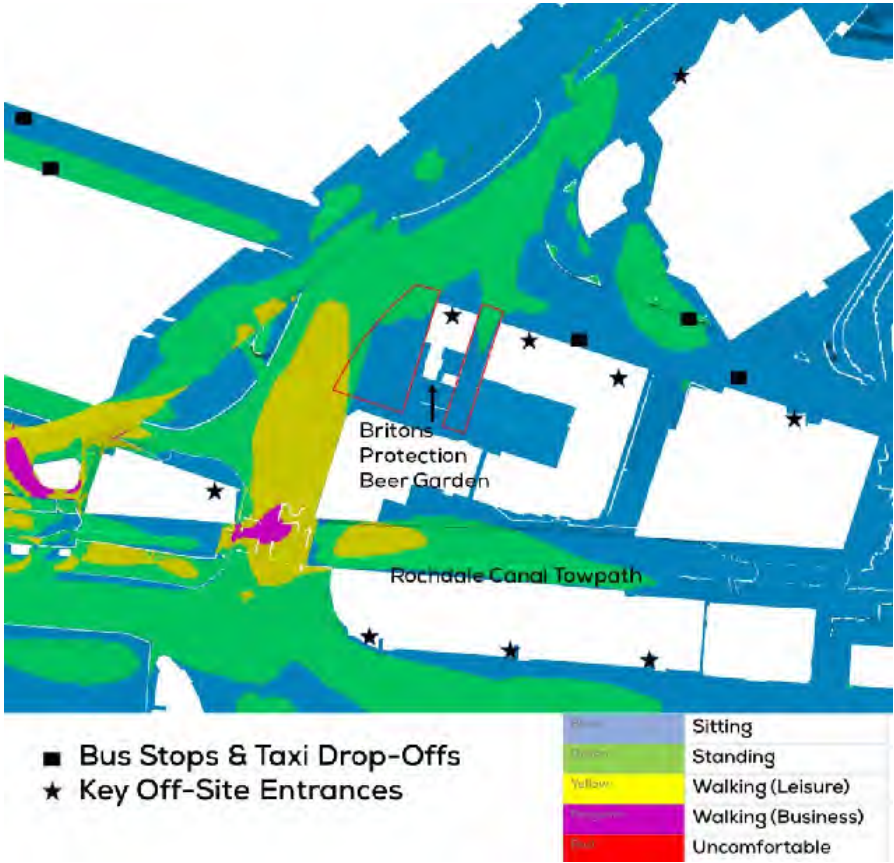


Figure 7-3 Scenario 1 (baseline), winter wind comfort

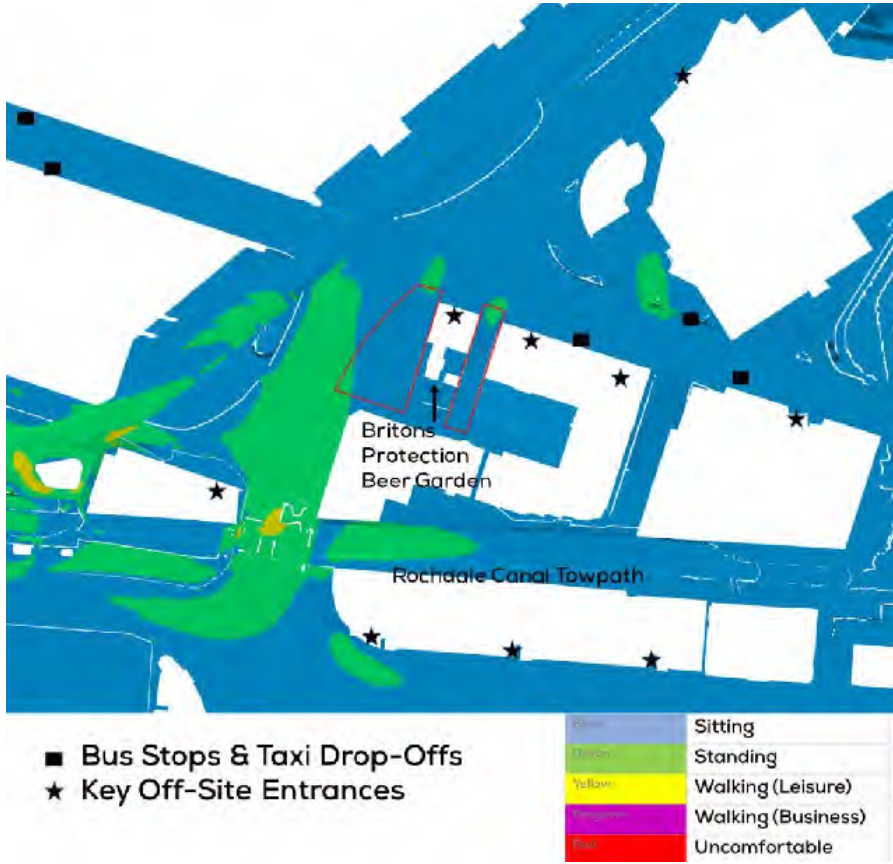


Figure 7-4 Scenario 1 (baseline), summer wind comfort

Future baseline (2024)

7.4.10 Analysis of the cumulative scenario (Scenario 3) showed that conditions with the cumulative surrounds would be expected to be marginally calmer around the site than those with the proposed development in place (Scenario 2). As such, it would be expected that, in the absence of the proposed development, conditions would be marginally calmer for the future baseline than for the baseline conditions.

Identified Receptors and their sensitivity

7.4.11 Table 7-7 summarises the identified receptors relating to wind microclimate, and their sensitivity.

Table 7-7 Identified receptors and their sensitivity

Receptor	Sensitivity	Justification
General thoroughfares	Medium	Potential for wind to impact usability of space
Briton's Protection public house beer garden	High	Potential for wind to impact usability of space
Rochdale Canal towpath	High	Potential for wind to impact usability of space
Bus-stops and taxi drop-offs	High	Potential for wind to impact usability of space
Off-site entrances	High	Potential for wind to impact usability of space
Entrances to proposed development	High	Potential for wind to impact usability of space

7.5 CONSTRUCTION EFFECTS

Relevant aspects of the proposed development

7.5.1 During the construction phase, the conditions will gradually transition from the baseline conditions to those of the completed and operational proposed development. Therefore, the height of the proposed development during construction is the aspect which is relevant to wind microclimate conditions.

Potential effects of the proposed development and their significance

General thoroughfares

7.5.2 Conditions on general thoroughfares around the proposed development are suitable in both the baseline and the completed development scenarios. Therefore any wind effects during the construction phase will be negligible (not significant).

Briton’s Protection public house beer garden

7.5.3 Conditions for the Briton’s Protection beer garden are suitable in both the baseline and the completed development scenarios. Therefore any wind effects during the construction phase will be negligible (not significant).

Rochdale Canal towpath

7.5.4 Conditions on the Rochdale Canal towpath are suitable in both the baseline and the completed development scenarios. Therefore any wind effects during the construction phase will be negligible (not significant).

Bus stops and taxi drop-offs

7.5.5 Conditions at bus stops and taxi drop-offs are suitable in both the baseline and the completed development scenarios. Therefore any wind effects during the construction phase will be negligible (not significant).

Off-site entrances

7.5.6 Conditions at off-site entrances are suitable in both the baseline and the completed development scenarios. Therefore any wind effects during the construction phase will be negligible (not significant).

Climate change and adaptation

7.5.7 Climate change is not expected to have a significant impact on wind conditions for the operational development during the construction period. Therefore, between the time of the planning application (2022) and the completion of the proposed development (2024) the current trends associated with climate change are not likely to have any significant effects on the predicted wind microclimate conditions in and around the proposed development.

Summary of effects

Table 7-8 Summary of effects during construction

Receptor	Sensitivity	Description of effect	Magnitude of change/impact	Effect significance
General thoroughfares	Moderate	Wind comfort and safety	Negligible	Not significant
Briton’s Protection public house beer garden	High	Wind comfort and safety	Negligible	Not significant

Receptor	Sensitivity	Description of effect	Magnitude of change/impact	Effect significance
Rochdale Canal towpath	High	Wind comfort and safety	Negligible	Not significant
Bus stops and taxi drop-offs	High	Wind comfort and safety	Negligible	Not significant
Off-site entrances	High	Wind comfort and safety	Negligible	Not significant

Supplementary mitigation measures

Site A/Application A

7.5.8 There are no supplementary mitigation measures required for wind microclimate at site A during construction.

Site B/Application B

7.5.9 There are no supplementary mitigation measures required for wind microclimate at site B during construction.

7.6 OPERATIONAL EFFECTS

Relevant aspects of the proposed development and designed-in mitigation

7.6.1 The assessment was based on a 3D model of the proposed development, provided by the architects, including the overall form of the proposed buildings and entrance locations.

7.6.2 During the design of the proposed development, initial CFD analyses were performed to ensure that the general form of the building did not cause any severe wind impacts.

Potential effects of the proposed development and their significance

7.6.3 Conditions for the scenario with the proposed development in baseline surrounds (Scenario 2) are shown in Figure 7-5, Figure 7-6 and Figure 7-7.

7.6.4 Winter conditions are suitable for a mixture of sitting, standing, leisure walking and business walking.

7.6.5 Summer conditions are suitable for a mixture of sitting, standing and leisure walking.

7.6.6 There are some localised safety exceedances (S15) to the west of the study area, adjacent to the Axis Tower and the Deansgate-Castlefield Metrolink building. These are the same locations of S15 exceedances as the baseline scenario, and no further safety exceedances are present, therefore all wind effects resulting from the proposed development with respect to safety are negligible (not significant).

General thoroughfares

7.6.7 Conditions on local thoroughfares are suitable for business walking at worst, which is suitable for the intended use and is a negligible wind effect (not significant).

Briton’s Protection public house beer garden

7.6.8 Conditions in the Briton’s Protection public house beer garden are suitable for a mixture of sitting and standing in winter and for sitting in summer. This is suitable for the intended use and is a negligible wind effect (not significant).

Rochdale canal towpath

7.6.9 Conditions on the Rochdale Canal towpath are suitable for a mixture of sitting and standing in winter and for sitting in summer. This is suitable for the intended use and is a negligible wind effect (not significant).

Bus stops and taxi drop-offs

7.6.10 Conditions at the Great Bridgewater Street bus stops and taxi drop-off are suitable for either sitting or standing in winter, and for sitting in summer. This is suitable for the intended use and is a negligible wind effect (not significant).

Off-site entrances

7.6.11 All off-site building entrances are adjacent to regions of standing or sitting, which is suitable for the intended use. This is suitable for the intended use and is a negligible wind effect (not significant).

Entrances to proposed development

7.6.12 Conditions at the entrances of the proposed building on site A are suitable for sitting in summer and standing in winter. This is suitable for the intended use and is a negligible wind effect (not significant).

7.6.13 Conditions at the entrances of the proposed building on site B are suitable for sitting in summer or winter. This is suitable for the intended use and is a negligible wind effect (not significant).

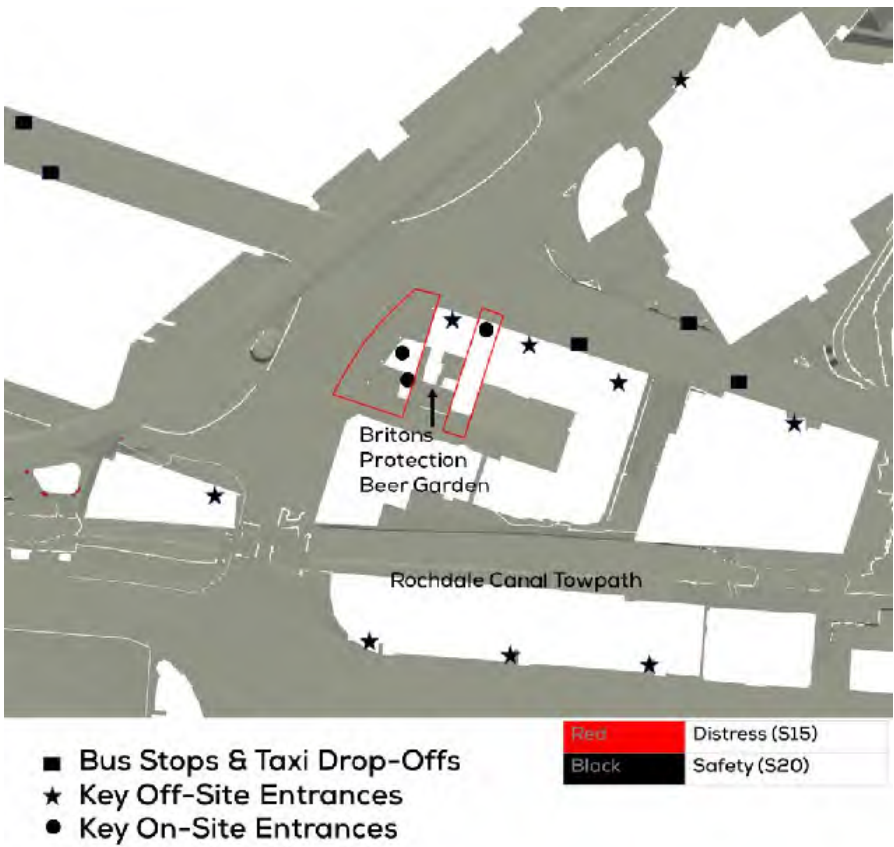


Figure 7-5 Scenario 2 (proposed development in baseline surrounds), wind safety

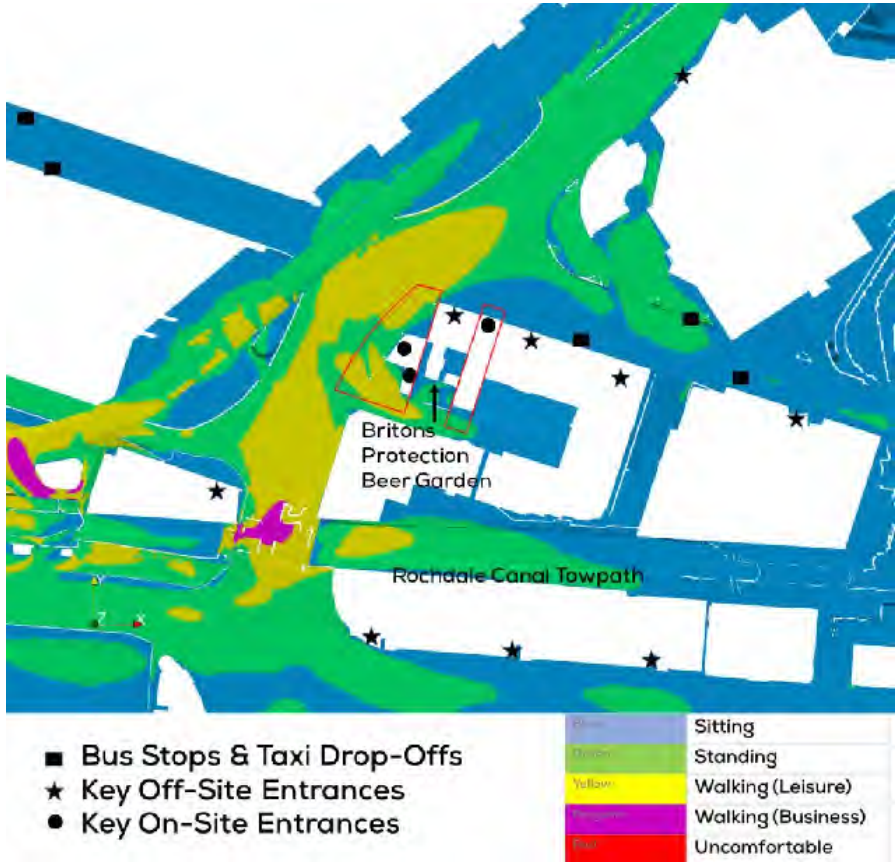


Figure 7-6 Scenario 2 (proposed development in baseline surrounds), winter wind comfort

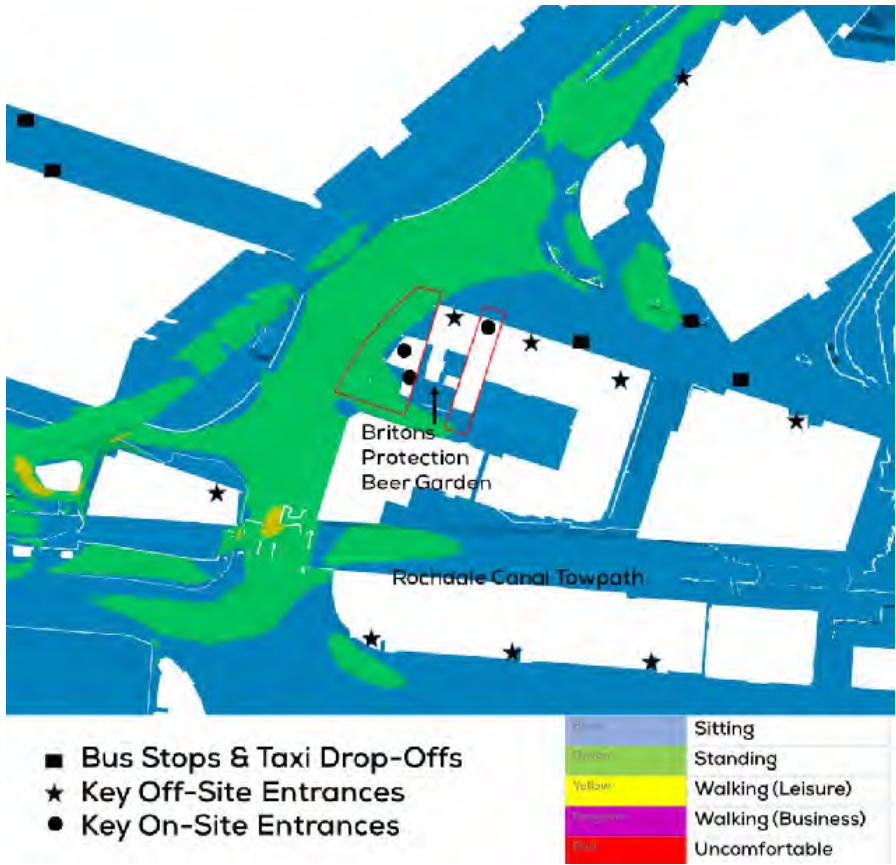


Figure 7-7 Scenario 2 (proposed development in baseline surrounds), summer wind comfort

Climate change and adaptation

7.6.14 The UK Climate Projections 2018 (UKCP18) present regional projections for UK wind speeds from the baseline period to 2070-2080 (timeframe considered most relevant for urban regeneration projects, as this is the furthest period in the future from the regional projections, which sees the largest impact from climate change), in both summer and winter seasons. For the north-west region, the projected changes in mean wind speeds between the baseline and 2070's are not expected to exceed 0.16m/s. With these predictions, the current trends associated with climate change are not likely to have any significant effects on the predicted wind microclimate conditions in and around the proposed development.

Summary of effects

Table 7-9 Summary of effects during operation

Receptor	Sensitivity	Description of effect	Magnitude of change/impact	Effect significance
General thoroughfares	Moderate	Wind comfort and safety	Negligible	Not significant
Briton's Protection public house beer garden	High	Wind comfort and safety	Negligible	Not significant
Rochdale Canal towpath	High	Wind comfort and safety	Negligible	Not significant
Bus stops and taxi drop-offs	High	Wind comfort and safety	Negligible	Not significant
Off-site entrances	High	Wind comfort and safety	Negligible	Not significant
Entrances to proposed development	High	Wind comfort and safety	Negligible	Not significant

Supplementary mitigation measures

Site A/Application A

7.6.15 There are no supplementary mitigation measures required for wind microclimate at the proposed development at site A during operation.

Site B/Application B

7.6.16 There are no supplementary mitigation measures required for wind microclimate at the proposed development at site B during operation.

7.7 RESIDUAL EFFECTS AND CONCLUSIONS

Table 7-10 Summary of residual effects during construction

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
General thoroughfares	Wind comfort and safety	Negligible	None required	Negligible
Briton's Protection public house beer garden	Wind comfort and safety	Negligible	None required	Negligible
Rochdale Canal towpath	Wind comfort and safety	Negligible	None required	Negligible
Bus stops and taxi drop-offs	Wind comfort and safety	Negligible	None required	Negligible
Off-site entrances	Wind comfort and safety	Negligible	None required	Negligible

Table 7-11 Summary of residual effects during operation

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
General thoroughfares	Wind comfort and safety	Negligible	None required	Negligible
Briton's Protection public house beer garden	Wind comfort and safety	Negligible	None required	Negligible
Rochdale Canal towpath	Wind comfort and safety	Negligible	None required	Negligible
Bus stops and taxi drop-offs	Wind comfort and safety	Negligible	None required	Negligible
Off-site entrances	Wind comfort and safety	Negligible	None required	Negligible
Entrances to proposed development	Wind comfort and safety	Negligible	None required	Negligible

7.8 ASSESSMENT OF ONE APPLICATION COMING FORWARD IN ISOLATION

7.8.1 There is likely to be no change to the effects outlined in this assessment should either site A or site B come forward, without the other.

7.9 REFERENCES

- Greater Manchester Combined Authority (GMCA) (2021). Places for Everyone Joint Development Plan Document;
- Lawson, T. Imperial College Press (2001). Building Aerodynamics
- Manchester City Council (MCC) (2007). Guide to Development in Manchester;
- Manchester City Council (MCC) (2012). Manchester's Local Development Framework – Core Strategy Development Plan
- Ministry for Housing, Communities and Local Government (MHCLG) (2021). National Planning Policy Framework (NPPF);
- Ministry for Housing, Communities and Local Government (MHCLG) (2021). National Design Guide; and
- Met Office (2018). UKCP18 Factsheet: Wind.

7.10 GLOSSARY

Term	Definition
CFD	Computational Fluid Dynamics
GMCA	Greater Manchester Combined Authority
MCC	Manchester City Council
NPPF	National Planning Policy Framework
UKCP18	United Kingdom Climate Projections 2018

7.11 LIST OF APPENDICES (ES VOLUME III)

Reference	Title
Appendix 7-A	Wind Microclimate Technical Methodology

8 DAYLIGHT & SUNLIGHT

8.1 INTRODUCTION

- 8.1.1 This chapter of the ES has been prepared by GIA and assesses the likely daylight and sunlight impacts of the proposed development upon the site and surrounding area. This chapter also describes the methods used to assess these impacts, the existing baseline conditions, the proposed mitigation measures required to prevent, reduce or offset any significant negative impacts and the likely residual impacts after these methods have been adopted.
- 8.1.2 This ES chapter is supported by the following technical results within ES Volume III:
- Appendix 8-A – Drawings of the baseline and proposed development scenario; and
 - Appendix 8-B – Daylight and sunlight results for baseline v proposed development scenario.

8.2 METHODOLOGY AND ASSESSMENT CRITERIA

EIA scoping

- 8.2.1 Although a formal EIA scoping opinion was not received from Manchester City Council (MCC), they did confirm they agreed with the approach set out in the EIA Scoping Report (see Appendix 4-A, ES Volume III), which was submitted to MCC on 20th October 2021.

Assessment approach

Methodology for determining baseline conditions and sensitive receptors

- 8.2.2 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice', Second Edition (BRE, 2011) suggest that residential properties have the highest requirement for daylight and sunlight and state that:
- “the guidelines are intended for use for rooms in adjoining dwellings where light is required, including living rooms, kitchens and bedrooms.”*
- 8.2.3 The scope of residential properties that have been assessed has been determined through professional judgement, considering their orientation and proximity to the proposed development.
- 8.2.4 The following property is defined as a sensitive receptor and will be considered due to its proximity to the site, and its residential use:
- The Hacienda.
- 8.2.5 This property is identified in the drawings contained in Appendix 8-A, ES Volume III.
- 8.2.6 The assessment has considered other adjacent residential properties and due to the distance and orientation from the proposed development, they are unlikely to be affected, so they have not been assessed in detail.
- 8.2.7 Although the Jurys Inn is located directly adjacent to the site, it is not a residential property. The closest windows serve circulation space, which do not require assessment under the BRE Guidelines 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice 2011, 2nd edition' (released October 2011). Other windows, which are further away, serve bedrooms which the BRE Guidelines (BRE, 2011) recognise as having a lesser requirement for daylight. Therefore, no detailed assessment of The Jurys Inn has been undertaken.

- 8.2.8 There is residential accommodation on the second floor of The Briton's Protection public house, however the accommodation is in the northern half of the second floor with no windows overlooking the proposed development. As such, no detailed assessment of The Briton's Protection public house has been undertaken.
- 8.2.9 Whilst it is acknowledged that there is a beer garden adjoining The Briton's Protection public house, which is located in between the two sites, the BRE Guidelines (BRE, 2011) define amenity areas as:
- Gardens, usually the main back garden of a house;
 - Parks and playing fields;
 - Children's playgrounds;
 - Outdoor swimming pools and paddling pools;
 - Sitting out areas such as those between non-domestic buildings and in public squares; and
 - Focal points for views such as a group of monuments or fountains.
- 8.2.10 There are no amenity areas located near the site, as defined within the BRE Guidelines (BRE, 2011) and as such, no overshadowing assessment of surrounding amenity areas is required within this chapter. An analysis of the shadow path of the proposed development is provided in the Design and Access Statement.

Scenarios assessed

- 8.2.11 The following scenarios have been assessed and are reported within this chapter of the ES:
- Baseline (pre-development); and
 - Proposed development
- 8.2.12 Where consented schemes have the potential to be affected by the proposed development or cause cumulative impact to the existing surrounding residential buildings, these have been included in the baseline scenario and assessed individually in detail, so no separate technical assessment of the cumulative impact is required. This approach is in line with the BRE Guidelines (BRE, 2011).
- 8.2.13 The baseline scenario considers the current baseline condition of the site (as can be seen in November 2021). This scenario is depicted on drawing nos. 1434/01-03 (Appendix 8-A, ES Volume III).
- 8.2.14 The proposed development is illustrated on drawing nos. 1434/04-06 (Appendix 8-A, ES Volume III).

Methodology for determining demolition and construction effects

- 8.2.15 The site is currently clear and so there would be no charge in the daylight and sunlight at this stage. Owing to the evolving and changing nature of construction activities, the assessment of potential effects during construction of the proposed development on daylight and sunlight to surrounding properties has not been modelled.
- 8.2.16 Since the potential daylight and sunlight effects relating to demolition and construction works will vary throughout the construction programme and gradually increase to the potential effects identified for the completed development, the interim construction effects have not been assessed quantitatively as it is considered that the completed proposed development represents the worst case assessment in terms of likely daylight and sunlight impacts.

Methodology for determining operational effects

- 8.2.17 The following approaches are undertaken to assess the effect on the sensitive receptors of surrounding properties when the proposed development is complete and operational:
- Daylight
 - Vertical Sky Component (VSC); and
 - No Sky Line (NSL) Method.
 - Sunlight
 - Annual Probable Sunlight Hours (APSH).

Summary of approach for daylight and sunlight assessments

- 8.2.18 The technical analyses carried out to inform the daylight and sunlight assessment have been undertaken by creating a digital three-dimensional (3D) model of the existing site and proposed development, based on measured survey data.
- 8.2.19 The 3D model uses Waldram Diagrams to establish the VSC and 3D geometric calculations for daylight distribution. This model (which is orientated to north using Ordnance Survey (OS) information) enables the path of the sun to be tracked throughout the year to establish the shadow cast by the existing and proposed buildings and thus calculate the sun hours in each scenario.
- 8.2.20 In accordance with the BRE Guidance, (BRE, 2011) only those surrounding properties which have windows facing towards the site were included in the assessment. If a nearby property has no windows facing the site, these properties would not be affected by the proposed development in terms of light.

Daylight

VSC method

- 8.2.21 The VSC method of assessment is defined in the BRE Guidelines (BRE, 2011) as the:
- “ratio of that part of illuminance at a point on a given vertical plane that is received directly from a Commission on Illumination (CIE) standard overcast sky, to illuminate on a horizontal plane due to an unobstructed hemisphere of this sky”.*
- 8.2.22 This ratio is the percentage of the total unobstructed view that is available, once obstructions (e.g. the proposed development), are placed in front of the point of view.
- 8.2.23 The assessment is calculated from the centre of a window on the outward face and measures the amount of light available on a vertical wall or window following the introduction of visible barriers, such as buildings. The VSC has been calculated using a 'Waldram Diagram'.
- 8.2.24 The Waldram Diagram is a snapshot taken from that point of the sky in front of the window, together with all relevant obstructions to it, i.e., the buildings. For calculation purposes, trees may be ignored unless they form dense continuous belts.
- 8.2.25 Due to the limitations of peripheral vision, the maximum VSC value is almost 40% for a completely unobstructed vertical wall or window. In terms of assessment criteria, the BRE Guidelines (BRE, 2011) state that:
- “if the VSC, with the development in place, is both less than 27% and less than 0.8 times its former value, occupants of the existing building will notice the reduction in the amount of skylight. The area lit by the window may appear more gloomy and electric lighting will be needed more of the time”.*

NSL method

- 8.2.26 The BRE Guidelines (BRE, 2011) provide that where room layouts are known, the effect on the daylight distribution can be calculated by plotting the NSL. In terms of the surrounding receptors, it has not been possible to obtain room layouts for all of the properties and therefore layouts have been assumed where information is not available.
- 8.2.27 The NSL method is a measure of the distribution of daylight at the ‘working plane’ within a room. The ‘working plane’ means a horizontal ‘desktop’ plane 0.85m in height for residential properties. The NSL divides those areas of the working plane which can receive direct sky light from those which cannot. If a significant area of the working plane lies beyond the NSL (i.e., it receives no direct sky light), then the distribution of daylight in the room will be poor and supplementary electric lighting may be required.
- 8.2.28 The potential effects of daylighting distribution in an existing building can be found by plotting the NSL in each of the main rooms. For houses, this will include living rooms, dining rooms and kitchens. Bedrooms should also be analysed, although the BRE Guidelines (BRE, 2011) state that they are less important. The BRE Guidelines (BRE, 2011) identify that if the area of a room that does receive direct sky light is reduced to less than 0.8 times its baseline value, then this would be noticeable to its occupants.
- 8.2.29 ‘BS 8206-2:2008 Lighting for buildings – Part 2: Code of practice for daylighting’ (BSI, 2008) states (para 5.7) that the:
- “uniformity of daylight is considered to be unsatisfactory if a significant part of the working plane (normally more than 20%) lies behind the no sky line”.*
- 8.2.30 Therefore, it is implied that an NSL of at least 80% would be considered satisfactory.
- 8.2.31 In regard to deep rooms which are lit by windows on one side, the BRE Guidelines (BRE, 2011) state (para. 2.2.10):
- “If an existing building contains rooms lit from one side only and greater than 5m deep, then a greater movement of the no sky line may be unavoidable.”*

Sunlight

APSH

- 8.2.32 Sunlight is measured using a sun indicator which contains 100 spots, each representing 1% of APSH. Therefore, where no obstruction exists, the total annual probable sunlight hours would amount to 1,486, and each spot equates to 14.86 hours of the total annual sunlight hours.
- 8.2.33 The number of spots has been calculated for the baseline and proposed development scenarios during the year and also during the winter period, and a comparison made between the two. This provides a percentage of APSH for each of the time periods for each window assessed.
- 8.2.34 The BRE Guidelines (BRE, 2011) note that:
- “In housing, the main requirement for sunlight is in living rooms, where it is valued at any time of day, but especially in the afternoon.”*
- “all main living rooms of dwellings...should be checked if they have a window facing within 90° of due south. Kitchens and bedrooms are less important, although care should be taken not to block too much sun”.*
- “If the main living room to a dwelling has a main window facing within 90° of due north, but a secondary window facing within 90° of due south, sunlight to the secondary window should be checked.”*

“...a south facing window will, in general, receive most sunlight, while a north facing one will receive it only on a handful of occasions. East and west facing windows will receive sunlight only at certain times of day”.

8.2.35 Regarding existing surrounding receptors, the BRE Guidelines (BRE, 2011) provide that a window may be adversely affected if a point at the centre of the window receives less than 25% of the APSH, including at least 5% of the APSH during the winter months (21 September to 21 March), or less than 0.8 times its baseline sunlight hours during either period, or if there is a reduction in total APSH which is greater than 4%.

8.2.36 BS 8206 Part 2 (section 5.2) states that:

“Provided that the entry of sunlight is properly controlled, it is generally welcome in most buildings in the UK. Dissatisfaction can arise as much from the permanent exclusion of sunlight as from its excess. The provision of sunlight is important in dwellings, particularly during winter months. Sunlight is especially valued in habitable rooms used for long periods during the day.”

“Interiors in which the occupants have a reasonable expectation of direct sunlight should receive at least 25% of probable sunlight hours (see 2.10.2). At least 5% of probable sunlight hours should be received during the winter months, between 21 September and 21 March. Sunlight is taken to enter an interior when it reaches one or more window reference points.”

8.2.37 As is often the case, it is not possible to determine the room uses within each of the neighbouring properties, nor is it clear which windows should be considered as the ‘main windows’. Therefore, unless the room’s use is known through plans, all the rooms with windows facing the site and within 90 degrees of due south have been considered in the assessment. Windows that do not face within 90 degrees of due south do not have a realistic expectation of direct sunlight, due to their orientation and the sunlight path in the northern hemisphere.

Summary of criteria for daylight and sunlight

8.2.38 Table 8-1 provides a summary of the criteria set out within the BRE Guidelines (BRE, 2011) for daylight and sunlight used in this assessment.

Table 8-1 Summary of Daylight and Sunlight Assessment Criteria

Method	BRE Guidelines (BRE, 2011) Criteria
VSC	A window may be adversely affected if its VSC measured at the centre of the window is less than 27% and less than 0.8 times is former value.
NSL	A room may be adversely affected if the daylight distribution (NSL) is reduced beyond 0.8 times its existing area.
APSH	A window may be adversely affected if a point at the centre of the window received for the whole year is less than 25% of the APSH including at least 5% of the APSH during the winter months (21 September to 21 March) and less than 0.8 times its former sunlight hours during either period and for existing neighbouring buildings, if there is a reduction in total APSH which is greater than 4%.

Assessment of effects

Receptor sensitivity

8.2.39 It is important that the location and nature of the site and surroundings are considered when determining the significance of any impacts identified. The BRE Guidelines (BRE, 2011) are very clear that the targets provided are not mandatory. The location of the proposed development could be deemed as special circumstances in which the planning authority may wish to use different target values. This scope and view should also be followed through to the sensitivity of the surrounding receptors. There should be an expectation that a higher degree of obstruction is inevitable in an area with modern high-rise buildings. This point is also made in the National Planning Policy Framework and Planning Practice Guidance.

8.2.40 For these reasons, the surrounding receptors may have a lower sensitivity to change in an urban location than those located in suburban, less dense areas. Sensitivity classification is assigned on how the proposed receptor is able to accommodate or adapt to the effect of the proposed development

8.2.41 The following existing receptor is defined as having a moderate sensitivity:

- The Hacienda

8.2.42 The Hacienda is located in a city centre where there is an expectation for a higher density of development, which inevitably leads to lower daylight and sunlight levels than residential buildings located in sub-urban, low-rise locations. The site is currently cleared, meaning it is underdeveloped with an unusually open aspect given the city centre location. In a city centre, it is likely that cleared sites will be developed and so the current level of daylight and sunlight received could not be expected to be maintained indefinitely. The Hacienda is therefore deemed to have a moderate sensitivity, as it is anticipated that the site would be developed, and the city centre location means there is an expectation for lower daylight and sunlight than the BRE targets, which are predicated on low-rise, suburban development.

Magnitude of change/impact

8.2.43 For daylight and sunlight, the BRE Guidelines (BRE, 2011) outline the approach within the accompanying appendix, in terms of assigning criteria to assess the effects:

“Adverse impacts occur when there is a significant decrease in the amount of skylight and sunlight reaching an existing building where it is required...The assessment of impact will depend on a combination of factors, and there is no simple rule of thumb that can be applied.”

“Where the loss of skylight or sunlight fully meets the guidelines, the impact is assessed as negligible or minor adverse. Where the loss of light is well within the guidelines, or only a small number of windows or limited area of open space lose light (within the guidelines), a classification of negligible impact is more appropriate. Where the loss of light is only just within the guidelines and a larger number of windows or open space are affected, a minor adverse impact would be more appropriate, especially if there is a particularly strong requirement for daylight and sunlight in the affected building or open space.”

“Where the loss of skylight or sunlight does not meet the guidelines in this book, the impact is assessed as minor, moderate or major adverse. Factors tending towards a minor adverse impact include:

- *Only a small number of windows are affected;*
- *The loss of light is only marginally outside the guidelines;*
- *An affected room has other sources of skylight or sunlight; and*
- *The affected building only has a low level of requirement for skylight or sunlight.”*

8.2.44 The classification of major adverse is documented within Paragraph 7 of the BRE Guidelines (BRE, 2011):

“Factors tending towards a major adverse impact include:

- *a large number of windows are affected;*
- *the loss of light is substantially outside the guidelines;*
- *all the windows in a particular property are affected; and*
- *the affected indoor spaces have a particular strong requirement for skylight or sunlight, e.g. a living room in a dwelling”.*

8.2.45 The BRE Guidelines (BRE, 2011) state the following regarding beneficial impacts:

“Beneficial impacts occur when there is a significant increase in the amount of skylight and sunlight reaching an existing building. Beneficial impacts should be worked out on the same principles as adverse impacts.”

8.2.46 The BRE Guidelines (BRE, 2011) do not provide any guidance on what constitutes a moderate adverse impact.

8.2.47 Therefore, best practice guidance and professional judgment has been used to determine any impacts based on the guidance set out in Appendix I of the BRE Guidelines (BRE, 2011). Potential effects are identified as beneficial, adverse or negligible, and their magnitude of effects are set out as Minor, Moderate and Major.

8.2.48 The initial numerical criteria for determining the magnitude of effect is based on percentage alterations, as shown in Table 8-2.

Table 8-2 Daylight & Sunlight Magnitude of Effect

Magnitude of Effect	Percentage Alterations from Baseline
Major	40%+
Moderate	30-39.9%
Minor	20-29.9%
Negligible	0-20%

Significance evaluation

8.2.49 The significance of any identified environmental effects is determined by the assessment of their magnitude against their sensitivity. Table 8-3 illustrates how the sensitivity of the receptors and the magnitude of any effect combine to confirm significance.

Table 8-3 Significance of Effect

		Magnitude of Effect			
		Major	Moderate	Minor	Negligible
Receptor sensitivity	High	Major	Moderate	Minor	Negligible
	Moderate	Moderate	Minor	Negligible	Negligible
	Low	Minor	Negligible	Negligible	Negligible

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

8.2.51 When assigning significance criteria for daylight and sunlight effects, professional judgement has been used. Consideration has been given to the proportion of rooms/windows affected, as well as the percentage alterations, absolute changes, sensitivity of the receptor, and any other relevant factors. There may be mitigating factors such as location and nature of development, balconies, overhangs or design features which may also affect the determination of assigning the criteria.

8.3 LEGISLATION AND POLICY WHICH HAS INFLUENCED ASSESSMENT OR MITIGATION

National policy and guidance

Revised National Planning Policy Framework (NPPF) (MHCLG, 2021)

8.3.1 The NPPF stipulates that *“...Planning policies and decisions should ensure that developments... create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users.”*

8.3.2 The document also states that *“...planning policies and decisions should always seek to secure a good standard of amenity for existing and future occupants of land and buildings.”*

8.3.3 Paragraph 125 further states:

“Where there is an existing or anticipated shortage of land for meeting identified housing needs, it is especially important that planning policies and decisions avoid homes being built at low densities, and ensure that developments make optimal use of the potential of each site. In these circumstances:

[...]

c) when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site (as long as the resulting scheme would provide acceptable living standards).”

Planning Policy Guidance (PPG) – Effective Use of Land (MHCLG, 2019)

8.3.4 The PPG – Effective Use of Land, published on 22 July 2019, Paragraph: 006 Reference ID: 66-006-20190722 states that:

“Where a planning application is submitted, local planning authorities will need to consider whether the proposed development would have an unreasonable impact on the daylight and sunlight levels enjoyed by neighbouring occupiers, as well as assessing whether daylight and sunlight within the development itself will provide satisfactory living conditions for future occupants.”

8.3.5 Paragraph 007 Reference ID: 66-007-20190722 also states:

“All developments should maintain acceptable living standards. What this means in practice, in relation to assessing appropriate levels of sunlight and daylight, will depend to some extent on the context for the development as well as its detailed design. For example in areas of high-density historic buildings, or city centre locations where tall modern predominate, lower daylight and daylight and sunlight levels at some windows may be unavoidable if new developments are to be in keeping with the general form of their surroundings”.

Regional policy and guidance

The Places for Everyone Joint Development Plan Document (DRAFT) (GMCA, 2021)

8.3.6 Policy JP-P 1 Sustainable Place, states that all development should have a clear identity that:

“Respects and acknowledges the character and identify of the locality in terms of design, siting, size, scale and materials used “.

Local policy and guidance

Manchester's Local Development Framework - Core Strategy Development Plan Document (MCC, 2012)

- 8.3.7 The MCC Core Strategy was adopted in July 2012, and includes the following policies relating to daylight and sunlight:
- Policy DM1 – Development Management – States that all developments should have regard to the effects on amenity including privacy, light, noise, vibration, air quality and odours.
 - Policy EN2 – Tall Buildings – States that, by their very size, tall buildings can have a significant impact on the local environment and its microclimate. It is therefore expected that this impact be modelled and that submissions for tall buildings also include appropriate measures to create an attractive, pedestrian friendly local environment.

Guide to Development in Manchester Supplementary Planning Document (SPD) and Planning Guidance (MCC, 2007)

- 8.3.8 The SPD was adopted in April 2007 and sets out a series of design principles which should be considered and implemented where necessary. Those measures relevant to this assessment are:
- Minimise reliance on energy-using equipment for heating, cooling, lighting and natural ventilation;
 - Site layout and building design principles should maximise the capture and use of daylight and passive solar energy, whilst avoiding excessive solar gain in the summer; and
 - Consider the impacts of overshadowing.

Guidance documents and standards

'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice', Second Edition (BRE, 2011)

- 8.3.9 The BRE Guidelines (BRE, 2011) provides advice on site layout planning to achieve good sunlighting and daylighting within buildings, and in the open spaces between them. It is intended for use by building designers, developers, consultants and Local Planning Authorities. The advice it gives is not mandatory and should not be used as an instrument of planning policy, it states:

"This guide is a comprehensive revision of the 1991 edition of Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice. It is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location."

- 8.3.10 It also states:

"The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. In special circumstances the developer or planning authority may wish to use different target values... in an area with modern high rise buildings, a higher degree of obstruction maybe unavoidable if new developments are to match the height and proportions of existing building" (para.1.6).

- 8.3.11 In addition, the BRE Guidelines (BRE, 2011) state (para. 1.3) that, *"it is intended to be read in conjunction with the interior daylighting recommendations in the British Standard 8206-2 Code of practice for daylighting, and in the Chartered Institution of Building Services Engineers (CIBSE) publication Lighting guide: daylighting and window design"*.

British Standard (BS) 8206-2:2008: 'Lighting for Buildings – Part 2: Code of Practice for Daylighting' (BSI, 2008)

- 8.3.12 The British Standard 8206 part 2 provides recommendations regarding the design for daylight in buildings and sets out various methods for assessing daylight. The document states:

"Daylighting gives to a building a unique variety and interest. An interior which looks gloomy, or which does not have a view to the outside when this could reasonably be expected, will be considered unsatisfactory by its users."

EN17037:2019 Daylight in Buildings (BSI, 2018)

- 8.3.13 The new European Standard for Daylighting, or EN17037 was published in December 2018. Most local authorities continue to refer to the BRE guidelines (BRE, 2011). The BRE hope to secure funding and re-write the BRE guidelines (BRE, 2011) in the financial year beginning April 2019, with the view of a revised publication in 2020. These timescales leave a fair degree of ambiguity as to when or if the new European Standard will become part of planning policy and what the transition between standards will be. In the meantime, The BRE guidelines (BRE, 2011) and BS8206 remain the relevant tests.

Daylighting and window design: Lighting Guide LG10 (CIBSE, 1999)

- 8.3.14 This guide replaces the CIBSE Applications Manual on Window Design (1987) and provides a daylight design guide. It states:

"when daylighting decisions are made, however, they will have implications for other, interrelated aspects of window performance such as solar heat gain, winter heat loss, provision of view, acoustic performance, privacy, security and protection from fire."

8.4 BASELINE CONDITIONS

Current baseline (2022)

Daylight & sunlight

- 8.4.1 The full baseline daylight and sunlight results can be found in Appendix 8-B, ES Volume III and are summarised in Table 8-4.
- 8.4.2 A total of 211 windows facing the site serving 164 rooms within one building were assessed for VSC and NSL for daylight and 11 rooms were assessed for APSH for sunlight within one building.
- 8.4.3 Out of the 211 windows assessed for daylight, 63 (30%) meet the BRE guidelines (BRE, 2011) for VSC. For NSL, 92 (56%) of the 164 rooms assessed meet the BRE criteria. For sunlight, 11 (100%) of the 11 rooms assessed meet the BRE criteria for both Winter and Annual APSH.
- 8.4.4 Overall, this baseline scenario is considered a low level of compliance, despite the fact that the site is also underdeveloped in context to its city centre location which should contribute to higher baseline results to the surrounding receptor, as there are no obstructions on the site to block daylight and sunlight.

Table 8-4 Baseline Daylight and Sunlight results to surrounding sensitive receptor

Receptor	Total No. Windows That Meet VSC Criteria		Total No. of Rooms That Meet NSL Criteria		Total no. of Rooms That Meet APSH Criteria	
	Pass	Total	Pass	Total	Pass	Total
The Hacienda	63	211	92	164	11	11

8.4.5 The assessment of baseline levels to the surrounding properties considers whether a window/room already meets the BRE criteria in the existing scenario only, whilst the BRE Guidelines (BRE, 2011) states that a window/room should not be reduced by any more than 0.8 times its former value (a 20% reduction) in the proposed development scenario. As such, as the VSC target is 27%, if a window in the baseline has 25% VSC, it will be classed as not meeting the BRE targets. In the proposed development scenario, if the same window is reduced to 24%, it will be classed as meeting the VSC target as it is within 0.8 times its former value. Therefore, some windows/rooms may not meet the target criteria in the baseline but will in the proposed development scenario.

Future baseline (2024)

8.4.6 There will be no change in the baseline between 2022 and 2024. The site is clear, and consented developments have been included in the baseline

Identified Receptors and their sensitivity

8.4.7 Table 8-5 provides a description of the receptors identified through the baseline review.

Table 8-5 Identified receptors and their sensitivity

Receptor	Sensitivity	Justification
The Hacienda	Moderate	Located in a city centre, where the expectation and potential for daylight and sunlight is lower than suburban locations

8.5 CONSTRUCTION EFFECTS

- 8.5.1 The potential daylight and sunlight effects during construction have been scoped out, as per section 8.2 of this ES chapter.
- 8.5.2 Since the potential daylight and sunlight effects relating to construction works will vary throughout the construction programme and gradually increase to the potential effects identified for the completed development, the interim construction effects have not been assessed quantitatively as it is considered that the completed development represents the worst-case assessment in terms of likely daylight and sunlight.

8.6 OPERATIONAL EFFECTS

Relevant aspects of the proposed development and designed-in mitigation

8.6.1 In order to ensure that daylight and sunlight impacts to surrounding receptors were limited, different massing options for the proposed development were considered during the design process. This process was informed by discussions between the client, wider design team and GIA, and the different iterations were assessed to understand the impact of each on the surrounding receptors.

Potential effects of the proposed development and their significance

Daylight to surrounding sensitive receptors

- 8.6.2 The full proposed development daylight results can be found within Appendix 8-B, ES Volume III and are summarised in Table 8-6 and Table 8-7.
- 8.6.3 A total of 211 windows serving 164 rooms were assessed for daylight within one building considered to be a sensitive receptor.

Table 8-6 Summary of VSC Daylight Results

Receptor	VSC				
			Below BRE Guidelines (BRE, 2011)		
	Total No. of Windows	No. of Windows that Meet BRE	Minor Adverse	Moderate Adverse	Major Adverse
The Hacienda	211	162	21	22	6

Table 8-7 Summary of NSL Daylight Results

Receptor	NSL				
			Below BRE Guidelines (BRE, 2011)		
	Total No. of Rooms	No. of Rooms that Meet BRE	Minor Adverse	Moderate Adverse	Major Adverse
The Hacienda	164	152	3	0	9

- 8.6.4 For VSC, 162 (77%) of the 211 windows meet the BRE criteria. 21 of the affected windows will experience an alteration between 20-30%, 22 of the affected windows will experience an alteration between 30-40%, and the remaining six windows will experience alterations in excess of 40% from the baseline value.
- 8.6.5 None of the windows that do not meet the VSC targets in the proposed development scenario will meet the VSC targets in the baseline scenario. The low levels in the baseline means that minor reductions in actual VSC are proportionally much larger. As an example, R7 on the first floor, which can be seen in the full results Appendix 8-B, will achieve 3.8% VSC in the baseline scenario. It will be reduced to 1.3% VSC in the proposed development scenario. This is only a reduction of 2.5% VSC, however this equates to a 65.8% reduction, and a major adverse impact. If the window received higher VSC levels in the baseline, a 2.5% reduction in VSC would be negligible. Considering the open aspect of the site, the lower baseline levels in The Hacienda lead to disproportionate impacts from the proposed development.
- 8.6.6 For NSL, 152 (93%) of the 164 rooms assessed will meet the BRE criteria.
- 8.6.7 Three of the affected rooms will experience an alteration between 20-30% and the remaining nine windows will experience alterations in excess of 40% from the baseline value.
- 8.6.8 Similarly, none of the rooms that fall short of the NSL targets will meet the targets in the baseline, and the losses are typically small in area, but proportionally large due to the lower baseline levels.
- 8.6.9 Overall, considering the limited impacts, the city centre location, emerging height and density in the locality, the lower baseline levels and the flexibility with which the BRE Guidelines (BRE, 2011) are intended to be used, the effect on daylight to the Hacienda is considered to be negligible in significance.
- 8.6.10 The effect on daylight is considered negligible for the following reasons:
- The building evidences a high level of compliance against VSC and NSL daylight target criteria;
 - The moderate sensitivity of the receptor; and
 - Where impacts are identified, the lower baseline levels mean they are proportionally large however the actual reductions in daylight are minor and isolated.
- Sunlight to Surrounding Sensitive Receptors
- 8.6.11 The full proposed development sunlight results can be found within Appendix 8-B, ES Volume III and are summarised in Table 8-8 and Table 8-9.
- 8.6.12 A total of 11 rooms were assessed for sunlight within one building considered a sensitive receptor.

- 8.6.13 Windows that are not within 90 degrees of due south, or do not serve living rooms, were excluded from the assessment.

Table 8-8 Summary of annual sunlight results

Receptor	APSH				
			Below Threshold for Total APSH		
	Total No. of Rooms	No. of Rooms That Meet BRE	Minor Adverse	Moderate Adverse	Major Adverse
The Hacienda	11	11	0	0	0

Table 8-9 Summary of winter sunlight results

Receptor	Winter PSH				
			Below Threshold for Winter APSH		
	Total No. of Rooms	No. of Rooms That Meet BRE	Minor Adverse	Moderate Adverse	Major Adverse
The Hacienda	11	11	0	0	0

- 8.6.14 A total of 11 rooms within this building were assessed for sunlight to compare the baseline against the proposed development scenario.
- 8.6.15 The effect on sunlight to this receptor is therefore considered to be negligible in significance.
- 8.6.16 The effect on sunlight is considered negligible as all 11 rooms meet the BRE Guidelines (BRE, 2011).

Climate change and adaptation

- 8.6.17 The effects of climate change will not impact the findings of this assessment.

Summary of effects

- 8.6.18 The summary of effects from the assessment is summarised in Table 8.10 below.

Table 8-10 Summary of effects during operation

Receptor	Sensitivity	Description of effect	Magnitude of change/impact	Effect significance
The Hacienda	Moderate	Reduction in daylight levels as a result of the completed proposed development	Minor adverse	Negligible
The Hacienda	Moderate	Effect on sunlight as a result of the proposed development.	Minor adverse	Negligible

Supplementary mitigation measures

- 8.6.19 Overall, the impact on daylight to the surrounding properties is considered minor adverse and the impact on sunlight is considered negligible. Overall, this is considered to result in non-significant effects and so no supplementary mitigation is considered necessary beyond this described in the 'design-in' mitigation.

Site A/application A

- 8.6.20 Given the context of the site and nature of effects, no further mitigation is considered necessary.

Site B/application B

- 8.6.21 Given the context of the site and nature of effects, no further mitigation is considered necessary.

8.7 RESIDUAL EFFECTS AND CONCLUSIONS

Table 8-11 Summary of residual effects during operation

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
The Hacienda	Reduction in daylight levels as a result of the completed proposed development	Negligible	None Required	Negligible
The Hacienda	Effect on sunlight as a result of the proposed development.	Negligible	None Required	Negligible

8.8 ASSESSMENT OF ONE APPLICATION COMING FORWARD IN ISOLATION

- 8.8.1 The impact would be reduced if the applicants came forward separately, however the cumulative impact would be the same as the current assessment. The assessment of the construction of both buildings at the same time represents the worst-case scenario, and so the impact of the applications coming forward in isolation has not been assessment.

8.9 FUTURE MONITORING OF SIGNIFICANT RESIDUAL ENVIRONMENTAL EFFECTS

- 8.9.1 No significant effects were identified, therefore future monitoring is not required for the proposed development.

8.10 REFERENCE LIST

- 8.10.1 This ES Chapter has been prepared by reference to the following:

- Manchester City Council (MCC) (2012). Manchester's Local Development Framework – Core Strategy Development Plan.
- Ministry for Housing, Communities and Local Government (MHCLG) (2021). National Planning Policy Framework, MHCLG.
- Ministry for Housing, Communities and Local Government (MHCLG) (2019). National Planning Practice Guidance;
- Manchester City Council (MCC) (2007). Guide to Development in Manchester Supplementary Planning Document and Planning Guidance:
- Building Research Establishment (BRE) (2011) 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice', Second Edition; and
- British Standard (BS) (2008) 8206-2:2008: 'Lighting for Buildings – Part 2: Code of Practice for Daylighting'.

8.11 GLOSSARY

Term	Definition
3D	Three-dimensional
APSH	Annual Probable Sunlight Hours
BRE	Building Research Establishment
BS	British Standard
CIBSE	Chartered Institution of Building Services Engineers
EIA	Environmental Impact Assessment
ES	Environmental Statement
MHCLG	Ministry for Housing, Communities and Local Government
NPPF	National Planning Policy Framework
NSL	No Sky Line
OS	Ordnance Survey
PPG	Planning Policy Guidance
SPD	Supplementary Planning Document
VSC	Vertical Sky Component

8.12 LIST OF APPENDICES (ES VOLUME III)

Reference	Title
Appendix 8-A	Drawings of the baseline and proposed development scenario
Appendix 8-B	Daylight and sunlight results for baseline v proposed development scenario.

9 BUILT HERITAGE

9.1 INTRODUCTION

- 9.1.1 This chapter of the ES assesses the likely environmental effects of the proposed development with respect to Built Heritage. 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. This chapter of the ES was produced by Turley Heritage.
- 9.1.2 This ES chapter is supported by the following appendices within ES Volume III:
- Appendix 9-A Heritage Assessment; and
 - Appendix 9-B A Heritage Asset Plan.
- 9.1.3 Cumulative effects associated with Built Heritage have additionally been considered within the ES and can be found in Chapter 11 Cumulative and Interactive Effects.

9.2 METHODOLOGY AND ASSESSMENT CRITERIA

EIA Scoping

- 9.2.1 Although a formal scoping opinion was not received from Manchester City Council (MCC), they did confirm that they were happy with the approach set out in the EIA Scoping Report (Appendix 4-A, ES Volume III), which was submitted to MCC on 20th October 2021.
- 9.2.2 Additionally, feedback was provided by Historic England, as summarised in Table 9-1.

Table 9-1 Summary of comments provided by Historic England based on the EIA scoping report for the proposed development.

Historic England Comment (HE)	Response
We would expect the Environmental Statement to contain a thorough assessment of the likely effects which the proposed development might have upon those elements which contribute to the significance of these assets. This is considered in section 6.6 of the submitted scoping report, which also sets out the scope of assets to be considered as part of the EIA, and the proposed methodology.	The significance and setting of heritage assets with potential to be affected is assessed in the Heritage Assessment at Appendix 9-A, ES Volume III of this chapter and potential significant environmental effects are described in the chapter itself.
This methodology is generally acceptable. However, given the height of the proposed development, it is likely that it will be intermittently visible across a large area and could, as a result, affect the significance of heritage assets at some distance from this site itself. We would expect the assessment to clearly demonstrate that the extent of the proposed study area is of the appropriate size to ensure that all heritage assets likely to be affected by this development have been included and can be properly assessed.	Heritage assets with potential to experience effects and significant environmental effects have been identified and assessed. Potential views from heritage assets at greater distance have also been considered in the Heritage Assessment at Appendix 9-A, ES Volume III, including the St Peters Square and Albert Square Conservation Areas.
We would also expect the Environmental Statement to consider the potential impacts on non-designated features of historic, architectural, archaeological or artistic interest, since these can also be of national importance and make an important contribution to the character and local distinctiveness of an area and its sense of place.	Non designated heritage assets within the defined Study Area have been identified through the Greater Manchester Historic Environment Record (HER). Due to distance and limited inter-visibility these assets are unlikely to experience significant environmental effects and have been scoped out of the assessment.

Historic England Comment (HE)	Response
We would strongly recommend that you involve the Conservation Officer of MCC and the archaeological staff at Greater Manchester Archaeological Advisory Service in the development of this assessment. They are best placed to advise on: local historic environment issues and priorities; how the proposal can be tailored to avoid and minimise potential adverse impacts on the historic environment; the nature and design of any required mitigation measures; and opportunities for securing wider benefits for the future conservation and management of heritage assets.	An MCC conservation officer will be formally consulted on the ES and application following submission.
The assessment should also take account of the potential impact which associated activities (such as construction, servicing and maintenance, and associated traffic) might have upon perceptions, understanding and appreciation of the heritage assets in the area. The assessment should also consider, where appropriate, the likelihood of alterations to drainage patterns that might lead to in situ decomposition or destruction of below ground archaeological remains and deposits and can also lead to subsidence of buildings and monuments.	The impact and effect of construction activities on built heritage is taken into consideration in the ES chapter. Archaeology is addressed in a separate Archaeological Desk Based Assessment (prepared by ARS dated January 2022) which has been submitted as a standalone planning document with the application.

Baseline study methodology

- 9.2.3 Initial baseline appraisal of the site and heritage assets with potential to be affected by redevelopment was undertaken in 2016 and updated in 2020 as informed by site visits. Pre-application discussions were held with Historic England in October 2016 and November 2020. This baseline was reviewed, developed and updated again in December 2021 to ensure the current site conditions and changes within the surrounding area have been taken into consideration. This baseline information was prepared from the following sources:
- National Heritage List for England (Historic England);
 - Greater Manchester HER;
 - Historic mapping and Ordnance Survey Mapping;
 - MCC;
 - Site visits; and
 - Desk top research.

Assessment approach

- 9.2.4 The approach taken to the assessment of impact and effects on built heritage is informed by consultation of sources, research, site visits and application of professional judgement, combined with existing knowledge of the significance and setting of heritage assets in this area of Manchester.
- 9.2.5 A Study Area of 500m has been applied based on the city centre context of the site and the following factors:
- The nature and scope of the proposed development;
 - The proximity of heritage assets to the proposed development;
 - The degree of inter-visibility between heritage assets and the site taking into consideration, for instance, changes in topography as well as interposing townscape and landscape features (informed by the ZTV and site visits); and

- The significance of the relevant heritage assets and the contribution made by their setting, including any known historic or functional relationships.

Assessment of effects

- 9.2.6 In the absence of specific prescribed criteria for the assessment of effects on built heritage, the methodology for establishing the relative value or importance of heritage assets; the magnitude of change; and the significance of effect has been taken from the Design Manual for Roads and Bridges (DMRB) (2019, LA 106 Cultural Heritage Assessment) and informed by Historic England including Good Practice Advice in Planning Note 2, Managing Significance in Decision Taking in the Historic Environment (March 2015), and Good Practice Advice Note 3 The Settings of Heritage Assets (2017).
- 9.2.7 With reference to guidance set out in the DMRB, the effect on the cultural heritage resource is not significant when the impact does not substantially diminish or enhance the heritage interest of the cultural heritage resource.

Receptor sensitivity

- 9.2.8 The criteria used to assess receptor sensitivity is described in Table 9-2.

Table 9-2 Criteria for determining receptor sensitivity

Sensitivity	Criteria
High	Scheduled monuments with standing remains Registered Battlefields Grade I and II* listed buildings Other listed buildings that can be shown to have exceptional qualities in their fabric or historical association not adequately reflected in the listing grade Grade I and II* registered parks and gardens Conservation areas containing very important buildings
Moderate	Grade II listed buildings Historic (unlisted) buildings that can be shown to have exceptional qualities in their fabric or historical association Grade II registered parks and gardens Conservation areas containing important buildings Historic townscape or built-up areas with historic integrity in their buildings, or built settings (e.g. including street furniture and other structures)
Low	'Locally listed' buildings and landscapes Historic (unlisted) buildings of modest quality in their fabric or historical association Historic townscape or built-up areas of limited historic integrity in their buildings, or built settings (e.g. including street furniture and other structures)
Negligible	Assets of no architectural or historic note; buildings of an intrusive character

Magnitude of change/impact

- 9.2.9 The criteria used to assess how far an effect deviates from the baseline condition, i.e. the magnitude of change, are described in Table 9-3.

Table 9-3 Criteria for determining magnitude of change/impact

Magnitude	Criteria
Large	Change to key historic building elements, such that the asset is totally altered and much of its heritage significance is lost or enhanced. Substantial change within the setting of an historic building leading to considerable loss or enhancement of heritage significance of the asset

Magnitude	Criteria
Medium	Change to many key historic building elements, such that the asset is clearly modified and there is some loss or enhancement of heritage significance. Change within the setting of an historic building leading to some loss or enhancement of heritage significance of the asset
Small	Changes to key historic building elements, such that the asset is slightly altered and there is some loss or enhancement of heritage significance. Change within the setting of an historic building leading to a slight loss or enhancement of heritage significance of the asset
Negligible	Slight changes to historic building elements or within its setting that hardly affect the heritage significance of the asset

Significance evaluation

- 9.2.10 The significance of a potential effect is derived by considering both the sensitivity of the feature and the magnitude of change, as demonstrated in Table 9-4.

Table 9-4 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

- 9.2.11 Note that moderate and major effects can be considered to be 'significant', however this is subject to professional judgement and specific circumstances of the effect, including the significance of the heritage asset, the contribution made by its setting and impact of the proposed development.
- 9.2.12 With reference to guidance set out in DMRB, the effect on the cultural heritage resource is not significant when the impact does not substantially diminish or enhance the heritage interest of the cultural heritage resource.
- 9.2.13 Effects can also be described, for example, as:
- Beneficial or adverse;
 - Permanent or reversible;
 - Short, medium or long term; and
 - Significant (major or moderate) or insignificant (negligible or minor).

9.3 Legislation and policy which has influenced assessment or mitigation

National policy and guidance

The Planning (Listed Buildings and Conservation Areas) Act 1990

- 9.3.1 Under s66(1) of The Planning (Listed Buildings and Conservation Areas) Act 1990, MCC, in determining the submitted full planning applications has a statutory duty to pay special regard to the desirability of preserving listed buildings, their setting or any features of special interest they may possess.
- 9.3.2 Case law has confirmed that Parliament's intention in enacting s66(1) was that decision-makers should give considerable importance and weight to the desirability of preserving the special interest and setting of listed buildings, where 'preserve' means 'to cause no harm'.

- 9.3.3 The setting of conservation areas is not expressly protected by primary legislation. However, the National Planning Policy Framework 2021 (NPPF) states that the setting of a designated heritage asset (including conservation areas) can contribute to its significance.
- The National Planning Policy Framework 2021**
- 9.3.4 Paragraph 197 of the NPPF states that in determining planning applications, local planning authorities should take account of the desirability of sustaining and enhancing the significance of heritage assets, putting them into viable uses consistent with their conservation, as well as the desirability of new development making a positive contribution to local character and distinctiveness.
- 9.3.5 Paragraph 199 requires, when considering the impact of development on the significance of a designated heritage asset that great weight should be given to the asset’s conservation. ‘Conservation’ is defined by the NPPF as ‘the process of maintaining and managing change to a heritage asset in a way that sustains and, where appropriate, enhances its significance.’
- 9.3.6 Paragraphs 201 and 202 differentiate between ‘substantial’ and ‘less than substantial harm’ and provide a framework for the consideration of harm to the significance of designated heritage assets where it arises, bearing in mind the considerable importance and weight that must be given to the statutory duties of the 1990 Act.
- 9.3.7 Paragraph 206 requires that local planning authorities look for opportunities for new development within the setting of heritage assets to better reveal their significance. It states that proposals that preserve those elements of setting that make a positive contribution to or better reveal the significance of the asset should be treated favourably.
- 9.3.8 The assessment has been undertaken in line with best practice guidance documents to inform the approach and impact assessment. Those documents used to inform the assessment are listed below:
- Historic Environment Good Practice Advice in Planning Note 2: Managing Significance in Decision-Taking in the Historic Environment (Historic England 2015); and
 - Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (Historic England 2017).

Regional policy and guidance

Places for Everyone (publication stage August 2021)

- 9.3.9 Draft Policy JP-P 2 states that proposals affecting a designated heritage asset (or an archaeological site of national importance) and a conservation area should conserve those elements which contribute to its significance including those identified in any conservation area appraisal as making a positive contribution to the area. Harm to such elements will only be permitted where this is clearly justified and outweighed by the public benefits of the proposal.

Local policy and guidance

- 9.3.10 The Manchester Local Plan is formed of the Core Strategy 2012-2027 and Proposals Map, the extant Unitary Development Plan (UDP) Policies and relevant Development Plan Documents (DPDs).
- Manchester’s Local Development Framework – Core Strategy Development Plan (MCC, 2012)**
- Policy EN 2 Tall Buildings
- 9.3.11 Policy EN 2 of the Core Strategy relates to tall buildings, which are defined as ‘buildings which are substantially taller than their neighbourhoods and/or which significantly change the skyline’. It further states that proposals for tall buildings will be supported where it is demonstrated that they:

- “Are of excellent design quality;
- Are appropriately located;
- Contribute positively to sustainability;
- Contribute positively to place making, for example as a landmark, terminating a view, or by signposting a facility of significance; and
- Will bring significant regeneration benefits.”

Policy EN 3 Heritage

- 9.3.12 Policy EN 3 (Heritage) of the Core Strategy states that:
- ‘Throughout the City, the Council will encourage development that complements and takes advantage of the distinct historic and heritage features of its districts and neighbourhoods, including those of the City Centre.*
- New developments must be designed so as to support the Council in preserving or, where possible, enhancing the historic environment, the character, setting and accessibility of areas and buildings of acknowledged importance, including scheduled ancient monuments, listed buildings, registered parks and gardens, conservation areas and archaeological remains...’*

MCC Extant Unitary Development Policies

Policy DC 18.1 Conservation Areas

- 9.3.13 Policy DC18.1 confirms that MCC will give particularly careful consideration to development proposals within Conservation Areas. It states the following:
- “.....e) Development proposals adjacent to Conservation Areas will be granted only where it can be shown that they will not harm the appearance or character of the area. This will include the protection of views into and out of Conservation Areas.”*

Policy DC 19 Listed Buildings

- 9.3.14 Policy DC19 of the UDP relates to the determination of planning applications for development which involve or have an impact on buildings of Special Architectural or Historic Interest. It states that the Council will have regard to protecting their general setting. In giving effect to this policy, the Council will:
- “.....d) seek to preserve and enhance the settings of listed buildings by appropriate control over the design of new development in their vicinity, control over the use of adjacent land, and where appropriate, by the preservation of trees and landscape features...”*

Assessment limitations (technical deficiencies or lack of knowledge)

- 9.3.15 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:
- The list of heritage and non-heritage asset assets within the Study Area has been compiled from information provided by the Greater Manchester HER and the National Heritage List for England; and
 - This Chapter is focussed on built heritage only. An Archaeological Desk Based Assessment has been prepared which assesses potential impacts on buried archaeological remains. This assessment does not form part of the ES but is submitted as a supporting document with the planning applications.

9.4 BASELINE CONDITIONS

Current baseline (2022)

- 9.4.1
- The site comprises two parcels of land at the corner of Great Bridgewater Street and Albion Street. Site A is a broadly triangular area of land extending from Great Bridgewater Street in the north and Trumpet Street to the south. It is adjacent to the grade II listed Britons Protection Public House to the east and follows the curve of Albion Street to the west. It is currently an open area of asphalt hardstanding and used for surface level car parking.
- 9.4.2
- Site B is a narrow area of land also extending from Great Bridgewater Street in the north to Trumpet Street in the south. It is sandwiched between the Britons Protection and the Jurys Inn Hotel and currently has no formal use, with a gravel surface.
- 9.4.3
- To the east of the site on Great Bridgewater Street is the Jurys Inn Hotel. Most buildings on Great Bridgewater Street, with the exception of the Britons Protection and Peveril of the Peak public house, are large scale and positioned close to the street frontage, creating an enclosed urban grain. To the north, across Great Bridgewater Street is the Bridgewater Hall. The open/wide road junction of Great Bridgewater Street/Lower Mosley/Albion Street is to the immediate west of the site, with the descending route of the Metrolink, the energy centre and ‘tower of light’ of Manchester Civic Heat and Power Network and Manchester Central beyond. To the rear of the site is Trumpet Street and the north elevation of 13 – 17 Albion Street.
- 9.4.4
- Until the end of the 18th century, the area surrounding the site was laid out as largely agricultural land with development concentrated along the Roman road of Deansgate (formerly known as Alport Street). To the south of the site, a series of cotton mills and finishing works lay along the River Medlock associated with the region’s textile industry.
- 9.4.5
- A surge in growth of the cotton industry during the late 18th century was heightened by the construction of the canal system between 1790 and 1805 which connected Manchester with the principal towns in the manufacturing districts. A formal grid pattern of streets was laid out in the area around this time.
- 9.4.6
- By the middle of the 19th century, the booming textile industry had expanded northwards and the area surrounding the site was developed with a number of large cotton mills. The ‘Britons Protection Inn’ existed by 1851 in combination with a timber yard to the east, a coal yard and associated buildings on site A and dwellings lining Trumpet Street to the south.
- 9.4.7
- The construction of Manchester Central Station and its associated infrastructure in 1876-9 resulted in dramatic change to the character of the area. The station and railway lines replaced a number of the mills in the area and resulted in change to the urban grain of the area. By the late 19th century and early 20th century site A was densely developed with a series of buildings arranged perpendicular to Albion Street and site B was occupied by two narrow buildings with a row of dwellings still extant to the south. The Trumpet Street dwellings had been demolished by 1957 and a bus station added to the east, on the current site of the Jurys Inn Hotel.
- 9.4.8
- During the late 20th century and early 21st century, the area surrounding the site has undergone marked change with the introduction of a number of modern buildings of increasing height and scale. The Bridgewater Hall and the large office buildings to the north were developed in the late 20th century. The Beetham Tower to the west was built in 2006 as a highly visible landmark and is now joined with additional tall buildings, including the Axis tower close to the site and the Deansgate Square towers beyond. In combination with the HOME development to the south of Whitworth Street West, the Tower of Light and a number of other extant planning permissions in the surrounding area, the site occupies an area experiencing significant change.

Future baseline (2024)

- 9.4.9
- If the proposed development did not go ahead, it is not considered that the site conditions would change. It is expected that development would proceed in the surrounding area on sites with or that gain planning permission.

Identified Receptors and their sensitivity

- 9.4.10
- Table 9-5 provides a description of the built heritage receptors identified through the baseline review.
- 9.4.11
- These are assets with potential to experience a significant environmental effect and thus reported within the ES. These and other assets with potential to be affected (not significant) are considered within the Heritage Assessment at Appendix 9-A, ES Volume III. A Heritage Asset Plan showing the site and all heritage assets within the 500m Study Area is included at Appendix 9-B, ES Volume III.
- 9.4.12
- With reference to guidance set out in DMRB, the effect on the cultural heritage resource is not significant when the impact does not substantially diminish or enhance the heritage interest of the cultural heritage resource.

Table 9-5 Identified receptors and their sensitivity

Receptor	Sensitivity	Justification
The Britons Protection Public House (grade II listed)	Moderate	The guidance in Table 9-2 has been applied, informed by professional judgement and the assessment of significance and setting of the heritage asset/receptor set out in the Heritage Assessment at Appendix 9-A, ES Volume III.
13-17 Albion Street (grade II listed)	Moderate	The guidance in Table 9-2 has been applied, informed by professional judgement and the assessment of significance and setting of the heritage asset/receptor set out in the Heritage Assessment at Appendix 9-A, ES Volume III.
GMEX (Manchester Central (grade II* listed)	High	The guidance in Table 9-2 has been applied, informed by professional judgement and the assessment of significance and setting of the heritage asset/receptor set out in the Heritage Assessment at Appendix 9-A, ES Volume III.
Chepstow House (grade II listed)	Moderate	The guidance in Table 9-2 has been applied, informed by professional judgement and the assessment of significance and setting of the heritage asset/receptor set out in the Heritage Assessment at Appendix 9-A, ES Volume III.
Peveril of the Peak Public House (grade II listed)	Moderate	The guidance in Table 9-2 has been applied, informed by professional judgement and the assessment of significance and setting of the heritage asset/receptor set out in the Heritage Assessment at Appendix 9-A, ES Volume III.

9.5 CONSTRUCTION EFFECTS

Relevant aspects of the proposed development

- 9.5.1
- There are temporary effects that may affect the setting and significance of heritage assets during the site clearance, excavation and construction phase. This includes temporary diminution in the quality of the setting of heritage assets arising from the presence of mobile cranes, visible machinery, earthworks and material management, construction activities and construction traffic movements. The risk of such effects will be partially mitigated by embedded mitigation, including a Construction Environmental Management Plan and measures such as the erection of hoardings to screen activity.

Potential effects of the proposed development and their significance

Change in the setting of heritage assets/receptors

- 9.5.2 The Britons Protection (grade II listed) is adjacent to the site and will experience adverse effects during the construction phase of the proposed development due to the proximity of the heritage asset to construction activities. The sensitivity of the heritage asset is moderate. The magnitude of change is considered to be medium adverse. Therefore, there is likely to be a temporary adverse effect on this asset which is considered to be moderate adverse and not significant.
- 9.5.3 13 – 17 Albion Street (grade II listed) is located to the south of the site and will also experience adverse effects during the construction phase of the proposed development due to the proximity of the heritage asset to construction activities. The sensitivity of the heritage asset is moderate. The magnitude of change is considered to be medium adverse. Therefore, there is likely to be a temporary adverse effect on this asset which is considered to be moderate adverse and not significant.
- 9.5.4 GMEX (Manchester Central) (grade II* listed) is located to the north of the site. The activities of the construction phase will be visible from the asset, but at greater distance. The sensitivity of the heritage asset is high. The magnitude of change is considered to be small. Therefore, there is likely to be a temporary adverse effect on this asset which is considered to be moderate/minor adverse and not significant.
- 9.5.5 It is likely that construction activities would also be visible from both Chepstow House (grade II listed) and Peveril of the Peak Public House (grade II listed), located to the east of the site. The sensitivity of these heritage assets is moderate. The magnitude of change is considered to be small. Therefore, there is likely to be a temporary adverse effect on these assets which is considered to be minor adverse and not significant.

Climate change and adaptation

- 9.5.6 Climate change is unlikely to change the construction assessment in relation to built heritage asset receptors.

Summary of effects

- 9.5.7 Table 9-6 summarises the construction phase effects associated with built heritage.

Table 9-6 Summary of effects during construction

Receptor	Sensitivity	Description of effect	Magnitude of change/impact	Effect significance
The Britons Protection Public House	Moderate	Construction activities	Medium adverse	Moderate adverse, not significant
13 – 17 Albion Street	Moderate	Construction activities	Medium adverse	Moderate adverse, not significant
GMEX (Manchester Central)	High	Construction activities	Small adverse	Moderate/minor adverse, not significant
Chepstow House	Moderate	Construction activities	Small adverse	Minor adverse, not significant
Peveril of the Peak Public House	Moderate	Construction activities	Small adverse	Minor adverse, not significant

Supplementary mitigation measures

- 9.5.8 Given the reasons for the identified adverse effects and the embedded mitigation already taken into consideration, no further mitigation is proposed for both site A and site B.

9.6 OPERATIONAL EFFECTS

Relevant aspects of the proposed development and designed-in mitigation

- 9.6.1 The proposed ground plus 25 storey building on site A has a tapered plan form with a narrow elevation to Great Bridgewater Street and a wider rear elevation to Trumpet Street. A curved primary elevation follows the curved western boundary of the site to Albion Street, composed of aluminium framed glazing with perforated metal panels. The straight east facing elevation is finished in terracotta cladding. An open triple height space is proposed at ground floor with columns supporting the upper floors. The main entrance to the building and ground floor concierge and circulation space are concentrated in the southern part of the site, with vehicular access and visitor parking spaces off Trumpet Street. A section of floor plan has also been cut out at the rear of the site where the proposed building adjoins the beer garden of the Britons Protection Public House.
- 9.6.2 A narrow rectangular seven storey building is proposed on site B, accessed from Great Bridgewater Street. The lower five floors of the building will have greater solidity in terracotta cladding with the upper two storeys in aluminium framed glazing, consistent with the approach taken for site A.

Potential effects of the proposed development and their significance

Change in the setting of Heritage Assets/Receptors

- 9.6.3 The proposed development would affect the way in which the Britons Protection Public House is experienced and appreciated and reduce its distinctiveness in the townscape given its adjacency to the proposed development, the height of the building proposed and the contrast between the diminutive building and the tower. Steps have been taken to reduce and minimise this impact including a triple height space from ground to third floor and the Britons Protection will be viewed alongside the narrow and tapered edges of the buildings. The historic and architectural interest of the Britons Protection and ability to appreciate that interest would be unchanged, including the contribution made by its interior. The sensitivity of the heritage asset is moderate. The magnitude of change is considered to be medium adverse. Therefore, there is likely to be an adverse effect on this asset which is considered to be moderate adverse and not significant.
- 9.6.4 Based on the orientation of 13 -17 Albion Street and the way in which its architectural and historic interest is principally experienced and appreciated in views from the west and in combination with the canal network, it is not considered that the significance of the asset would be harmed. Existing open views of the north facing side elevation of the building will be obscured by the proposed development, however former buildings on the site, although lower, would also have partially or wholly screened this elevation and the listed building already occupies a setting characterised by a number of modern buildings of increased height. The significance of the listed building as a former warehouse in the Venetian Gothic style will be sustained. The sensitivity of the heritage asset is moderate. The magnitude of change is considered to be negligible, resulting in a negligible effect that is not significant.

9.6.5 The proposed development would be clearly visible from Manchester Central, both in views in combination with the listed building from Lower Mosley Street and Albion Street and in views of the former station from Mount Street and Windmill Street to the north. The proposed development will occupy an area of existing and proposed modern buildings of increased footprint and height and will be read in this context. The proposed materials and palette relate to the warm red tones of the historic townscape in this part of the city. The curved glazed façade to Albion Street addresses the street pattern and the roof form of Manchester Central. The orientation of the building and narrow width of the site means that it would appear slender in these views. The proposed development would constitute change within the setting of Manchester Central and would be viewed cumulatively with existing tall buildings. However based on the height, scale, mass, design and materials of the proposed development and the character of its existing setting, it is not considered that the significance of Manchester Central would be harmed. The sensitivity of the heritage asset is high. The magnitude of change is considered to be negligible, resulting in a negligible effect that is not significant.

9.6.6 The proposed development will be visible from Chepstow House and Peveril of the Peak Public House, in combination with existing taller buildings that function as a backdrop. The proposed tower would rise above the articulated roofscape of Chepstow House, however in combination with the existing Beetham Tower and Axis Tower. The more recent Deansgate Towers are also clearly appreciable in views westwards and the proposed development will form part of the existing city skyline appreciable from the setting of these assets. Although an additional tall building, and closer to these assets, it is not considered that the character of the setting of these assets would change to the extent that their individual significance would be harmed. The sensitivity of these heritage assets is moderate. The magnitude of change is considered to be negligible, resulting in a negligible effect that is not significant.

Climate change and adaptation

9.6.7 Climate change is unlikely to change the operational assessment in relation to built heritage asset receptors.

Summary of effects

9.6.8 Table 9-7 summarises the operation phase effects associated with built heritage.

Table 9-7 Summary of effects during operation

Receptor	Sensitivity	Description of effect	Magnitude of change/impact	Effect significance
The Britons Protection Public House	Moderate	The impact on new built development on the significance and setting of the asset	Medium adverse	Moderate adverse, not significant
13 – 17 Albion Street	Moderate	The impact on new built development on the significance and setting of the asset	Negligible	Negligible, not significant
GMEX (Manchester Central)	High	The impact on new built development on the significance and setting of the asset	Negligible	Negligible, not significant
Chepstow House	Moderate	The impact on new built development on the significance and setting of the asset	Negligible	Negligible, not significant
Peveril of the Peak Public House	Moderate	The impact on new built development on the significance and setting of the asset	Negligible	Negligible, not significant

Supplementary mitigation measures

9.6.9 Given the reasons for the identified adverse effects and the embedded mitigation already taken into consideration, no further mitigation is proposed for both site A and site B.

9.7 RESIDUAL EFFECTS AND CONCLUSIONS

9.7.1 A summary of the residual effects of the proposed development is provided in Table 9-8 for construction and Table 9—9 for the operational phase.

Table 9-8 Summary of residual effects during construction

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
The Britons Protection Public House	Change in the setting of the asset	Moderate adverse, not significant	N/A	Moderate adverse, not significant
13 – 17 Albion Street	Change in the setting of the asset	Moderate adverse, not significant	N/A	Moderate adverse, not significant
GMEX (Manchester Central)	Change in the setting of the asset	Moderate/minor adverse, not significant	N/A	Moderate/minor adverse, not significant
Chepstow House	Change in the setting of the asset	Minor adverse, not significant	N/A	Minor adverse, not significant
Peveril of the Peak Public House	Change in the setting of the asset	Minor adverse, not significant	N/A	Minor adverse, not significant

Table 9—9 Summary of residual effects during operation

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
The Britons Protection Public House	Change in the setting of the asset	Moderate adverse, not significant	N/A	Moderate adverse, not significant
13 – 17 Albion Street	Change in the setting of the asset	Negligible, not significant	N/A	Negligible, not significant
GMEX (Manchester Central)	Change in the setting of the asset	Negligible, not significant	N/A	Negligible, not significant
Chepstow House	Change in the setting of the asset	Negligible, not significant	N/A	Negligible, not significant
Peveril of the Peak Public House	Change in the setting of the asset	Negligible, not significant	N/A	Negligible, not significant

9.7.2 There are no residual effects which are considered to be Significant. Although there will be a moderate adverse effect on the Britons Protection during the operation phase, this is not considered to be significant. The listed building has a mixed urban setting and is therefore experienced and appreciated in combination with both historic and modern cityscape. Tall buildings already exist within its setting including the Axis Tower, the Beetham Tower, the Home development and Deansgate Square. It is not considered that the Proposed Development in combination with these existing buildings would substantially diminish the heritage interest of the listed building.

9.8 ASSESSMENT OF ONE APPLICATION COMING FORWARD IN ISOLATION

- 9.8.1 Should site A come forward in isolation it is considered that the effects outlined in this chapter would be unchanged.
- 9.8.2 Should site B come forward in isolation, effects would be reduced both during construction (Table 9-10) and during operation (Table 9—11).

Table 9-10 Summary of residual effects during construction for Site B alone

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
The Britons Protection Public House	Change in the setting of the asset	Minor adverse	N/A	Minor adverse, not significant
13 – 17 Albion Street	Change in the setting of the asset	Negligible	N/A	Negligible, not significant
GMEX (Manchester Central)	Change in the setting of the asset	Negligible	N/A	Negligible, not significant
Chepstow House	Change in the setting of the asset	Negligible	N/A	Negligible, not significant
Peveril of the Peak Public House	Change in the setting of the asset	Negligible	N/A	Negligible, not significant

Table 9—11 Summary of residual effects during operation for Site B alone

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
The Britons Protection Public House	Change in the setting of the asset	Negligible	N/A	Negligible, not significant
13 – 17 Albion Street	Change in the setting of the asset	Negligible	N/A	Negligible, not significant
GMEX (Manchester Central)	Change in the setting of the asset	Negligible	N/A	Negligible, not significant
Chepstow House	Change in the setting of the asset	Negligible	N/A	Negligible, not significant
Peveril of the Peak Public House	Change in the setting of the asset	Negligible	N/A	Negligible, not significant

9.9 REFERENCES

- The Planning (Listed Buildings and Conservation Areas) Act 1990
- Ministry of Housing, Communities and Local Government, (2021), National Planning Policy Framework (NPPF)
- Ministry of Housing, Communities and Local Government, (2021), Planning Policy Guidance (PPG)
- Manchester City Council, (2012), Manchester’s Local Development Framework Core Strategy Development Plan Document (2012) and Extant Unitary Development Policies (UDP)
- Historic England, (2017), Good Practice Advice Note 3: The Setting of Heritage Assets
- Historic England, (2015), Good Practice Advice Note 2: Managing Significance in Decision Taking in the Historic Environment

- Design Manual for Roads and Bridges (DMRB) (2019) ((LA 104 Environmental Assessment and Monitoring) and (LA 106 Cultural Heritage Assessment))

9.10 GLOSSARY

Term	Definition
(HER) Historic environment record	Information services that seek to provide access to comprehensive and dynamic resources relating to the historic environment of a defined geographic area for public benefit and use.
MCC	Manchester City Council
NPPF	National Planning Policy Framework

9.11 LIST OF APPENDICES (ES VOLUME III)

- 9.11.1 Supporting technical documents and data should be included as appendices.

Reference	Title
Appendix 9-A	Heritage Assessment
Appendix 9-B	Heritage Asset Plan

10 Greenhouse Gas Emissions

10.1 INTRODUCTION

- 10.1.1 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.
- 10.1.2 The GHG emissions ES chapter is accompanied by a summary of the assumptions and benchmarks that were used when calculating the GHG emissions (Appendix 10-A, ES Volume III)
- 10.1.3 Cumulative effects associated with GHG emissions have additionally been considered within the ES and can be found in Chapter 11 Cumulative and Interactive Effects.

10.2 METHODOLOGY AND ASSESSMENT CRITERIA

EIA Scoping

- 10.2.1 Although a formal scoping opinion was not received from MCC, they did confirm that they were happy with the approach set out in the EIA Scoping Report (Appendix 4-A, ES Volume III), which was submitted to MCC on 20th October 2021.

Baseline study methodology

- 10.2.2 The baseline consists of the GHG emissions associated with the current site use. The baseline GHG emissions have then been compared to the GHG emissions associated with the proposed development. The site is currently being used as a surface level car park, with no direct sources of GHG emissions identified. Based on this, it is assumed that the baseline for the purposes of this ES chapter is zero. For the purpose of comparison, for the baseline scenario and future baseline scenario, it is assumed that the site will remain unaltered and unoccupied for the lifecycle of the proposed development (i.e., 60 years after the baseline year).

Assessment approach

- 10.2.3 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 (IEMA, 2017) instead advocates for flexibility and proportionality to suit the proposed development under assessment.
- 10.2.4 For the purposes of the assessment, the proposed development has been split up into lifecycle stages, as per BS EN 15978: 2011 Sustainability of Construction Works – Assessment of Environmental Performance of Buildings – Calculation Method, as shown in Figure 10-1.

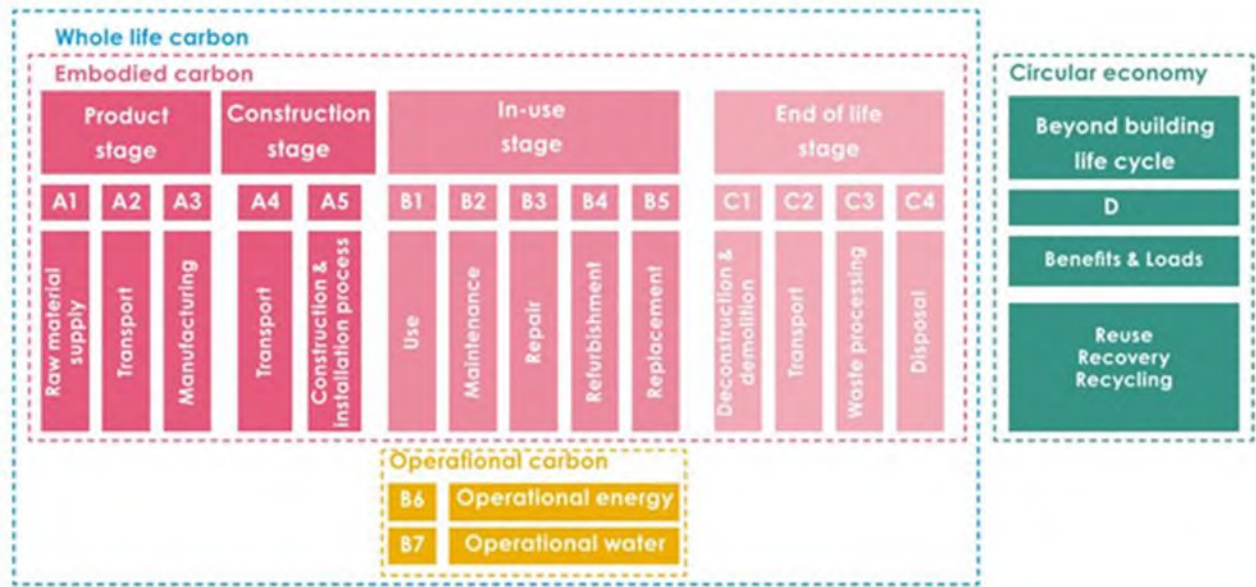


Figure 10-1: Diagram showing the stages of a lifecycle GHG emissions assessment. Diagram taken from LETI (2020) Embodied Carbon Primer, based on lifecycle stages set out in BS EN 15978:2011 Sustainability of Construction Works – Assessment of Environmental Performance of Buildings – Calculation Method.

- 10.2.5 The decision to include or exclude a source of GHG emissions is based on:
 - The relative contribution of a GHG emissions source to the total GHG emissions over the whole life of the proposed development;
 - The availability of published benchmarks and certainty over future technologies and scenarios to meaningfully estimate the GHG emissions; and
 - The opportunities for design and construction decisions to significantly influence the reduction of a GHG emissions source.

Construction

- 10.2.6 Based on the criteria set out above and in line with Figure 10-1, 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; and
 - A4-A5 Construction process stage: GHG emissions associated with product delivery to site and the installation process.

Operation

- 10.2.7 Based on the criteria set out above and in line with Figure 10-1, the assessment of the operation phase 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;
 - B6 Operational energy: GHG emissions associated with the estimated total operational energy;
 - B7 Operational water: GHG emissions associated with operational water consumption and foul water; 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.

Sources of GHG emissions excluded from the assessment

- 10.2.8 Based on the criteria set out above, the following sources of GHG emissions have been excluded from the scope of the assessment:
- Operational transport: GHG emissions associated with operational transport have not been assessed since actual modal split in operation is highly dependent on resident and visitor behaviour as well as decarbonisation of the wider transport network. The proposed development contains minimal car parking (i.e., three car parking spaces) and is in Manchester City Centre, where there is a wide choice of public transport options. Due to its city centre location, a range of amenities are located close by, thereby encouraging active travel. A Travel Plan and a Transport Statement accompany the planning application, setting out how physical and operational interventions will be adopted to encourage sustainable and low carbon modes of travel;
 - 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. However, operational waste infrastructure has been considered within the Circular Economy Statement and the Design and Access Statement;
 - 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 site also currently contains minimal green infrastructure, with there only being some informal greenery on plot B, therefore there won't be a large loss of carbon storage associated with development on the site; 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.

Assessment of effects

- 10.2.9 GHG emissions arising from the 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 their environmental limit, triggering subsequent effects on the global climate system.
- 10.2.10 In the absence of an industry-wide agreed and tested approach to defining the significance criteria and GHG emissions threshold at the local development site scale, IEMA (2017) guidance has been adopted. This guidance states that all GHG emissions are potentially significant, highlighting the following three overarching principles:
- GHG emissions from all projects will contribute to climate change, the largest inter-related cumulative environmental effect;
 - Consequences of changing climate have the potential to lead to significant environmental effects on all topics in the EIA Regulations; and
 - GHG emissions have a combined environmental effect that is approaching a significantly defined environmental limit.

Receptor sensitivity

- 10.2.11 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.

Magnitude of change/impact

- 10.2.12 The criteria for determining magnitude of change/impact have been determined based on the targets set in the UK Climate Change Act 2008 (2050 Target Amendment) Order 2019, and relevant policies and targets from MCC and the Greater Manchester Combined Authority. The criteria have been split out into embodied carbon (covering lifecycle stages A1-A5, B1-B5 and C1-C4) and operational energy (covering lifecycle stage B6). The criteria used to assess how far an effect deviates from the baseline condition, i.e. the magnitude of change, are described in Table 10-1, Table 10-2 and Table 10-3.

Table 10-1 Criteria for determining magnitude of change / impact for embodied carbon (lifecycle stages A1-A5, B1-B5 and C1-C4)

Magnitude	Criteria
Large	There is no commitment made to measure or reduce embodied carbon.
Medium	There is a commitment made to measure and reduce embodied carbon compared to the business as usual baseline. This is in line with Policy EN 4 of the Manchester Core Strategy, which includes the use of building materials with low embodied carbon.
Small	There is a commitment made to develop a pathway to reduce embodied carbon by 40% compared to a business as usual baseline for all buildings and key infrastructure. This is based on the World Green Building Council target for 2030 (WGBC, 2019).
Negligible	There is a commitment made to reduce construction stage embodied carbon upfront and offset any residual embodied carbon.

Table 10-2 Criteria for determining impact magnitude for GHG emissions associated with operational energy consumption (lifecycle stages B6).

Magnitude	Criteria
Large	Long-term continued high net increase in GHG emissions resulting from energy consumption associated with the proposed development. Not in line with achieving net zero over the lifecycle of the proposed development.
Medium	Medium-term net increase in GHG emissions resulting from energy consumption associated with the proposed development. Trending towards achieving net zero by 2050, in line with the amended UK Climate Change Act 2008 (2050 Target Amendment) Order 2019.
Small	Short term net increase in GHG emissions resulting from energy consumption associated with the proposed development, trending to net zero by 2030, in line with the World Green Building Council target for buildings (WGBC, 2020) and IPCC publications on staying below 1.5°C of global warming (IPCC, 2018).
Negligible	The proposed development is net zero from day 1 of operation.

Table 10-3 Criteria for determining impact magnitude for GHG emissions associated with operational water consumption (lifecycle stage B7).

Magnitude	Criteria
Large	Business as usual i.e. no reduction in water consumption against a notional baseline.
Medium	0-25% improvement against notional baseline for water consumption associated with buildings.
Small	Greater than 25% improvement against notional baseline for water consumption associated with buildings, equivalent to the minimum standard for BREEAM Outstanding.
Negligible	GHG emissions associated with operational water consumption are net zero from the start of operation.

Significance evaluation

10.2.13 The significance of a potential effect is derived by considering both the sensitivity of the feature and the magnitude of change, as demonstrated in Table 10-4. As the sensitivity of the receptor is always deemed to be 'high', significance is effectively determined based on the magnitude of change/impact.

Table 10-4 Matrix for determining effect significance

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

Legislation and policy which has influenced assessment or mitigation

National policy and guidance

The Climate Change Act 2008 (2050 Target Amendment) (Order 2019)

10.2.14 The Climate Change Act 2008 originally required the UK to reduce carbon emissions by at least 80% by 2050 compared to a 1990 baseline. On 27th June 2019, the UK Government increased the statutory duty of the Secretary of State to at least a 100% reduction in carbon emissions by 2050. Doing so would make the UK a "net zero" emitter.

Town and Country Planning (EIA) Regulations 2017 (as amended)

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

"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) (MHCLG, 2021)

10.2.16 The NPPF states the following in paragraph 153 in relation to GHG emissions:

"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."*

Planning Practice Guidance (PPG) (MHCLG, 2021)

10.2.17 The Climate Change Guidance states the importance of planning to consider climate change, stating the following:

"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."

Regional policy and guidance

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

10.2.18 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, with paragraph stating the following:

'Local planning authorities may give weight to relevant policies in emerging plans according to:

- a. the stage and preparation of the emerging plan (the more advanced its preparation, the greater the weight that may be given)'*

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

Policy JP-S 1 – Sustainable Development

10.2.20 Policy JP-S 1 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"

Policy JP-S 2 – Carbon and Energy

10.2.21 Policy JP-S 2 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:

- An expectation that new development will:*
 - Be net zero carbon from 2038 by following the energy hierarchy (with any residual carbon emissions offset); and*
 - 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"*

Policy JP-S 7 – Resource Efficiency

10.2.22 Policy JP-S 7 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)

- 10.2.23 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.
- 10.2.24 Policies relevant to GHG emissions are set out below:

Policy EC 1: Employment and Economic Growth in Manchester
- 10.2.25 Policy EC 1 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’

Policy C2 District centres
- 10.2.26 Policy C2 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.’

Policy EN 4: Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development
- 10.2.27 Policy EN 4 states the following:

‘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;
 - 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.’

Policy EN 6: Target Framework for CO₂ reductions from low or zero carbon energy supplies

- 10.2.28 Policy EN 6 states the following:

‘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 10-5 and Table 10-6, 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.’

‘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 10-5 Domestic CO₂ emissions reduction targets

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 10-6 Non-domestic CO₂ emissions reduction targets

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

‘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.’

Policy EN 8: Adaptation to Climate Change

- 10.2.29 Policy EN 8 states the following:

‘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

- 10.2.30 The 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
- 10.2.31 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.
- 10.2.32 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).’*

Manchester Climate Change Framework 2020-2025

- 10.2.33 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’*.
- 10.2.34 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.’*
- 10.2.35 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 (IEMA 2017)

- 10.2.36 IEMA published this guidance in response to the inclusion of climate change in the UK EIA Regulations. This guidance states that:

“A good practice approach to EIA will see GHG emissions scoped into the assessment and thus estimated, reported and mitigated as part of the project’s undertakings. This approach should follow for all projects regardless of whether there is a net increase or decrease in GHG emissions relating to the works.”
- 10.2.37 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.”*

- 10.2.38 Based on these principles, the guidance states that:

“it might be considered that all GHG emissions are significant and an EIA should ensure the project addresses their occurrence by taking mitigation action.”

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

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

RICS Whole Life Carbon Assessment for the Built Environment (RICS, 2017)

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

UKGBC Embodied Carbon: Developing a Carbon Brief (UKGBC, 2017)

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

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

- 10.2.42 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)

- 10.2.43 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 (GLA) Construction Scope 3 (Embodied) Guidance on Greenhouse Gas Accounting and Reporting (GLA, 2013)

- 10.2.44 Although the proposed development is not in London, this guidance provides information on best practice. This accounting and reporting guidance written for the GLA contains a series of recommendations which aim 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.

Consultation Draft - Mayor of London Whole Life-Cycle Carbon Assessment Guidance (GLA, 2020)

- 10.2.45 Although the proposed development is not in London, this guidance provides information on best practice. This guidance document explains how to prepare a whole life carbon assessment. The document is intended for anyone involved in, or with an interest in developing whole life carbon assessments, including planning applicants, developers, designers, energy consultants and local authority officials.

London Energy Transformation Initiative (LETI) Embodied Carbon Primer (LETI, 2020)

10.2.46 Although the proposed development is not in London, this guidance provides information on best practice. The LETI Embodied Carbon Primer offers guidance to those interested in exploring embodied carbon in more detail. There is lack of knowledge in the built environment industry surrounding embodied carbon reduction strategies and calculations. Therefore, LETI has produced the primer to support project teams to design buildings that deliver ambitious embodied carbon reduction.

Assessment limitations (technical deficiencies or lack of knowledge)

10.2.47 When calculating GHG emissions associated with the construction and operation of the proposed development, appropriate energy and carbon benchmarks have been used based on floor area and building use. 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 in geography, construction processes and construction materials used for the proposed development compared to the buildings that the benchmarks are based upon. However, these are considered the best available methods of estimating GHG emissions given the information available.

10.3 BASELINE CONDITIONS

Current baseline (2022)

10.3.1 In line with IEMA (2017) 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 (2022).

10.3.2 The site is currently used for car parking, and there are no buildings on the site, therefore it is assumed that GHG emissions associated with this land use is minimal. Therefore, it is assumed that the baseline is zero.

Future baseline (2024)

10.3.3 The future baseline represents the scenario where the proposed development does not go ahead, and the site remains in situ over the study period. As there is no permanent use currently on the site, it is assumed that the future baseline is zero.

Identified Receptors and their sensitivity

10.3.4 As highlighted in the ‘methodology and assessment criteria’ section of this ES chapter, the receptor is global atmospheric GHG concentrations. The sensitivity of this receptor is deemed to be high.

10.4 CONSTRUCTION EFFECTS

Relevant aspects of the proposed development

- 10.4.1 Construction effects consider GHG emissions associated with the product stage (lifecycle stages A1-A3) and the construction process stage (lifecycle stages A4-A5).
- 10.4.2 A Circular Economy Statement has been produced for the proposed development. This includes the following objectives for reducing demand for materials and minimise quantities used, which will likely in turn reduce embodied carbon:
- Reduce the demand for materials with a high carbon footprint (such as concrete), especially in the production and transport stages of the project’s lifecycle;
 - Replace materials with high embodied carbon energy (such as aluminium) with alternatives that are less carbon intensive (e.g. timber and / or recycled steel);
 - Extend the longevity of the materials (e.g. specifying appliances with extended warranty and lifespan);

- Use materials that have been previously recycled in the building itself or in the landscaped areas (e.g. use of recycled aggregates); and
- Minimise the use of materials that require more frequent replacement or refurbishment (such as carpets and floor coverings)

Potential effects of the proposed development and their significance

- 10.4.3 Embodied carbon associated with the 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 (as cited in the RICS Methodology to Calculate Embodied Carbon of Materials, 2014), the 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 10-A, ES Volume III.
- 10.4.4 The total cumulative embodied carbon associated with the construction of the proposed development has been estimated to be between 10,000 tCO₂e and 13,200 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 10-2 provides a summary of the cumulative embodied carbon associated with the construction phase.

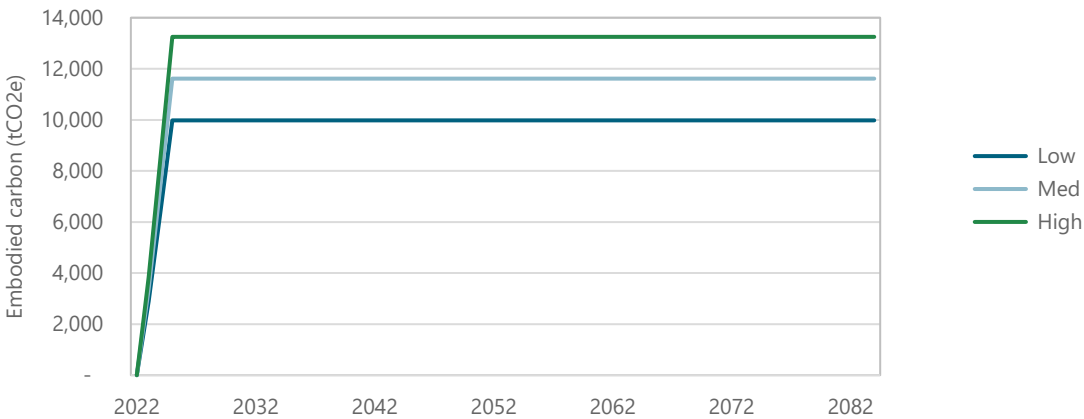


Figure 10-2 Graph showing cumulative embodied carbon for the construction of the proposed development

- 10.4.5 For the worst-case scenario a total of 11,400 tCO₂e can be attributed to the raw material phase, 1,500 tCO₂e to the construction phase and 300 tCO₂e the delivery and transport phase. The main source of GHG emissions during construction is therefore the raw material phase.
- 10.4.6 The magnitude of impacts for the construction phase associated with the proposed development are deemed to be large as it has been assumed that there isn’t a commitment in place to reduce construction stage embodied carbon. As the sensitivity of the receptor is deemed to be high, the effects are of major adverse significance.

Summary of effects

- 10.4.7 Table 10-7 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 10-7 Summary of effects during construction

Receptor	Sensitivity	Description of effect	Magnitude of change/impact	Effect significance
The global atmosphere	High	Embodied carbon associated with the product stage (lifecycle stages A1-A3).	Large	Major Adverse

Receptor	Sensitivity	Description of effect	Magnitude of change/impact	Effect significance
The global atmosphere	High	Embodied carbon associated with the construction process stage (lifecycle stages A4-A5).	Large	Major Adverse

Supplementary mitigation measures

Site A/application A

10.4.8 Table 10-8 provides a summary of the supplementary mitigation measures relating to construction GHG emissions associated with application A.

Table 10-8 Summary of construction supplementary mitigation measures for Application A

Adverse effect	Mitigation measure	Responsibility/Mechanism for implementation	Timing
Construction stage GHG emissions	Put in place a commitment to reduce lifecycle embodied carbon 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	As soon as possible.
Construction stage GHG emissions	Reduce the demand for materials with a high carbon footprint (such as concrete), especially in the production and transport stages of the lifecycle of the proposed development (e.g. using cement replacement)	Developer/contractor	As soon as possible.
Construction stage GHG emissions	Where practical, maximise recycled content in other key building and fit-out components (e.g., blockwork, internal plasterboard partitions, floor finishes etc.)	Developer/contractor	As soon as possible.
Construction stage GHG emissions	Materials used for hard landscaping and street furniture should explore opportunities for high recycled content and bio-based materials.	Developer/contractor	As soon as possible.
Construction stage GHG emissions	Where practical, maximise use of recycled aggregates in the civil engineering works (e.g. sub-base, pipe bedding etc.)	Developer/contractor	As soon as possible.
Construction stage GHG emissions	Review opportunities to reduce energy association with construction installation processes.	Developer/contractor	As soon as possible.
Construction stage GHG emissions	Review opportunities to reduce the number and distance of construction transport trips.	Developer/contractor	As soon as possible.
Construction stage GHG emissions	Explore the use of off-site construction to consolidate delivery requirements.	Developer/contractor	As soon as possible.

Site B/Application B

10.4.9 The supplementary mitigation measures for site B/application B are the same as those set out for site A/application.

10.5 OPERATIONAL EFFECTS

Relevant aspects of the proposed development and designed-in mitigation

- 10.5.1 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).
- 10.5.2 The Energy Strategy sets out high level energy assumptions for the proposed development, which have been used as the basis of this ES chapter. It is currently assumed that in the residential units, heat recovery ventilation systems (MVHR) will be used, along with electric panel heaters, low energy LED lighting and self-contained heat pump hot water cylinders. The commercial areas will use air source heat pumps (ASHP)/variable refrigerant flow (VRF) and instantaneous point of use water heating. The Energy Strategy for the proposed development shows compliance with Poly EN6 (Target Framework for CO₂ reductions from low or zero carbon energy supplies) of the Manchester City Council Core Strategy (MCC, 2012).
- 10.5.3 A Circular Economy Statement has been produced for the proposed development, as outlined in section 10.4 of this ES chapter.

Potential effects of the proposed development and their significance

Operational embodied carbon (lifecycle stage B1-B5)

- 10.5.4 Embodied carbon associated with the operation stage (i.e. lifecycle stage B1-B5) has been estimated by applying appropriate embodied carbon benchmarks based on floor area and the building typologies. A summary of the assumptions that have been made when calculating estimated GHG emissions can be found in Appendix 10-A, ES Volume III. Embodied carbon associated with the use (maintenance) stage has been estimated to be approximately 5,100 tCO₂e over the 60-year lifecycle of the proposed development.
- 10.5.5 The magnitude of impacts relating to operational embodied carbon are deemed to be large, as there is no commitment in place to reduce lifecycle embodied carbon. As the sensitivity of the receptor is deemed to be high, the effects are of major adverse significance.

Operational energy consumption (lifecycle stage B6)

- 10.5.6 Energy use intensity per square metre of floor area has been applied to the estimated floor area based on appropriate benchmarks (i.e., Chartered Institute of Building Service Engineers (CIBSE) TM46 for Office (CIBSE, 2008) and figures included in the UKGBC (2020) 'Building the Case for Net Zero' report for residential). The Department for Business, Energy and Industrial Strategy (BEIS) Greenhouse Gas Reporting: Conversion Factors 2021 for grid electricity have then 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 10-A, ES Volume III.
- 10.5.7 Figure 10-3 shows the estimated annual GHG emissions for operational energy associated with the proposed development for a 60-year period from 2024. 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 90 and 160 tCO₂e/y in 2028 when the proposed development has been built out. Annual GHG emissions associated with operational energy are then predicted to reduce to between 20 and 40 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.

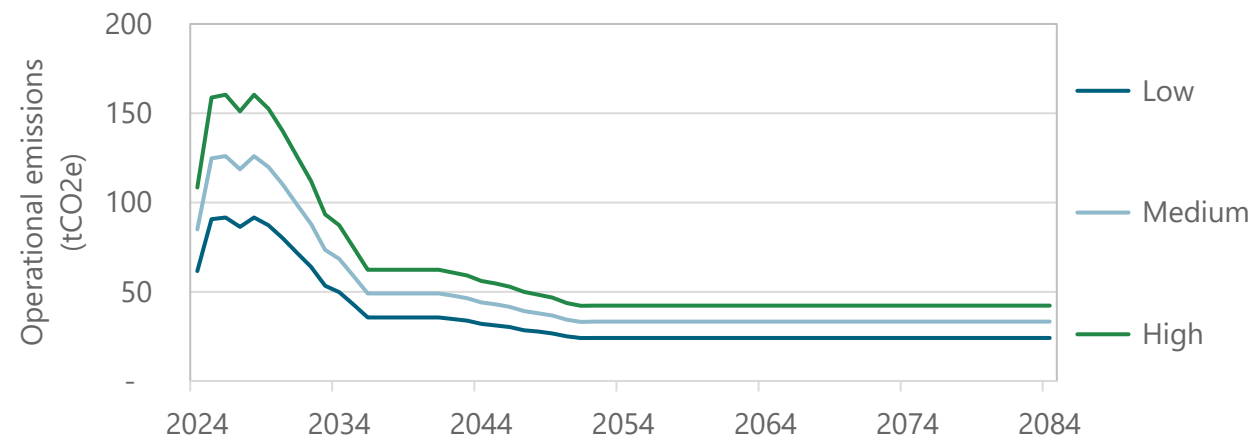


Figure 10-3 Annual GHG emissions associated with operational energy over a 60-year design life.

- 10.5.8 Figure 10-4 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 2,200 and 3,900 tCO₂e over the 60-year lifecycle of the proposed development.

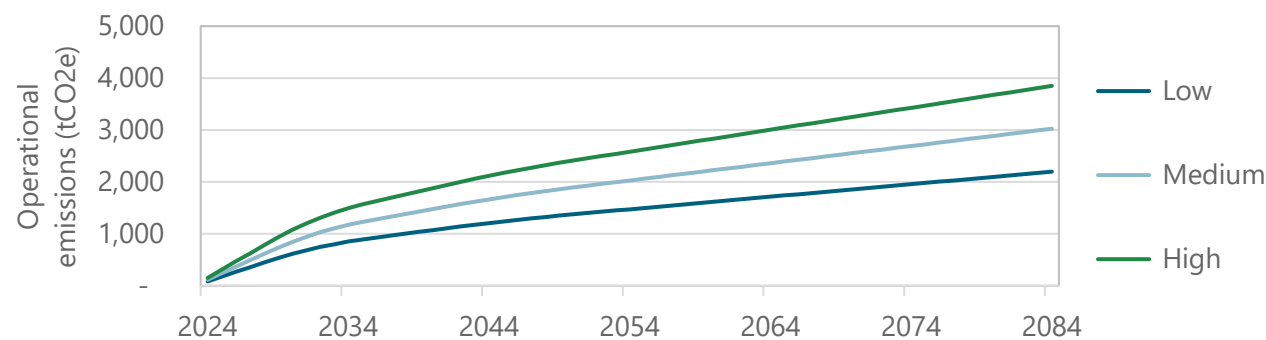


Figure 10-4 Cumulative operational energy GHG emissions over the 60-year design life of the proposed development

- 10.5.9 The magnitude of effects relating to operational GHG emissions associated with operational energy are deemed to be medium. Although there is no commitment in place to achieve net zero emissions associated with operational energy by 2050, there is a trend shown towards this due to the fact that a commitment has been made to heat the proposed development using electricity for heating, rather than fossil fuels. As the sensitivity of the receptor is deemed to be high, the effects are of moderate adverse significance.

Operational water (lifecycle stage B7)

- 10.5.10 Estimated water consumption for the residential units has been based on the Building Services Research and Information Associated (BSRIA) Rules of Thumb Guidelines for Building Services (BSRIA, 2011) which is estimated to be 0.12 cubic metres per day per person. As all of the flats in the proposed development will be two bedrooms, it is assumed that there will be two occupants per flat. Based on this, water consumption over the 60-year design life for this development will be approximately 399,400 cubic metres.
- 10.5.11 Estimated water consumption for the offices has been based on the BSRIA Rules of Thumb Guidelines for Building Services, which estimates it to be 0.045 cubic metres per day per person. As per the BSRIA document, it is assumed that each person in the office will require 8m² of space as a worst-case scenario. Based on this, water consumption over the 60-year design life of the proposed development will be approximately 18,800 cubic metres for the office component.
- 10.5.12 The BEIS Greenhouse Gas Reporting: Conversion Factors 2021 states that the carbon factor for water supply in the UK is 0.149 kg CO₂e per m³ of water supplied. Based on this, GHG emissions attributed to water demand for the proposed development over the 60-year lifecycle are summarised in Table 10-9.

Table 10-9 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)	Carbon factor (kg CO ₂ e per m ³ of water supplied)	GHG emissions (tCO ₂ e)
Residential (Site A)	378,400	0.149	56
Residential (Site B)	21,000	0.149	3
Office (Site B)	18,800	0.149	3
Total	418,200	N/A	62

- 10.5.13 The magnitude of effects associated with operational water consumption for the proposed development are deemed to be large as there is no commitments in place to reduce water consumption. As the sensitivity of the receptor is deemed to be high, the effects are of major adverse significance.

End-of-life stage (lifecycle stage C1-C4)

- 10.5.14 GHG emissions associated with the end-of-life stage (lifecycle stage C1-C4) have been estimated by applying appropriate benchmarks based on floor area and the building typologies. GHG emissions associated with the end-of-life stage are estimated to be approximately 35 tCO₂e.
- 10.5.15 GHG emissions associated with the end-of-life stage are deemed to be of large magnitude as there are no commitments in place. As the sensitivity of the receptor is deemed to be high, the effects are of major adverse significance.

Summary of effects

- 10.5.16 Table 10-10 provides a summary of operational effects in relation to GHG emissions. This takes into account GHG emissions associated with operational embodied carbon, operational energy, operational water and GHG emissions associated with the end-of-life stage

Table 10-10 Summary of effects during operation

Receptor	Sensitivity	Description of effect	Magnitude of change/impact	Effect significance
The global atmosphere	High	Embodied carbon associated with the in-use stage for the proposed development (lifecycle stage B1-B5)	Large	Major adverse
The global atmosphere	High	GHG emissions associated with operation energy for the proposed development (lifecycle stage B6)	Medium	Moderate Adverse
The global atmosphere	High	GHG emissions associated with operational water (lifecycle stage B7)	Large	Major adverse
The global atmosphere	High	GHG emissions associated with the end-of-life stage (lifecycle stage C1-C4).	Large	Major adverse

Supplementary mitigation measures

Site A/Application A

- 10.5.17 Table 10-11 provides a summary of the supplementary mitigation measures relating to operational GHG emissions associated with the application A.

Table 10-11 Summary of operational supplementary mitigation measures for Application A

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 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	As soon as possible.
In use stage (B1-B5)	Extend the longevity of the materials (e.g., specifying appliances with extended warranty and lifespan).	Developer/ contractor	As soon as possible.
In use stage (B1-B5)	Minimise the use of materials that require more frequent replacement or refurbishment (such as carpets and floor coverings).	Developer/ contractor	As soon as possible.
Operational energy (B6)	Explore the use of passive design measures in order to reduce the need for heating.	Developer/ contractor	As soon as possible.
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	As soon as possible.
Operational water (B7)	Specify water saving devices, such as low flush toilets and showers to reduce water consumption associated with the proposed development.	Developer/ contractor	As soon as possible.
Operational water (B7)	Specify the use of water meters to measure water consumption.	Developer/ contractor	As soon as possible.
Operational water (B7)	Explore the feasibility of specifying rainwater harvesting in order to reduce potable water consumption.	Developer/ contractor	As soon as possible.

Site B/Application B

10.5.18 The supplementary mitigation measures for site B/application B are the same as those set out for site A/application.

10.6 WHOLE LIFE CARBON SUMMARY

- 10.6.1 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. There is no new assessment of the significance of effects in this section as each lifecycle stage has already been assessed in the construction effects section or the operational effects section.
- 10.6.2 Figure 10-5 shows the lifecycle GHG emissions for the sources that were assessed as part of this ES chapter, thereby considering both the construction and operation phases of the proposed development. The total GHG emissions for these sources over the 60-year design life of the proposed development are between approximately 17,400 and 22,300 tCO₂e, as outlined in Table 10-12. In comparison, if the proposed development were to not go ahead, estimated GHG emissions associated with the future baseline scenario are assumed to be zero due to the fact that there are currently no permanent uses on the site.

Table 10-12 Whole life carbon summary for the proposed development

Emissions source	Low scenario	High scenario
Construction (A1-A5)	10,000	13,200
In use stage (B1-B5)	5,100	5,100
Operational energy (B6)	2,200	3,900
Operational water (B7)	62	62
End of life stage (C1-C4)	35	35
Total	17,397	22,297

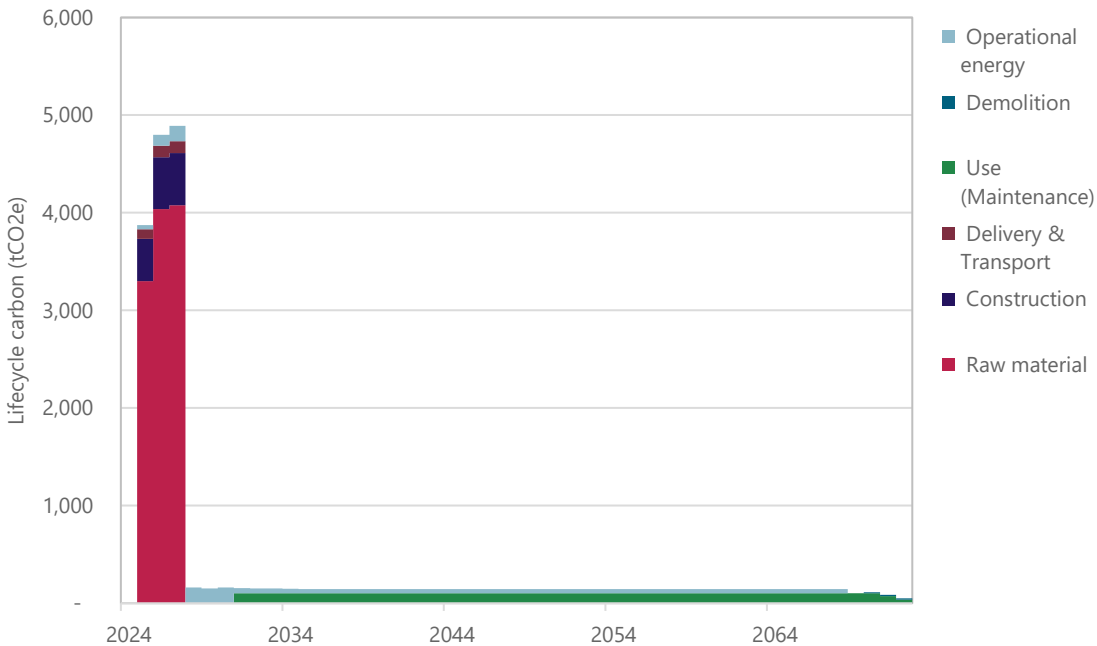


Figure 10-5 Diagram breaking down GHG emissions associated with the proposed development by lifecycle stage

10.6.3 Figure 10-6 breaks down the GHG emissions associated with each lifecycle of the proposed development as a proportion of the whole life GHG emissions.

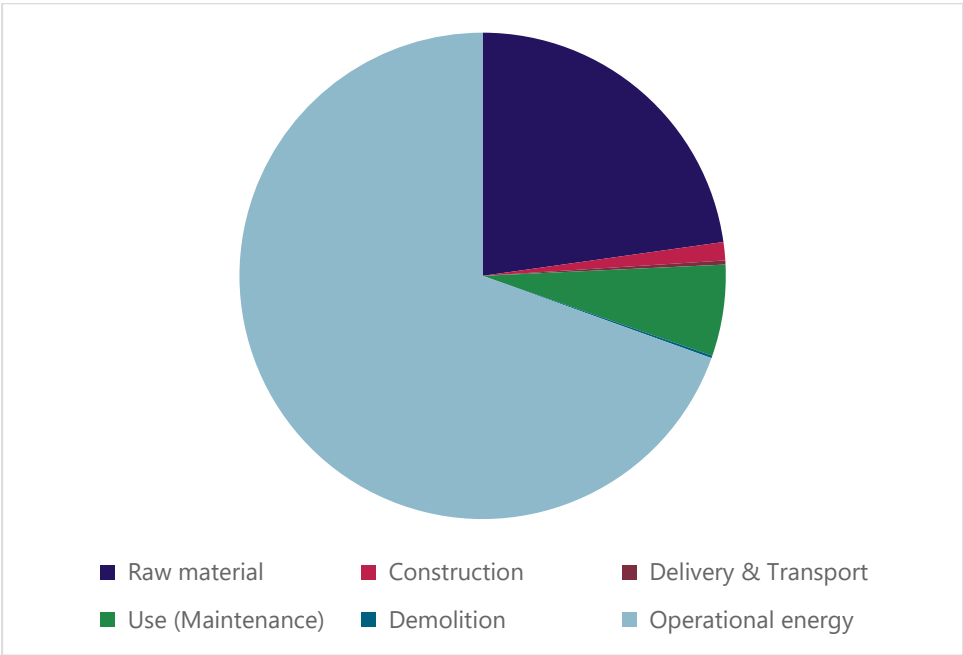


Figure 10-6 Pie chart breaking down the GHG emissions associated with the proposed development by lifecycle stage.

10.7 RESIDUAL EFFECTS AND CONCLUSIONS

10.7.1 Table 10-13 provides a summary of the construction phase residual effects relating to GHG emissions.

Table 10-13 Summary of residual effects during construction

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
The global atmosphere	GHG emissions associated with the construction phase	Major adverse	The following supplementary mitigation measures have been specified for the construction phase: - Put in place a commitment to reduce lifecycle embodied carbon 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. - Reduce the demand for materials with a high carbon footprint (such as concrete), especially in the production and transport stages of the lifecycle of the proposed development (e.g. using cement replacement); - Where practical, maximise recycled content in other key building and fit-out components (e.g., blockwork, internal plasterboard partitions, floor finishes etc.);	Moderate adverse. Effects are long-term.

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
			- Materials used for hard landscaping and street furniture should explore opportunities for high recycled content and bio-based materials; - Where practical, maximise use of recycled aggregates in the civil engineering works (e.g. sub-base, pipe bedding etc.); - Review opportunities to reduce energy association with construction installation processes; - Review opportunities to reduce the number and distance of construction transport trips; and - Explore the use of off-site construction to consolidate delivery requirements.	

10.7.2 Table 10—14 provides a summary of the operational phase residual effects relating to GHG emissions.

Table 10—14 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).	Major adverse	The following supplementary mitigation measures have been specified for GHG emissions associated with the in-use stage: - Put in place a commitment to reduce lifecycle embodied carbon 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; - Extend the longevity of the materials (e.g., specifying appliances with extended warranty and lifespan); and - Minimise the use of materials that require more frequent replacement or refurbishment (such as carpets and floor coverings).	Moderate adverse. Effects are long-term.

Receptor	Effect	Significance before mitigation	Supplementary mitigation	Residual effect significance
The global atmosphere	GHG emissions associated with operation energy for the proposed development (lifecycle stage B6).	Moderate adverse	The following supplementary mitigation measures have been specified for GHG emissions associated with operational energy: - 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.	With supplementary mitigation measures in place, residual effects may be reduced to minor to moderate adverse (depending on the level of energy reduction is achieved). Effects are long-term.
The global atmosphere	GHG emissions associated with operational water (lifecycle stage B7)	Major adverse	The following supplementary mitigation measures have been specified for GHG emissions associated with the in-use stage: - Specify water saving devices, such as low flush toilets and showers to reduce water consumption associated with the proposed development - Specify the use of water meters to measure water consumption. - Explore the feasibility of specifying rainwater harvesting in order to reduce potable water consumption.	Moderate adverse. Effects are long-term.
The global atmosphere	GHG emissions associated with the end-of-life stage (lifecycle stage C1-C4).	Major adverse	The following supplementary mitigation measures have been specified for GHG emissions associated with the end-of-life stage: - Put in place a commitment to reduce lifecycle embodied carbon 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.	Moderate adverse. Effects are long term.

10.8 ASSESSMENT OF ONE APPLICATION COMING FORWARD IN ISOLATION

- 10.8.1 The build out of the proposed development in its entirety represents the worst-case scenario for GHG emissions. Therefore, the effects associated with one application coming forward in isolation are considered to be less than the effects associated with both applications coming forward.

10.9 REFERENCES

- British Standards Institution (BSI) (2011) BS EN 15978:2011 Sustainability of Construction Works – Assessment of Environmental Performance of Buildings – Calculation Method;
- BSRIA (2011). Rules of Thumb, Guidelines for building services;

- Chartered Institute of Building Service Engineers (CIBS) TM46 for Office (CIBSE, 2008);
- Department for Business, Energy and Industrial Strategy. (2021). Greenhouse Gas Reporting: Conversion Factors 2021
- Greater London Authority (GLA). Construction Scope 3 (Embodied) Guidance on Greenhouse Gas Accounting and Reporting;
- Institute of Environmental Management and Assessment (IEMA) (2017) Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance;
- Intergovernmental Panel on Climate Change (IPCC). (2018). Special Report: Global Warming of 1.5°C;
- London Energy Transformation Initiative (LETI) Embodied Carbon Primer;
- London Energy Transformation Initiative (LETI). (2020) Embodied Carbon Primer;
- Manchester City Council. (2020). Manchester City Council Climate Change Action Plan 2020-2025;
- Manchester Climate Change Partnership and Manchester Climate Change Agency. (2020). Manchester Climate Change Framework 2020-2025;
- Manchester City Council. (2012). Manchester Core Strategy (2012-2027);
- Mayor of London. (2002). Whole Life-Cycle Carbon Assessment Guidance;
- Ministry of Housing, Communities & Local Government (MHCLG). (2019). National Planning Policy Framework (NPPF);
- Ministry of Housing, Communities & Local Government (MHCLG). (2017). National Planning Practice Guidance (NPPG);
- United Nations. (2015) Paris Agreement on Climate Change;
- Royal Institution of Chartered Surveyors (RICS). (2017). Whole Life Carbon Assessment for the Built Environment;
- The Building Regulations 2010 (as amended);
- The Stationary Office. (2017). Town and Country Planning (EIA) Regulations 2017
- Town and Country Planning (EIA) Regulations 2017 (as amended, 2018);
- UK Climate Change Act 2008 (2050 Target Amendment) (Order 2019);
- UK Green Building Council (UKGBC). (2017). Embodied Carbon: Developing a Client Brief;
- UK Green Building Council (UKGBC). (2020). Building the Case for Net Zero;
- Waste and Resource Action Programme (WRAP). (2011a) Cutting Embodied Carbon in Construction Projects;
- Waste and Resource Action Programme (WRAP). (2011b). Procurement Requirements for Carbon Efficiency;
- World Green Building Council (WGBC). (2020). The Net Zero Carbon Buildings Commitment;

10.10 GLOSSARY

Term	Definition
ASHP	Air Source Heat Pump
BEIS	The Department for Business, Energy and Industrial Strategy
BREEAM	Building Research Establishment's Environmental Assessment Method
CIBSE	Chartered Institute of Building Engineers
EIA	Environmental Impact Assessment
ES	Environmental Assessment
GHG	Greenhouse Gas
GMS	Greater Manchester Strategy
IEMA	Institute of Environmental Management and Assessment
LETI	London Energy Transformation Initiative
NPPF	National Planning policy Framework
RIBA	Royal Institute of British Architects
UKGBC	UK Green Building Council
VRF	Variable Refrigerant Flow
WGBC	World Green Building Council

10.11 LIST OF APPENDICES (ES VOLUME III)

Reference	Title
Appendix 10-A	Assumptions and benchmarks used when calculating GHG emissions

11 CUMULATIVE AND INTERACTIVE EFFECTS

11.1 INTRODUCTION

11.1.1 This chapter describes the cumulative environmental effects for the proposed development alongside surrounding planned developments likely to come forward at a similar time.

11.1.2 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).

11.1.3 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.

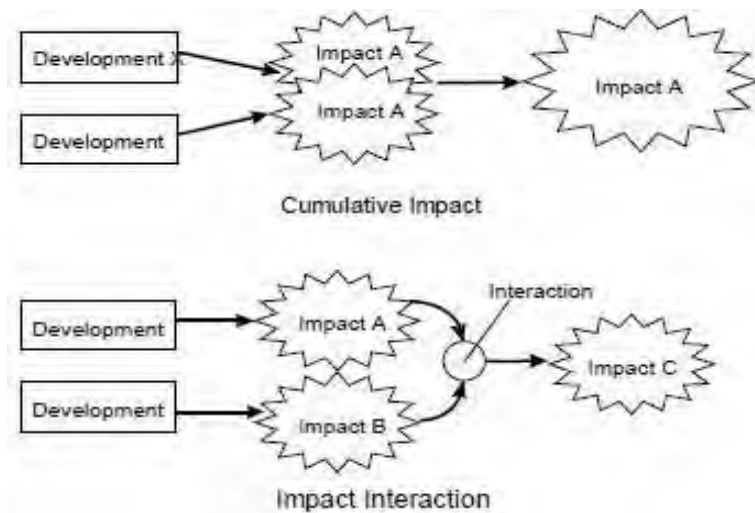


Figure 11-1 Types of cumulative effect (European Commission, 1999)

11.1.4 For the purposes of this Environmental Impact Assessment (EIA), cumulative effects are addressed in the context of the following:

- Interaction effects: the accumulation of different predicted effects generated by the proposed development upon the same sensitive receptors; and
- In-combination effects: the combination of predicted effects from adjacent or nearby scheme(s) together with those predicted for the proposed development.

11.1.5 In terms of assessing the potential in-combination effects in relation to other relevant developments, the 2017 EIA Regulations specify that the following should be provided: *"a description of the likely significant effects of the development on the environment resulting from 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"*. The EIA for the proposed development has adhered to this position and goes further by considering the cumulative effects of a number of planning applications submitted in proximity to the site which were under consideration through the planning process at the time of EIA scoping, but as of yet without a planning consent. This is to account for the potential cumulative environmental effects that could occur should these schemes be granted planning permission.

11.2 INTERACTION EFFECTS

11.2.1 By considering the residual effects greater than negligible described in each technical assessment, and the receptors they act upon (Table 11-1), it is possible to identify a list of specific receptors at risk of interaction effects, i.e. receptors that may experience an accumulation of environmental effects from more than one source.

Table 11-1 Residual effects (greater than negligible) and the receptors they act upon

Topic	Residual effects	Effect significance	Receptor
Noise and Vibration	Construction noise	Minor to short-term moderate adverse	ESR2 (the Briton's Protection Public House)
	Construction vibration	Negligible to short-term moderate adverse	ESR2 (the Briton's Protection Public House)
	Construction noise	Negligible to short-term moderate adverse	ESR4 (the Jurys Inn Hotel)
	Construction vibration	Negligible to short-term moderate adverse	ESR4 (the Jurys Inn Hotel)
Air Quality	No residual effects greater than negligible.		
Wind Microclimate	No residual effects greater than negligible.		
Daylight and sunlight	No residual effects greater than negligible.		
Built Heritage	Construction effects on the Briton's Protection Public House	Moderate adverse, short term.	The Briton's Protection Public House
	Construction effects on 13-17 Albion Street	Moderate adverse, short term.	13-17 Albion Street
	Construction effects on GMEX (Manchester Central)	Moderate/minor adverse, short term.	GMEX (Manchester Central)
	Construction effects on Chepstow House	Minor adverse, short term.	Chepstow House
	Construction effects on the Peveril of the Peak Public House	Minor adverse, short term.	The Peveril of the Peak Public House
	Operation effects on the Briton's Protection Public House	Moderate adverse, long term	The Briton's Protection Public House
Greenhouse Gas Emissions	Construction: GHG emissions associated with the construction phase (lifecycle stage A1-A5)	Moderate adverse. Effects are long-term	The global atmosphere
	Operation: Embodied carbon associated with the in-use stage for the proposed development (lifecycle stages B1-B5)	Moderate adverse. Effects are long-term	The global atmosphere

Topic	Residual effects	Effect significance	Receptor
	Operation: GHG emissions associated with operation energy for the proposed development (lifecycle stage B6)	Minor to moderate adverse (depending on the level of energy reduction achieved). Effects are long-term	The global atmosphere
	Operation: GHG emissions associated with operational water (lifecycle stage B7)	Moderate adverse. Effects are long-term.	The global atmosphere
	Operation: GHG emissions associated with the end-of-life stage (lifecycle stage C1-C4)	Moderate adverse. Effects are long-term.	The global atmosphere
Townscape and Visual Impact Assessment	Construction: Site clearance and general construction activities in addition to views of scaffolding, cranes and plant movement.	Moderate/minor adverse	Townscape features and character of the site
	Construction: Site clearance and general construction activities in addition to views of scaffolding, cranes and plant movement.	Minor adverse	City Centre SCA
	Construction: Views of scaffolding and cranes used during construction.	Minor adverse	Central Area of Change SCA.
	Construction: Views of cranes and scaffolding above intervening built form.	Minor adverse	Visitors to Manchester Town Hall and Albert Square (Photoviewpoint 1)
	Construction: Channelled views of cranes and scaffolding along streetscape.	Minor adverse	Pedestrians using Lower Mosely Street (Photoviewpoints 2 and 3)
	Construction: Views of cranes and scaffolding above intervening built form.	Minor adverse	Visitors to Manchester Central (Photoviewpoint 4)
	Construction: Views of higher level construction activity including cranes.	Minor adverse	Users of the Peveril of the Peak (Photoviewpoint 5)
	Construction: Channelled views of cranes and scaffolding in between buildings fronting Whitworth Street West	Minor adverse	Pedestrians and some residents on Medlock Street (Photoviewpoint 7)
	Construction: Views of cranes and scaffolding above intervening built form.	Minor adverse	Pedestrians using Whitworth Street West (Photoviewpoints 8 and 9)
	Construction: Views of cranes and scaffolding above the elevated carpark platform.	Minor adverse	Pedestrians using Great Bridgewater Street (Photoviewpoint 10)
	Construction: Channelled views of cranes and scaffolding along canal.	Minor adverse	Visitors to Castle Field Locks (Photoviewpoint 11)
	Construction: Views of higher level construction activity including cranes above the treeline surrounding the park.	Minor adverse	Recreational users of Hulme Park (Photoviewpoint 12)

Topic	Residual effects	Effect significance	Receptor
	Construction: Operation: Introduction of a contemporary residential building with a maximum height of 121.85m AOD and commercial and residential building of 60.75m AOD alongside associated public realm works.	Minor beneficial	Townscape features and character of the site
	Operation: Introduction of views of a residential tower and commercial building to Manchester City centre.	Minor beneficial	City Centre SCA
	Operation: Views of a residential tower within Manchester City centre.	Minor neutral	Central Area of Change SCA.
	Operation: Views of residential tower above intervening built form.	Minor neutral	Visitors to Manchester Town Hall and Albert Square (Photoviewpoint 1)
	Operation: Channelled views of residential tower along streetscape.	Minor neutral	Pedestrians using Lower Mosely Street (Photoviewpoints 2 and 3)
	Operation: Views of residential tower intervening built form.	Minor adverse	Visitors to Manchester Central (Photoviewpoint 4)
	Views of upper elevations of a residential tower.	Minor adverse	Users of the Peveril of the Peak (Photoviewpoint 5)
	Channelled views of residential tower in between buildings fronting Whitworth Street West	Minor neutral	Pedestrians and some residents on Medlock Street (Photoviewpoint 7)
	Views of residential tower above intervening built form.	Minor neutral	Pedestrians using Whitworth Street West (Photoviewpoints 8 and 9)
	Views of residential tower above intervening built form..	Minor neutral	Pedestrians using Great Bridgewater Street (Photoviewpoint 10)
	Channelled views of residential tower along canal.	Minor adverse	Visitors to Castle Field Locks (Photoviewpoint 11)
	Views of upper elevations of residential tower above the treeline surrounding the park.	Minor adverse	Recreational users of Hulme Park (Photoviewpoint 12)

- 11.2.2 The majority of residual effects with a greater than negligible significance identified during the construction phase act upon distinct receptors that do not interact. However, there is anticipated to be a minor to moderate effect on the Briton's Protection Public House during construction in relation to noise, a negligible to moderate effect in relation to vibration and a moderate adverse effect in relation to built heritage. Therefore, the interaction effects on the Briton's Protection Public House during construction are anticipated to be moderate adverse.
- 11.2.3 There is also anticipated to be a minor adverse effect on the Peveril of the Peak Public House during construction in relation to built heritage and a minor adverse effect in relation to view of higher-level construction activity including cranes. Therefore, the interaction effects on the Peveril of the Peak Public House during construction are anticipated to be minor adverse.

11.2.4 During operation, effects with a greater than negligible significance identified during the construction phase act upon distinct receptors that do not interact. Therefore, it is anticipated there will be no interaction effects associated with the operation phase.

11.3 IN-COMBINATION/CUMULATIVE SCHEME ASSESSMENT

Schemes considered

- 11.3.1 The following criteria was used in order to identify the in-combination cumulative schemes that were considered as part of the assessment:
- 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 metres (m²) or greater Gross External Area (GEA); and
 - Schemes below the above thresholds but of more than 50 residential units.
- 11.3.2 The in-combination cumulative schemes for assessment were presented to MCC as part of the EIA Scoping Report (Appendix 4-A, ES Volume III). Although a formal scoping opinion was not received from MCC, they did confirm that they were happy with the approach set out. The developments that have been considered in the technical assessments of this ES can be seen in Figure 11-2 and are outlined in Table 11-2).
- 11.3.3 It should be noted that two of the schemes (Axis Tower and Deansgate Square) included on the list have since been identified as being built with the construction phases complete and occupants on-site. These schemes are therefore considered to form baseline for the ES (and this is indicated in the construction status column within Table 11-2).

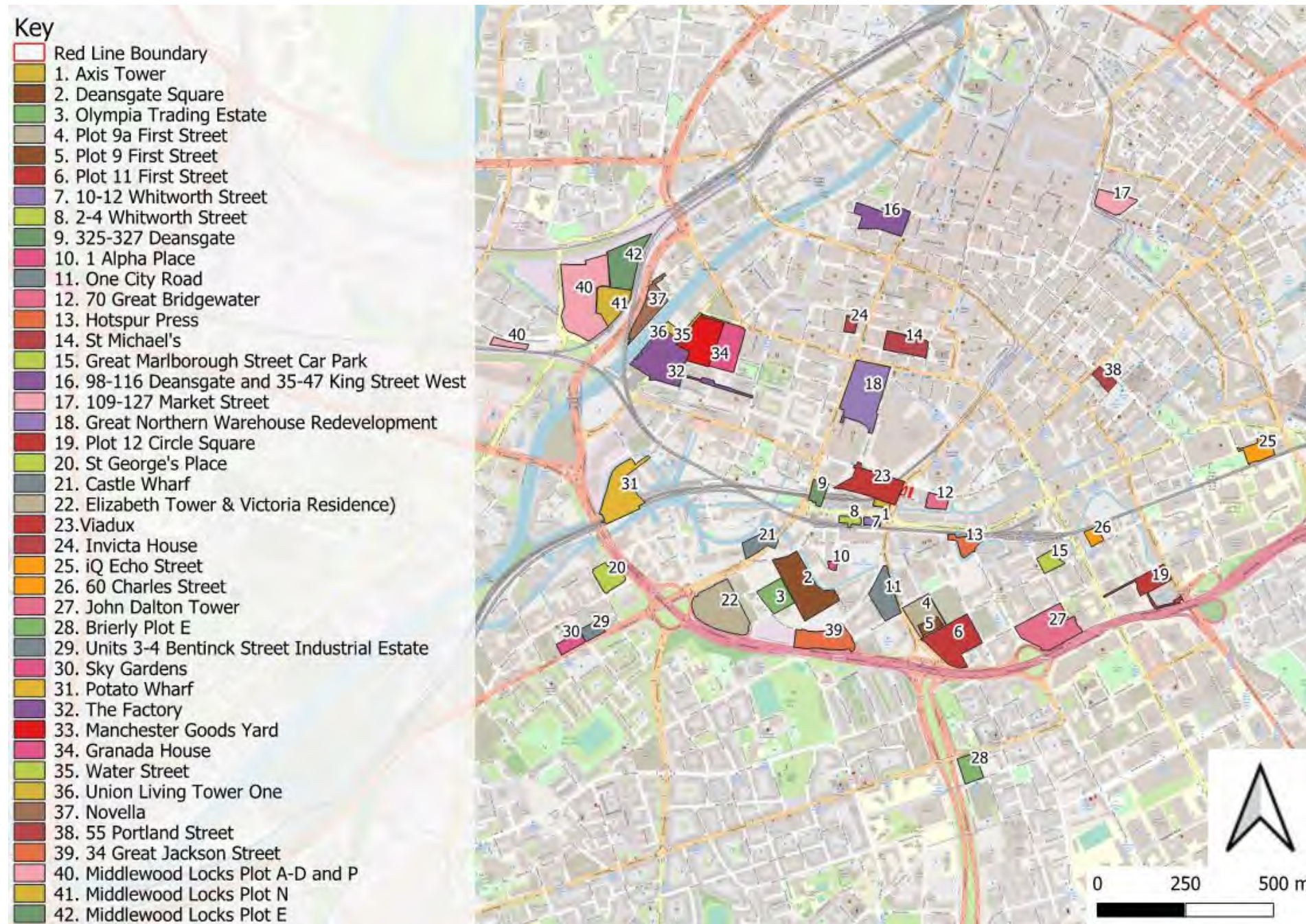


Figure 11-2 Indicative locations of cumulative schemes

Table 11-2 List of in-combination schemes

Ref	Scheme	Application number	Description	Date approved	Maximum height	Anticipated construction phasing
Construction complete and therefore considered as baseline for the EIA (not cumulative development)						
1	Axis Tower	106490/FO/2014/C1 (Manchester City Council)	Construction of a lower ground plus 27 storey residential building (Class C3) with associated servicing arrangements, hard landscaping, pedestrian access bridge and associated works	21 st Nov 2014	27 storeys	Completed February 2020
2	Deansgate Square	111719/FO/2016/C1 (Manchester City Council)	Construction of four residential buildings, ancillary amenity building for residents accommodating a tennis court, swimming pool and gym facilities (Use Class C3), ground floor retail units (Use Classes A1, A2, or A3), amenity space for residents within residential buildings, new public realm and landscaping, basement car parking and related highway, access, servicing, engineering and associated works.	4 th July 2016	65 storeys	Completed April 2021

Ref	Scheme	Application number	Description	Date approved	Maximum height	Anticipated construction phasing
Cumulative developments						
3	Olympia Trading Estate	116850/FO/2017 (Manchester City Council)	Demolition of the existing buildings on the site and construction of three residential buildings, 32, 26 and 18 storeys in height, comprising a total of 399 residential units (C3) and 50 retirement living units (C2) with roof top ancillary restaurant; 675sq.m of commercial floor space (Use Classes A1, A2, A3, A4, B1, D1 or D2); associated car and cycle parking within a basement level; public realm and landscaping; access and servicing arrangements; and other associated works.	3 rd May 2019	32-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
		128192/NMC/2020 (Manchester City Council)	Non-material amendment to planning permission 116850/FO/2017 to change the wording of the description and of condition 23 to allow changes to the internal layouts of the buildings and resulting external changes.	18 th Nov 2020	128192/NMC/2020 (Manchester City Council)	
4	Plot 9A First Street	121462/FO/2018 (Manchester City Council)	Erection of a ground plus sixteen storey building comprising commercial office (Use Class B1); hotel (Use Class C1); standalone flexible, commercial space across part of the ground and first floor (Use Classes A1 (Shops), A2 (Professional and Financial Services), A3 (Restaurants and Cafes), A4 (Drinking Establishments, B1 (offices), and D2(Gymnasium); flexible ancillary commercial and retail uses at ground and first floor (Use Class B1, A3, A4); basement car park, landscaping and associated works.	14 th December 2018	16-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
5	Plot 9 First Street	125833/FO/2019 (Manchester City Council)	Erection of a basement plus 11-storey building comprising office accommodation (Use Class B1), flexible commercial space (Use Classes A1 (Shops), A2 (Professional and Financial Services), A3 (Restaurants and Cafes), A4 (Drinking Establishments), B1 (offices), and D2 (Gymnasium), car parking, cycling parking and associated facilities, landscaping, and associated works.	15 th April 2020	11-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
6	Plot 11 First Street	125573/FO/2019 (Manchester City Council)	Construction of four buildings of heights varying from 10 storeys to 45 storeys together comprising co-living bedspaces (use class sui generis) and associated amenity facilities, with ground floor commercial units (Use classes A3 (café / restaurant and D2 (gym)), private amenity space and public realm comprising hard and soft landscaping, car parking and cycle facilities and other associated works.	9 th March 2021	45-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
7	10-12 Whitworth Street	111003/FO/2016/C1 (Manchester City Council)	Demolition of existing building at 10 - 12 Whitworth Street West, and redevelopment of the site for a new 35 storey residential building (Use Class C3) comprising 327 apartments, with associated residents' services, facilities and communal spaces: servicing, highways, public realm and associated works.	11 th April 2016	35-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
		115544/NMC/2017 (Manchester City Council)	Non-material change to planning permission ref: 111003/FO/2016/C1 (Demolition of existing building at 10-12 Whitworth Street West, and redevelopment of the site for a new 35 storey residential building (Use Class C3) comprising 327 apartments, with associated resident's services, facilities and communal spaces, servicing, highways, public realm and other associated works.) including minor refinements to lower external elevation, revisions to the roof top amenity area, revised cladding details, omission of windows at ground and first floor east and west elevations, replacement door, adjusted fence line, together with internal alterations including the omission of the basement, increase in number of cycling spaces, revisions to refuse area, alterations to lifts, and a re:planning of ground and first floor amenity areas.	5 th Apr 2017		
8	2-4 Whitworth Street	126308/FO/2020 (Manchester City Council)	The demolition of 2 to 4 Whitworth Street West and the construction of a mixed-use building, comprising flexible units for retail, food and drink use at ground floor level with a hotel at upper storeys, together with associated landscaping, servicing, cycle parking and other associated works.	18 th December 2020	7-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
9	325 - 327 Deansgate	125804/FO/2019 (Manchester City Council)	Demolition of existing buildings and structures on-site and erection of 22-storey building comprising apart-hotel (Use Class C1) with flexible commercial uses at ground floor and within existing viaduct arches (Use Class A1, A2, A3, A4, D2), access, landscaping and other associated works	26 th June 2020	22-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
10	1 Alpha Place	120113/FO/2018 (Manchester City Council)	Erection of a seven storey apart-hotel (use class C1), comprising 59 rooms on the upper floors, with reception area and ancillary residents' lounge and breakfast area on the ground floor.	24 th September 2018	7-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.

Ref	Scheme	Application number	Description	Date approved	Maximum height	Anticipated construction phasing
11	One City Road	128002/FO/2020 (Manchester City Council)	Full planning application for demolition of existing structures on site, erection of one 11-storey plus basement office building (Use Class E) and one 14-storey plus basement office building with ground floor commercial unit (Use Class E), landscaping, highways works, and associated works	26 th January 2021	14-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
12	70 Great Bridgewater Street	129081/FO/2021 (Manchester City Council)	Partial demolition and reconfiguration of 70 Great Bridgewater Street to create a new office building (Use Class E), including the replacement of building facades, a 2-storey rooftop extension and alterations to the internal layout including the infilling of the central atrium, servicing and cycle parking, access and associated works.	23 rd April	8-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
13	Hotspur Press	120635/FO/2018 (Manchester City Council)	Part demolition and redevelopment and part retention and refurbishment of the former Hotspur Press Complex (Medlock Mill) to deliver 171 residential units (10 no. 1 bed, 1 person apartments, 49 no. 1 bed, 2 person apartments, 2no. 2 bed, 3 person apartments and 110 no. 2 bed 4 person apartments) - Use Class C3, within refurbished mill space and 28 storey building (including two levels of basement), commercial floorspace (Use Classes A1 (shop), A2 (financial and professional services), A3 (restaurants and cafes), B1 (office), D1 (medical clinic, health centre, art gallery and museum only) and / or D2 (gymnasium or bowling alley only) together with servicing, access, landscaping including a new public space and pedestrian route between Gloucester Street and First Street, and other associated works	30 th October 2020	28-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
14	St Michael's	114664/FO/2016 (Manchester City Council)	Partial demolition of existing buildings. Development up to 171.6m AOD comprising residential (Use Class C3), offices (Use Class B1), hotels (Use Class C1), place of worship (Use Class D1) and leisure/food and drink uses (Classes A1, A3, A4, A5 and D2). Creation of public spaces and new public realm, provision of basement car parking, highway alterations, landscaping and associated works.	20 th June 2018	40-Storey	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
15	Great Marlborough Street Car Park	121252/FO/2018 (Manchester City Council)	Partial reconfiguration of existing Multi-Storey Car Park (MSCP), including temporary access off Great Marlborough Street, construction of 5 storey external ramps, closure of vehicular access to top level; and construction of new facade; and partial demolition of the surplus part of existing MSCP and erection of a part 55, part 11 storey, part 4 storey mixed-use building comprising 853 purpose built student accommodation units (sui generis), ancillary amenity space and support facilities, and 786sqm (GIA) SME incubator workspace (Use Class B1), including public realm improvements and other associated work	23 rd July 2021	55-Storey	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
16	98-116 Deansgate And 35-47 King Street West	129251/FO/2021 (Manchester City Council)	Change of use of upper floors and erection of three storey rooftop extension, including plant level, to Kendal Milne building to provide offices on floors 1-9 (Use Class E), together with change of use of ground, lower ground and basement levels of Kendal Milne building to flexible commercial spaces (Use Class E, F2 and /or Sui Generis (Drinking Establishments) and associated elevational alterations and works; Demolition of adjacent Fraser Building and link bridges and erection of 14 storey office building (Use Class E), including plant level, together with associated amenity space and ground and basement floor flexible commercial units (Use Class E, F2 and / or Sui Generis (Drinking Establishments)) and basement areas for cycle storage and plant; Highways landscaping and public realm works, engineering and infrastructure works and other associated works.	4 th June 2021	14-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
17	109-127 Market Street	127882/LO/2020 (Manchester City Council)	Listed Building Consent: Internal and external alterations to include: the erection of four storey roof-top extension; partial demolition of the floor structure to create the atrium; installation of a lightwell; external alterations to form new entrances on the ground floor; sub-division of the ground floor into smaller units the refurbishment; works to windows including replacements; demolition of a staircase; partial demolition of kitchen and plant structure on Floor 7; creation of winter gardens on the 6th floor; creation of external roof top amenity spaces; installation of new rooftop plant; refurbishment of the interiors and other associated works.	26 th January 2021	10-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development
18	Great Northern Warehouse Redevelopment	118568/FO/2017(Manchester City Council)	Refurbishment, restoration and re-use of Great Northern Warehouse building as mixed-use development including retail units (Use Classes A1 shop, A3 restaurant/cafe and A4 drinking establishment), gym (Use Class D2), casino (sui generis) and 118 no. residential apartments (Use Class C3), refurbishment, restoration and extension of 223-255 Deansgate Terrace and Goods Yard Entrance to accommodate ground floor retail units (Use Classes A1 shop, A3 restaurant/cafe and A4 drinking establishment) and 24 no. residential apartments (Use Class C3) on upper floors, reconfiguration of Great Northern Square to allow for redeveloped and additional public realm, to include hard and soft landscaping, and formation of Dean Street parallel to Deansgate, together with associated highway works, access, car parking, servicing, rooftop plant, removal of non-original modern installations and making good and associated works	14 th March 2018	4-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development
		122854/FO/2019 (Manchester City Council)	Revision to Phase 1 of approved planning application 118568/FO/2017 for Deansgate Terrace only to include reconfiguration of internal layouts for commercial and residential use areas (to now allow for 3 retail units instead of 2 as previously approved), creation of new residential entrance from Deansgate, relocation of residential plant to basement, revisions to external elevations and roof, introduction of additional Use Class A2 financial and professional services into the commercial space within ground/basement, and associated works	27 th Sep 2019		

Ref	Scheme	Application number	Description	Date approved	Maximum height	Anticipated construction phasing
		124847/JO/2019 (Manchester City Council)	Variation of condition application to vary/reword conditions 2 (Approved Plans and Documents), 3 (Materials), 4a (Ground Conditions), 5 (Odour Impact Assessment), 6 (Construction Management Plan), 8 (Acoustic Insulation), 12 (Archaeology), 13 (Landscaping Details), 15 (Surface Water Drainage), 18 (Piling Risk Assessment), 28 (Local Labour Agreement), 31 (Bird Nest) and 32 (Bats) attached to previously approved planning application 118568/FO/2017 to allow for a revision to Phase 1 of the approved development for Deansgate Terrace only to include reconfiguration of internal layouts for commercial and residential use areas (to now allow for 3 retail units instead of 2 as previously approved), creation of new residential entrance from Deansgate, relocation of residential plant to basement, revisions to external elevations and roof, introduction of additional Use Class A2 financial and professional services into the commercial space within ground/basement, and associated works, and to reflect the already discharged conditions on application 118568/FO/2017	12 th Dec 2019		
19	Plot 12 Circle Square	125451/FO/2019 (Manchester City Council)	Erection of new 15 storey building plus basement to include basement plant room, ground floor reception, cycle store and commercial space (flexible Use Classes A1 (Shop), A2 (Financial and Professional Services), A3 (Restaurant and Cafe), A4 (Drinking Establishment), D1 (Non-residential Institutions - Creche only) and D2 (Assembly and Leisure - Gym only) and 14 storeys of offices (Use Class B1) together with rooftop lounge and terrace, associated means of access and external landscaping around base of building	7 th February 2020	15-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development
20	St George's Place	123261/FO/2019 (Manchester City Council)	Erection of a part 8 and 9 storey building located on Arundel Street and Worsley Street, a part 11 and 23-storey residential building located on the Mancunian Way and refurbishment and conversion of the existing DOT Building to form 355 residential apartments in total (Use Class C3a) together with commercial uses (Use Classes A1, A2, B1, D1 and D2) along with associated car parking, cycle parking, access, landscaping and other associated work	23 rd August 2019	23-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development
Schemes Currently Under Construction						
21	Castle Wharf	113870/FO/2016 (Manchester City Council)	Construction of two residential apartment buildings with ancillary amenity facilities for residents including a gym, landscaped terrace and swimming pool, new public realm and landscaping including two new pedestrian connections to the Castlefield basin from Chester Road, basement car parking and related highway, access, servicing and associated works.	5 th April 2017	19-Storeys	Under Construction. Close to completion. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
		129524/NMC/2021 (Manchester City Council)	Non-material amendments to planning permission 113870/FO/2016 to alter the description of development to omit 'swimming pool' and replace with 'spa facilities'; and amendments to building design, comprising changes to basement levels (including omission of 3 parking spaces and swimming pool) to avoid culvert, increase in spa area and residents' lounge area, increase in building footprint to accommodate insulation changes, amendments to ventilation louvres, two 3-bed apartments changed to two 2-bed apartments, and amendments to cladding and windows.	13 th Apr 2021		
22	Elizabeth Tower & Victoria Residence	119806/FO/2018 (Manchester City Council)	Erection of two tall buildings (51 storeys and 21 storeys) comprising 664no residential units (use class C3) and commercial space (A1, A3 or D1), provision of two levels of basement parking, alterations to surface level car park, landscaping, highway alterations, access and associated works.	4 th July 2018	52-Storeys	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
		119806/FO/2018 (Manchester City Council)	Erection of two tall buildings (51 storeys and 21 storeys) comprising 664no residential units (use class C3) and commercial space (A1, A3 or D1), provision of two levels of basement parking, alterations to surface level car park, landscaping, highway alterations, access and associated works.	4 th July 2018		
		128553/NMC/2020	Non material amendment application for changes to Condition 2 (plans) attached to planning permission 119806/FO/2018 to facilitate amendments to the internal layout and external appearance.	10 th Nov 2020		
23	Viadux	115871/FO/2017 (Manchester City Council)	Erection of a 40 storey building to form 375 residential apartments (Use Class C3a) and the erection of a 14 storey building for form offices (Use Class B1) (31,756 sqm) together with ground floor commercial space (Use Class A1, A3 or A4) (1010 sqm) with associated enclosed service yard, public realm including staircase and lift to connect with viaduct, car and le parking, landscaping and other associated works	27 th July 2017	40-Storeys	Anticipated to be completed by spring 2024; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
		126868/JO/2020 (Manchester City Council)	Variation of planning conditions 2, 3, 21, 24, 25, 29, 30, 31, 32, 36 and 38 of planning permission 115871/FO/2017 (amended by 126604/NMC/2020) to allow for a reduction in overall height of the building by 2.5 metres, changes to the number and type of structural interventions into the listed arches, modification and alteration to the bridge over Great Bridgewater Street, alterations to the ground floor layout including enlargement of residents lobby together with re-location of the cycle store and reduction in car parking, alterations to the upper floor layout to remove 3 bedroom apartments and elevational alterations to main facade of the residential tower to modify the fin arrangement together with alteration to the podium with the introduction of perforated panels.	20 th Aug 2020		
24	Invicta House	126945/FO/2020 (Manchester City Council)	Redevelopment for a hotel use (Use Class C1), with ground floor ancillary facilities, comprising retention and refurbishment of main facade of Invicta House, erection of a ten-storey building to the rear, and other associated works.	15 th September 2020	10-Storeys	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.

Ref	Scheme	Application number	Description	Date approved	Maximum height	Anticipated construction phasing
25	iQ Echo Street	118267/FO/2017 (Manchester City Council)	Full planning permission for the demolition of existing buildings on site and their replacement with a mixed use (sui generis) development comprising 3 towers ranging in height (from 14, 20 and to 25 storeys (including lower ground floor level) and intermediary link buildings and providing: 403 units of Co-Living residential accommodation with associated shared amenity spaces; 94 units of purpose built student accommodation with associated shared amenity spaces; ground floor commercial floor space and children's day nursery together with cycle parking, recycling and refuse bin storage, associated plant and public realm enhancements to Granby Row, Echo Street, Cobourg Street and Back Acton Street	1 st June 2018	25-Storey	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
		122732/JO/2019 (Manchester City Council)	Application to vary condition number 2 (approved drawings) to allow developmental changes to design, and remove / amend conditions: 3 (cleaning of contractors vehicles) , 4 Building materials / samples), 6 (Construction Management Plan), 8 (Secured by Design), 9 (Surface Water Drainage), 10 (Public Realm/ landscape works), 11 (Wind Mitigation Measures), 12 (Sustainable Drainage SuDS), 31 (protected species), 32 (fumes vapours and odours) and 34 (acoustic insulation) attached to planning permission 118267/FO/2017 to reflect previously agreed details and conditions that have been partially / fully discharged.	19 th Feb 2019		
26	60 Charles Street	122644/FO/2019 (Manchester City Council)	Erection of 16 storey building plus plant level comprising a 278-room hotel (Use Class C1) with ancillary ground floor bar and restaurant uses (Use Classes A3, A4) with associated works to facilitate access, servicing and other associated works following demolition of existing building on-site.	31 st May 2019	16-Storeys	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
27	John Dalton Tower	125799/FO/2019 (Manchester City Council)	Demolition of existing John Dalton West Building and associated structures, and erection of a new 7 storey education building (Use Class D1) for the Faculty of Science and Engineering (comprising teaching and research spaces, academic offices, social learning areas, catering/kitchen facilities and an energy centre), physical connections to and external refurbishment of the John Dalton Tower, hard and soft landscaping works, car and cycle parking and associated works.	12 th March 2020	7-Storeys	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
28	Birley Plot E	120896/FO/2018 (Manchester City Council)	Construction of a part 6, part 11 and part 16 storey building comprising 491 student bedspaces (sui generis), amenity space, cycle parking, landscaping, and associated highways work.	19 th October 2018	16-Storeys	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
		123767/JO/2019 (Manchester City Council)	Variation of condition numbers: 2 (Specified Plans), 11 (Landscaping), 15 (Operational Management Strategy), 16 (Access Strategy), 17 (Construction Management Plan), 18 (Local Labour Agreement), 20 (Acoustic Insulation) and 24 & 25 (Contaminated Land) of planning approval reference 120896/FO/2018 to allow for: re-positioning of building; internal arrangement amendments; and elevational amendments	5 th Jun 2019		
29	Units 3 And 4 Bentinck Street Industrial Estate	114961/FO/2017 (Manchester City Council)	Redevelopment of the site with a residential development comprising 109 dwellings (Use Class C3), with associated car parking and public realm.	5 th May 2017	10-Storey	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
30	Sky Gardens	115211/FO/2017 (Manchester City Council)	Redevelopment of site with a mixed-use development comprising 174 dwellings (Use Class C3) and 4 commercial units (to include Use Classes A1, A2, A3, A4, B1a), with associated car parking and a landscaped public square.	30 th May 2017	12-Storey	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
31	Potato Wharf	114999/FO/2017 (Manchester City Council)	Erection of two residential buildings (Use Class C3) with a link building, comprising 191no apartments, residential amenity areas, car parking, bicycle parking, public realm and landscape works, access and servicing arrangements, and associated works, following demolition of the existing buildings and plant.	27 th April 2017	11-Storey	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.

Ref	Scheme	Application number	Description	Date approved	Maximum height	Anticipated construction phasing
32	The Factory	114294/VO/2016 (Manchester City Council)	City council development of a new flexible arts and events space comprising a range of activities including theatre, music, dance, art, other performance and non-performance related events, exhibitions and conferences (Sui Generis) with ancillary facilities including retail exhibitions and conferences (Sui Generis) with ancillary facilities including retail and bar uses (Use Classes A1 and A3), offices, administrative and back of house functions (Use Class B1), training and educational facilities (Use Class D1), servicing and access arrangements, highways works, creation of new public realm, cycle parking and provision of new plant and associated works. Demolition of the Starlight Theatre, existing workshop and other structures and perimeter wall, removal of four existing trees and alterations to the Grade II listed Colonnaded Railway Viaduct.	16 th January 2017	7-Storey	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
		119890/VO/2018 (Manchester City Council)	City council development of a new flexible arts and events space comprising a range of activities including theatre, music, dance, art, other performance and non-performance related events, exhibitions and conferences (Sui Generis) with ancillary facilities including retail exhibitions and conferences (Sui Generis) with ancillary facilities including retail and bar uses (Use Classes A1 and A3), offices, administrative and back of house functions (Use Class B1), training and educational facilities (Use Class D1), servicing and access arrangements, highways works, creation of new public realm, removal of 4 trees, cycle parking and provision of new plant and associated works. Demolition of the Starlight Theatre, existing workshop and other structures and perimeter wall and alterations to the Grade II listed Colonnaded Railway Viaduct. (Amendment of application ref no 114294/VO/2016 approved in January 2017)	30 th Apr 2018		
33	Manchester Goods Yard	121511/FO/2018 (Manchester City Council)	Erection of two buildings comprising: 11 storey mixed use building (including ground and mezzanine) comprising workspace (Use Class B1), with retail uses at ground and mezzanine levels (Use Class A1/A2/A3/A4 and / or D2) and rooftop amenity spaces known as Manchester Goods Yard; and, a further 10 storey mixed use building (including ground) comprising workspace (Use Class B1), with retail uses at ground level (Use Class A1/A2/A3/A4 and / or D2) known as No.1 Grape Street, above two levels of basement parking for 391 cars and cycle storage, together with new public realm, landscaping, provision of external seating areas, access and other associated works.	14 th December 2018	11-Storeys	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
		123047/NMC/2019 (Manchester City Council)	Non-Material Amendment to planning permission ref:121511/FO/2018, to include amendments to the wording of conditions, introduction of additional condition regarding phasing and additional condition regarding interim landscaping details, together with additional office floorspace to level 8 and revisions to layout of level 9.	12 th Apr 2019		
		127790/NMC/2020 (Manchester City Council)	Non Material Amendment to planning permission ref:121511/FO/2018, including minor reduction in building heights, minor reduction of distance between blocks, relocation of smoke extract, and re-alignment of canopy.	17 th Sep 2020		
34	Granada House	118040/FO/2017 (Manchester City Council)	Part redevelopment and part refurbishment of the site, following demolition of existing buildings and structures, including the Annex Building fronting Atherton Street, the Administration Block and Security Lodge fronting Quay Street, Mechanical Workshop areas and Stores to the rear of Studio 8, former Staff Welfare Suite to the rear of Studios 2 and 6, to allow the erection of 10 storey residential and office building (use Class C3 / B1) comprising 22 residential units with rooftop pool, ground floor retail units (Use Class A1, A2 or A3) and amenity space; conversion of Studios 2, 6, 8 and 12 to event spaces and filming studios (Sui Generis); conversion of the existing Granada House building into a hotel (Use Class C1) with associated private members club (Sui Generis); restaurant and cafe use (Use Class A3) and drinking establishment uses (Use Class A4); erection of a new single storey rooftop bar / restaurant associated with the hotel and private members club; erection of 4 storey modular office building the the rear of Granada House; inclusion of a Combined Heat and Power (CHP) Energy Centre; creation of temporary car parking to the rear of Granada House; works associated with access and servicing of the wider development, and associated public realm and landscaping works.	16 th May 2018	10-Storey	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
35	Water Street	125655/FO/2019 (Manchester City Council)	Full Planning Permission for the erection of 32 storey plus two basement level mixed use building (sui generis), comprising co-living units, amenity space, gym and flexible commercial space, landscaping, access and other associated works	15 th July 2021	32-Storeys	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
36	Union Living Tower One	126648/FO/2020 (Manchester City Council)	Full Planning Permission for the erection of 36 storey plus basement level mixed use building comprising co-living units, amenity space and flexible commercial space (Sui Generis), co-work (Use Class B1), landscaping, access and other associated works.	30 th July 2020	36-Storeys	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
37	Novella	19/73721/REM (Salford City Council)	Details of reserved matters for access, appearance, landscaping, layout and scale for development of Plot C1 for the erection of a 23-storey building with associated 6-storey podium block to provide 211 apartments and ground floor commercial uses, together with associated ancillary facilities and servicing pursuant to outline planning permission 16/68325/OUT	3 rd October 2019	23-Storey	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.

Ref	Scheme	Application number	Description	Date approved	Maximum height	Anticipated construction phasing
38	55 Portland Street	119265/FO/2018 (Manchester City Council)	Construction of a building of ground floor (including mezzanines) plus 16 upper storeys comprising a new hotel (Use Class C1), with ancillary uses at ground floor (bar, restaurant and public area, business suite), together with associated landscaping, servicing, cycle parking, and other associated works	4 th July 2018	17-Storeys	Under construction. Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
Schemes awaiting decision						
39	34 Great Jackson Street	129273/FO/2021 (Manchester City Council)	Demolition of existing structures and the construction of two residential buildings of 56 storeys (plus basement and roof plant) (use class C3), with ground floor commercial uses (use class E), car parking, cycle provision, landscaping, access and other associated works	Awaiting decision	56-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development.
40	Middlewood Locks Plot A-D and P	21/78212/OUTEIA (Salford City Council)	Outline planning application for mixed use development comprising a maximum of 93,000sqm office floorspace (Use Class E(g)); a maximum of 1,000 dwellings (Use Class C3); a maximum of 23,706sqm of commercial floorspace (Use Classes C1, E (a, b, e and f) and Sui Generis (drinking establishments)); multi-storey car park, landscaping, infrastructure and other associated works.	Awaiting decision	15-Storey	Construction period between 2023 and 2029. Therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development
41	Middlewood Locks Plot N	21/78214/REM (Salford City Council)	Reserved matters following outline planning permission 14/65793/OUT for the erection of a new mixed-use residential building (Use Class C3) comprising 250 units and 413sqm of ground floor commercial floorspace, together with associated ancillary facilities, servicing, landscaping and public realm	Awaiting decision	15-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development
42	Middlewood Locks Plot E	21/78211/REM (Salford City Council)	Reserved matters application following outline planning permission 16/67987/OUTEIA for the erection of a mixed-use residential development (Use Class C3) comprising two blocks (E1 & E2) totalling 659 units and 1,712qm of ground and first floor commercial uses, together with associated ancillary facilities, servicing, landscaping and public realm.	Awaiting decision	31-Storeys	Completion date is unknown; therefore, it is assumed that there will be overlap in construction between this scheme and the proposed development

Assessment

11.3.4 This section outlines the predicted environmental effects of the proposed development in-combination with the other significant developments in the area.

Noise and vibration

Construction/operational

11.3.5 At the time of writing, no nearby committed developments have been identified within the surrounding area that are likely to affect the noise and vibration assessment, during construction or operation of the proposed development.

Air quality

Construction

11.3.6 Should the construction phases of any committed developments and the proposed development overlap, it is possible that cumulative dust impacts may occur. However, as previously outlined, any fugitive dust emissions generated by the proposed development will be controlled through the outlined mitigation measures. A similar level of control would also be expected for any other development. Therefore, residual cumulative impacts are predicted to be not significant in accordance with the EIA Regulations (UK Government, 2017, as amended).

Operational

11.3.7 Traffic data utilised within the assessment included predicted growth up to 2024. This is considered to provide a reasonable representation of potential increases in traffic flows as a result of local committed developments, as well as developments throughout the wider area. As such, the presented results consider cumulative effects from road vehicle exhaust emissions. Residual cumulative effects are therefore predicted to be negligible (not significant) in accordance with the EIA Regulations (UK Government, 2017, as amended).

Wind microclimate

Construction

11.3.8 During construction, conditions will gradually transition to those of the completed development. As cumulative operational conditions are expected to be suitable for the intended use, so will those conditions which are experienced during construction. Therefore, all cumulative construction wind effects will be negligible (not significant).

Operational

11.3.9 Conditions for the scenario with the proposed development in cumulative surrounds (Scenario 3) are shown in Figure 11-3, Figure 11-4 and Figure 11-5.

11.3.10 Winter conditions are suitable for a mixture of sitting, standing and leisure walking.

11.3.11 Summer conditions are suitable for a mixture of sitting and standing.

11.3.12 There are some localised marginal safety exceedances (S15) to the west of the study area, adjacent to the Axis Tower. These are of the same scale as the safety exceedances for the baseline scenario and cannot be attributed to the proposed development. Given this, and that no further safety exceedances are present, all wind effects with respect to safety are negligible (not significant).

- General thoroughfares - Conditions on local thoroughfares are suitable for leisure walking at worst, which is suitable for the intended use and is a negligible wind effect (not significant).
- Briton's Protection public house beer garden - Conditions in the Briton's Protection public house beer garden are suitable for sitting in either winter or summer. This is suitable for the intended use and is a negligible wind effect (not significant).
- Rochdale Canal towpath - Conditions on the Rochdale Canal towpath are suitable for a mixture of sitting and standing in winter and for sitting in summer. This is suitable for the intended use and is a negligible wind effect (not significant).
- Bus stops and taxi drop-offs - Conditions at the Great Bridgewater Street bus stops and taxi drop-off are suitable for either sitting or standing in winter, and for sitting in summer. This is suitable for the intended use and is a negligible wind effect (not significant).
- Off-site entrances - All off-site building entrances are adjacent to regions of standing or sitting. This is suitable for the intended use and is a negligible wind effect (not significant).
- Entrances to proposed development - Conditions at the entrances of the proposed development at site A are suitable for sitting in summer or winter. This is suitable for the intended use and is a negligible wind effect (not significant). Conditions at the entrances of the proposed development at site B are suitable for sitting in summer or winter. This is suitable for the intended use and is a negligible wind effect (not significant).

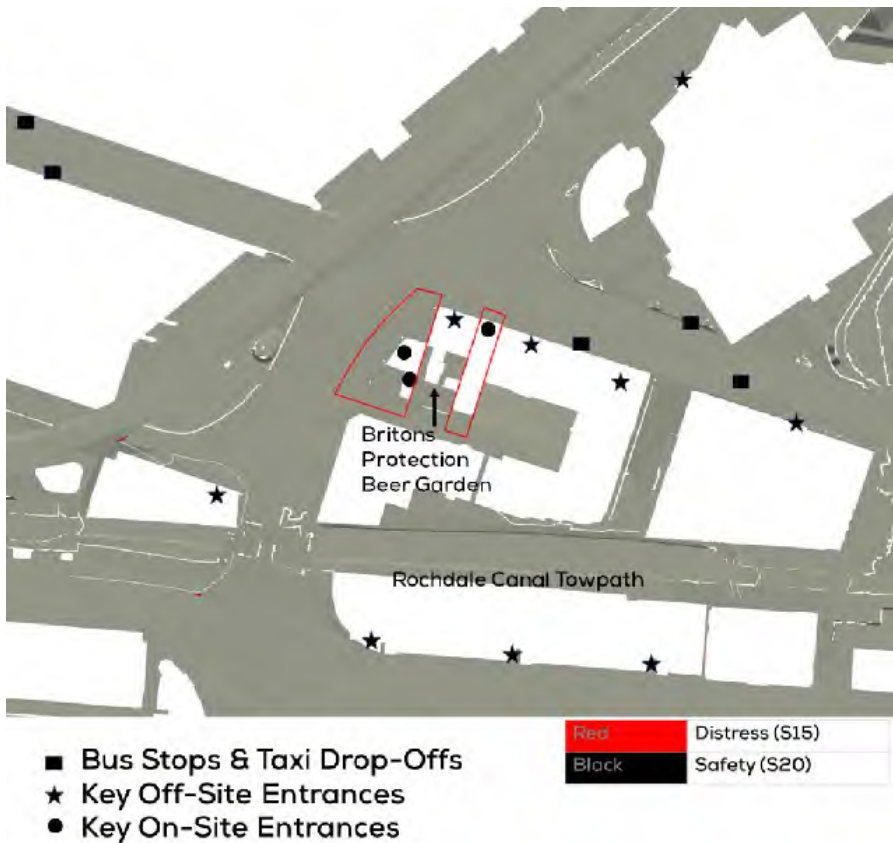


Figure 11-3 Scenario 3 (proposed development in cumulative surrounds), wind safety

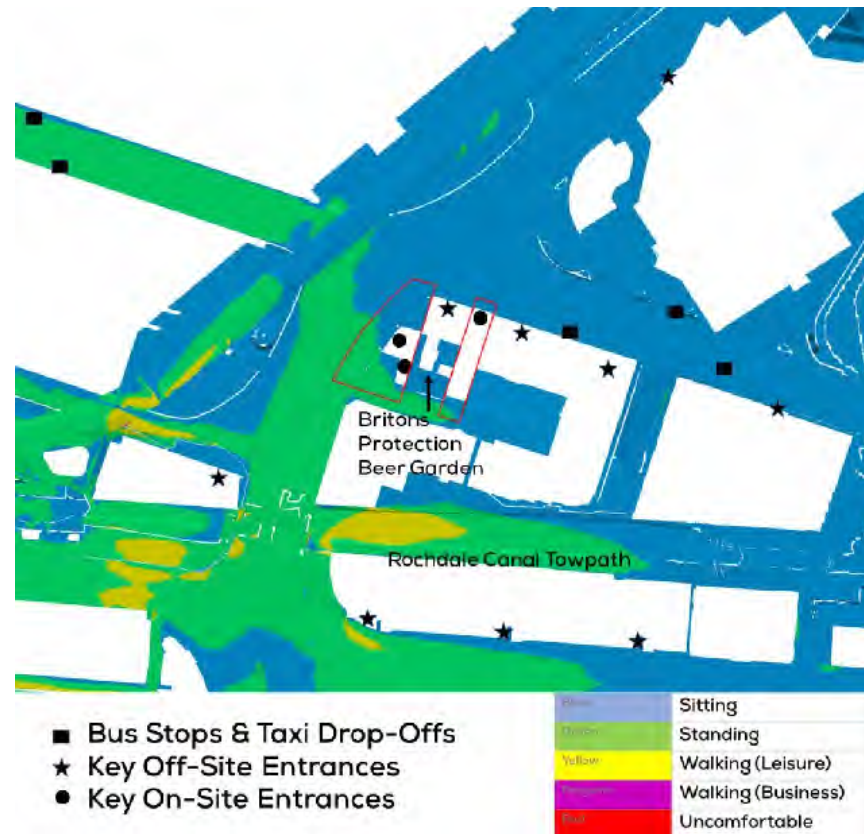


Figure 11-4 Scenario 3 (proposed development in cumulative surrounds), winter wind comfort

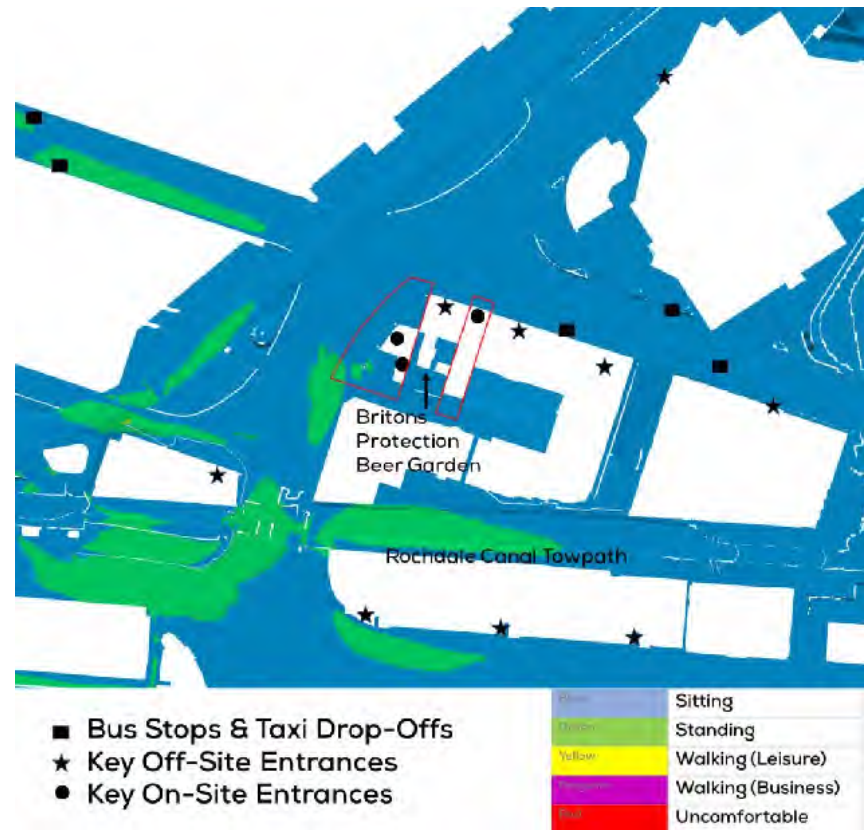


Figure 11-5 Scenario 3 (proposed development in cumulative surrounds), summer wind comfort

Daylight and sunlight

Construction/operational

- 11.3.13 Where consented schemes have the potential to be affected by the proposed development, these have been included in the baseline scenario and assessed individually in detail, so no separate technical assessment of the cumulative impact is required. This approach is in line with the BRE Guidelines (BRE, 2011).

Built heritage

Construction

- 11.3.14 There are possible construction in-combination effects on common receptors with the following approved projects:

- 7 – 10-12 Whitworth Street (111003/FO/2016/C1 (Manchester City Council)) and (115544/NMC/2017 (Manchester City Council));
- 8 – 2-4 Whitworth Street (126308/FO/2020 (Manchester City Council));
- 9 – 325 - 327 Deansgate (125804/FO/2019 (Manchester City Council));
- 12 – 70 Great Bridgewater Street (129081/FO/2021 (Manchester City Council));
- 13 – Hotspur Press (120635/FO/2018 (Manchester City Council)); and
- 23 – Viadux (115871/FO/2017 (Manchester City Council)), (126868/JO/2020 Manchester City Council)).

- 11.3.15 These are relatively close to the site and therefore concurrent construction activities could have an influence on common assets. It is considered however, that the level of effect for the in-combination effect would still be the same as that reported for the proposed development in isolation (moderate adverse or below, not significant).

Operational

- 11.3.16 Once operational, it is considered that the approved projects identified would not give rise to in-combination effects with the proposed development. This is based on the conclusions of technical reporting submitted for the other approved projects identifying no 'significant' effects on heritage assets or the approved projects being located a sufficient distance and thus exhibiting a good degree of separation from the proposed development that there would be no common affected receptors.

Greenhouse gas (GHG) emissions

- 11.3.17 Unlike other environmental effects discussed in the ES that have a direct or indirect effect on the site and local area, effects from GHG emissions are not localised but contribute to the global atmospheric concentration of greenhouse gases and consequently contribute to the global climate change effect. Therefore, assessing emissions from the proposed development in terms of combined effects with other nearby developments is extraneous and immaterial in terms of localised effects. The proposed development should be viewed, rather, in the context of developments and construction projects globally as it contributes to a global climatic effect. As there are GHG emissions associated with almost all new developments globally and that we are approaching a global climate tipping point, it may be stated that cumulative effects are significant.

Townscape and visual impact assessment

Cumulative schemes

- 11.3.18 A review of the intervisibility of the cumulative schemes identified for consideration in this EIA has scoped the cumulative townscape and visual assessment to an appraisal of the proposed development with the following schemes with planning consent:
 - Olympia Trading Estate (116850/FO/2017 and non-material change 128192/NMC/2020);
 - Plot 11 First Street (125573/FO/2019);
 - 10-12 Whitworth Street (111003/FO/2016/C1 and non-material change 115544/NMC/2017);
 - 2-4 Whitworth Street (126308/FO/2020);
 - 70 Great Bridgewater Street (129081/FO/2021); and
 - iQ Echo Street (118267/FO/2017 and non-material change 122732/JO/2019).
- 11.3.19 The review has scoped the cumulative townscape and visual assessment to an appraisal of the proposed development with the following scheme awaiting determination:
 - Middlewood Locks Plot N (21/78214/REM), note this development is situated within the administrative area of Salford.

Construction townscape effects

- 11.3.20 If the construction phases of the proposed development and that of the cumulative schemes identified were to align, there is a localised potential for construction activities to be perceived as having an increased prevalence within the character area due largely to the number of schemes present within the city centre. Where intervisibility is possible, views would be limited to taller elements such as cranes with the lower elevations of building and construction activities being screened by intervening built form and to a lesser extent tree cover within the city centre. There would be little additional loss of defining characteristics or features such as buildings or street alignment within the character area. On balance, the assessed effects on townscape character would not alter when considering the proposed development with the cumulative schemes identified. As such, cumulative construction effects on townscape character will remain as being moderate/minor adverse at the site level reducing to minor adverse for the wider townscape and not significant.

Construction visual effects

- 11.3.21 There would be no cumulative visual effects on receptors situated to the north and west of the site as illustrated in Photoviewpoints 1 and 6, shown in Appendix 0-C, ES Volume II. Elsewhere within the study area where encountered, views would be limited to the taller construction elements such as cranes and other features appearing above the intervening built form. However, this would not extend the area over which construction would be viewed, rather the differing schemes would coalesce within a vista. Overall, the assessed effects on visual receptors would not alter when considering the proposed development and the cumulative schemes identified. As such, cumulative visual effects during construction will remain as being minor adverse for all identified receptors with the exception of users of Manchester Oxford Road station which will remain as negligible and not significant.

Operational townscape effects

- 11.3.22 If all of the cumulative schemes identified were to be competed and operational there would be a localised increase in tall contemporary built form within the city centre experienced alongside and above the older and lower stature fabric of the city that may alter the current perception of the character area. However, on balance, Manchester City centre is already defined by the presence of a dense mix of tall residential and commercial buildings and is noted as having an urban form containing contrasting styles and ages. Furthermore, the inclusion of the proposed development would not extend the area where tall buildings are perceived within the city centre nor their prominence. Overall, the assessed effects on townscape character would not alter when considering the proposed development with the identified cumulative schemes. As such, cumulative operational townscape effects would remain as being minor beneficial for the site and city centre Strategic Character Area (SCA) and minor neutral for the Central Area of Change SCA and not significant.

Operational visual effects

- 11.3.23 There would be no cumulative visual effects for receptors located to the west of the site as illustrated in Photoviewpoints 9 and 11, shown in Appendix 0-C, ES Volume II, as other proposed schemes located within the intervening townscape would screen views of the proposed development. From the north, as illustrated in Photoviewpoint 1, shown in Appendix 0-C, ES Volume II, although other schemes may be evident from this location, existing built form will screen views of the proposed development and as such there will also be no cumulative visual effects. Elsewhere, within the study area where encountered, views would be limited to the upper elevations appearing above the intervening built form. The proposed development would be viewed as in-keeping with the scale and massing of the built form without bringing bult form perceptibly closer to receptors. Overall, this would not materially alter the composition of views or extend the area over which this type of proposed development would be viewed, rather a number of schemes would coalesce within a vista.
- 11.3.24 Overall, the assessed effects on visual receptors would not alter when considering the proposed development and the identified cumulative schemes. As such, cumulative visual effects during operation would remain as ranging from minor adverse for receptors represented by photoviewpoints 4, 5, 11 and 12 to minor neutral for receptors represented by photoviewpoints 1, 2, 3, 7 to 10. Users of Manchester Oxford Road station will remain as negligible with effects for all visual receptors remaining non-significant.

Summary of significant effects for the cumulative scheme scenario

- 11.3.25 Table 11-3 outlines the significant in-combination cumulative development effects that have been identified.

Table 11-3 Summary of significant cumulative development effects

Topic	Receptor	Cumulative effects	Significance of effect
Construction			
Greenhouse gas emissions	The global atmosphere	GHG emissions resulting from the construction of the development, contributing to the rising concentrations of GHG emissions globally.	Major adverse
Operation			
Greenhouse gas emissions	The global atmosphere	GHG emissions resulting from the operation of the development, contributing to the rising concentrations of GHG emissions globally.	Major adverse

11.4 CONCLUSIONS

- 11.4.1
- An assessment has been undertaken of the potential for interactive cumulative effects to arise – that is, whether individual receptors could be subject to the interaction of more than one effect simultaneously, leading to more significant effects on those individual receptors.
- 11.4.2
- An assessment has also been undertaken, within each discipline, of the potential for the proposed development to give rise to cumulative effects when viewed “in-combination” with other developments.

Interactive cumulative effects

- 11.4.3
- During construction, moderate adverse interactive effects have been identified in relation to the Briton’s Protection Public House and minor adverse interactive effect have been identified in relation to the Peveril of the Peak Public House.
- 11.4.4
- During operation, no interactive cumulative effects were identified.

In-combination cumulative effects

- 11.4.5
- During construction, significant in-combination cumulative effects have been identified for the following receptor:
 - Atmospheric GHG concentration;
- 11.4.6
- During operation, significant in-combination cumulative effects have been identified for the following receptor:
 - Atmospheric GHG concentration;

11.5 References

- Building Research Establishment (BRE) (2011) ‘Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice’, Second Edition;
- 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.

11.6 GLOSSARY

Term	Definition
AOD	Above Ordnance Datum
EIA	Environmental Impact Assessment
ESR	Existing Sensitive Receptor
GHG	Greenhouse gas
MCC	Manchester City Council
SCA	Strategic Character Area

12 RESIDUAL EFFECTS AND CONCLUSIONS

12.1 SUMMARY OF RESIDUAL ENVIRONEMNTAL EFFECTS

- 12.1.1 This chapter summarises the potentially significant residual effects resulting from the proposed development following adoption of the mitigation measures recommended in this Environmental Statement (ES). The significant residual effects have been derived from the assessments carried out in each of the technical chapters within this ES.
- 12.4.2 The supplementary mitigation measures have been summarised in Section 12.2 for reference. A summary of the significant residual effects, both adverse and beneficial, has been provided in tabular form in Section 12.3.
- 12.4.3 This ES has assessed effects on site A or application A (the larger parcel of land to the west of the Briton’s Protection public house) and site B or application B (the smaller parcel of land to the east of the Briton’s Protection public house).

Noise and Vibration

Construction

- 12.4.4 Construction noise and vibration will be mitigated by implementing a Construction Environmental Management Plan (CEMP) as well as a construction noise monitoring scheme. With these measures in place, some significant effects remain. During construction there will be minor to moderate adverse short-term residual effects on receptor ESR2 from construction noise. During construction, there will also be negligible to moderate adverse short term residual effects on ESR2 from construction vibration and on ESR4 from construction noise and construction vibration.

Operation

- 12.4.5 Noise from fixed mechanical plant and equipment will be mitigated through acoustic attenuators, screening, enclosures and/or louvres. During operation the residual effects on habitable rooms of the proposed development from noise from Manchester City Centre – transportation and community noise; plant noise (Britons Protection public house and Tower of Light); and Britons Protection public house beer garden will be negligible.
- 12.4.6 Additionally, outline residential façade glazing requirements have been set out in relation to noise from Briton’s Protection public house and the Tower of light.

Air Quality

Construction

- 12.4.7 With supplementary mitigation measures in place through a CEMP, residual effects associated with fugitive dust emissions from earthworks, construction and trackout activities are deemed to be not significant.

Operation

- 12.4.8 Effects associated with exposure of future residents to exceedances of relevant air quality standards are deemed to be not significant in the long term at a local level. Supplementary mitigation measures were deemed not to be necessary.
- 12.4.9 Effects associated with road traffic vehicles exhaust emissions from vehicles travelling to and from the site are deemed to be negligible (not significant) in the long term at a local level. Supplementary mitigation measures were deemed not to be necessary.

Wind microclimate

Construction

- 12.4.10 Effects during construction are not deemed to be significant and require no supplementary mitigation.

Operation

- 12.4.11 Effects during operation are not deemed to be significant and require no supplementary mitigation.

Daylight and sunlight

Construction

- 12.4.12 As the completed proposed development represents the worst-case assessment in terms of daylight and sunlight, the potential daylight and sunlight effects during construction were scoped out of the assessment.

Operation

- 12.4.13 Residual effects upon the Hacienda residential receptors in relation to a reduction in daylight levels as a result of the completed proposed development are deemed to be negligible. Residual effect on sunlight relating to the Hacienda residential receptors as a result of the proposed development are deemed to be negligible.

Built heritage

Construction

- 12.4.14 During the construction phase, it is anticipated that there will be moderate adverse effects on the Briton’s Protection Public House and 13-17 Albion Street, moderate/minor adverse effects on GMEX (Manchester Central and minor adverse effects on Chepstow House and the Peveril of the Peak Public House. Effects are deemed to be not significant.

Operation

- 12.4.15 During operation, it is anticipated that there will be moderate adverse effects on the Briton’s Protection Public House. Effects on all other receptors are deemed to be negligible during the operation phase. Effects are deemed to be not significant.

Greenhouse Gas Emissions

Construction

- 12.4.16 The residual effect on the global atmosphere resulting from GHG emissions associated with the construction phase will be moderate adverse in the long term with the implementation of relevant supplementary mitigation measures.

Operation

- 12.4.17 With supplementary mitigation measures in place, residual effects on the global atmosphere resulting from operational embodied carbon, operational water and end-of-life-stage) of the proposed development may be reduced to moderate adverse (depending on the level of energy reduction that is achieved). Residual effects associated with operational energy may be minor to moderate adverse, depending on the level of GHG emissions reductions achieved through the supplementary mitigation measures. The effects are long term.

Townscape and visual impact

Construction

Townscape effects

- 12.4.18 During construction the residual effects on townscape features and the character of the site are deemed to be moderate/minor adverse. The effects on the City Centre Strategic Character Area (SCA) and the Central Area of Change SCA are deemed to be minor adverse. Due to the temporary nature of changes resulting from the construction phase, no further mitigation is deemed necessary.

Visual effects

- 12.4.19 The residual visual effects for pedestrians and visitors to the surrounding area during construction are deemed to be minor adverse to negligible. Due to the temporary nature of changes resulting from the construction phase, no further mitigation is deemed necessary.

Operation

Townscape effects

- 12.4.20 No significant effects were identified during the operation phase of the proposed development, as such no further mitigation is deemed necessary. Residual effects on townscape features and the character of the site, and the City Centre SCA are deemed to be minor beneficial. Effects on the Central Area of Change SCA are deemed to be minor neutral.

Visual effects

- 12.4.21 No significant effects were identified during the operation phase of the proposed development, as such no further mitigation is deemed necessary. Residual effects for pedestrians and visitors to the surrounding area once the proposed development is in operation are deemed to be minor adverse, minor neutral or negligible.

Cumulative effects

Interactive cumulative effects

- 12.1.22 During construction, moderate adverse interactive effects have been identified in relation to the Briton's Protection Public House and minor adverse interactive effects have been identified in relation to the Peveril of the Peak Public House.
- 12.1.23 During operation, no interactive cumulative effects were identified.

In-combination cumulative effects

- 12.1.24 During construction, significant in-combination cumulative effects have been identified for the following receptors:
- The following nearby heritage assets: The Briton's Protection Public House, 13-17 Albion Street, GMEX (Manchester Central), Chepstow House and The Peveril of the Peak Public House; and
 - Atmospheric GHG concentration;
- 12.1.25 During operation, significant in-combination cumulative effects have been identified for the following receptors:
- Atmospheric GHG concentration;

12.4 SUMMARY OF SUPPLEMENTARY MITIGATION MEASURES REQUIRED

- 12.2.1 Where adverse effects have been predicted, mitigation measures have been proposed to reduce the effects where practicable; these are summarised in Table 12-1 (for construction effects) and Table 12-2 (for operational effects) for application A and Table 12-3 (for construction effects) and Table 12-4 (for operational effects) for application B. Reference should be made to individual technical assessment chapters for further details of the mitigation measures.

Site A/Application A

Construction

Table 12-1 Summary of supplementary mitigation measures required to limit construction effects

Topic	Adverse effect	Mitigation measure	Responsibility/mechanism for implementation	Timing
Various – see topic by topic list of mitigation subsequent to this table for inclusion in CEMP	Various	CEMP	CEMP to be secured by planning condition and implemented by contractor	Prior to and during construction.
Noise and vibration	Construction noise	More detailed assessment and scheme of Best Practicable Means via CEMP	Secured via planning condition/implemented by contractor	Pre-construction phase until construction end
		Construction noise monitoring scheme	Secured via planning condition/implemented by contractor	During construction phase
	Construction vibration	More detailed assessment and scheme of Best Practicable Means via CEMP	Secured via planning condition/implemented by contractor	Pre-construction phase until construction end
		Construction noise monitoring scheme	Secured via planning condition/implemented by contractor	During construction phase
Wind microclimate	No supplementary mitigation measures required			
Daylight and sunlight.	No supplementary mitigation measures required			
Built heritage	No supplementary mitigation measures required			

Topic	Adverse effect	Mitigation measure	Responsibility/ mechanism for implementation	Timing
Greenhouse gas emissions	Construction stage GHG emissions	Put in place a commitment to reduce lifecycle embodied carbon 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	As soon as possible.
	Construction stage GHG emissions	Reduce the demand for materials with a high carbon footprint (such as concrete), especially in the production and transport stages of the lifecycle of the proposed development (e.g. using cement replacement)	Developer/ contractor	As soon as possible.
	Construction stage GHG emissions	Where practical, maximise recycled content in other key building and fit-out components (e.g., blockwork, internal plasterboard partitions, floor finishes etc.)	Developer/ contractor	As soon as possible.
	Construction stage GHG emissions	Materials used for hard landscaping and street furniture should explore opportunities for high recycled content and bio-based materials.	Developer/ contractor	As soon as possible.
	Construction stage GHG emissions	Where practical, maximise use of recycled aggregates in the civil engineering works (e.g. sub-base, pipe bedding etc.)	Developer/ contractor	As soon as possible.
	Construction stage GHG emissions	Review opportunities to reduce energy association with construction installation processes.	Developer/ contractor	As soon as possible.
	Construction stage GHG emissions	Review opportunities to reduce the number and distance of construction transport trips.	Developer/ contractor	As soon as possible.
	Construction stage GHG emissions	Explore the use of off-site construction to consolidate delivery requirements.	Developer/ contractor	As soon as possible.
Townscape and visual impact	No supplementary mitigation measures required			

Construction Environmental Management Plan

12.4.2 The CEMP should incorporate the following:

Noise and Vibration

12.4.3 Percussive piling is not considered to be appropriate for the site in noise and vibration terms and should not form part of the construction methodology as far as possible. Rotary, CFA or alternative lower noise/vibration piling methods should be adopted as a minimum.

- Best Practicable Means (as defined in Section 72 of the Control of Pollution Act 1974) will be used to reduce noise levels at all locations at all times. Where practicable, the control measures set out in BS 5228: Part 1:2009+A1 2014 Section 8 will be implemented. Generic noise and vibration measures to be adopted include:
 - All plant, equipment and noise control measures applied to plant and equipment shall be maintained in good and efficient working order and operated such that noise emissions are minimised as far as reasonably practicable;
 - Equipment will be shut down when not in use;
 - Equipment fitted with enclosures shall be operated with such enclosures in place at all times;
 - Specific measures will be implemented to ensure that any risk to the structural integrity of nearby buildings in close proximity to the works as a result of vibration are avoided;
- Choice of methodology/technique for operations (including site layout) will be considered in order to eliminate or reduce emissions at sensitive locations;
- Fixed items of construction plant will be electrically powered where practicable in preference to diesel or petrol driven;
- Noisy plant will be kept as far away as possible from sensitive areas;
- Where possible, equipment will be used in the mode of operation that minimises noise;
- A temporary builder's power supply will be applied for in advance if no existing supply is available;
- All materials will be handled in a manner that minimises noise;
- Static and semi-static plant/equipment (e.g. compressors and generators) will be fitted with suitable enclosures where practicable;
- Choice of methodology/technique for operations (including site layout) will be considered in order to eliminate or reduce emissions at sensitive locations;
- Where powered tools are required; they are to be screened as far as reasonably practicable to reduce potential impact;
- Spoil will be loaded into lorries in a such a manner as to minimise impact noise, i.e:
 - Where possible softer materials (such as soils) will be loaded into lorries first to form a cushioning barrier to rubble and other hard materials to reduce impact noise.
- The nominated contractor will liaise with the local community, when necessary, to ensure they are aware of the programme of works and to give advance notice of any noisy or disruptive works. Community engagement and notification measures include:
 - A site board, shall be erected outside the site, which shall identify the main contractor's name and address, and site manager's name and contact phone number. The board shall also state the working hours of the site;
 - Letter drops to neighbouring residents before work begins;
 - Establish contact with the relevant residents' association, meetings with residents at appropriate intervals, minutes of meeting and agreed actions circulated to residents;

- Site will keep an observations, investigations and complaints log, to be made available to MCC on request; and
- All complaints will be responded to.

12.4.4 With regards to mobile plant and site vehicles:

- Equipment will be shut down when not in use or throttled down to a minimum during waiting periods;
- Vehicles shall not wait or queue on the public highway with engines running (unless the engine is required to power the operation of the vehicle, e.g., concrete wagon);
- Deliveries will be co-ordinated to prevent vehicles queuing outside site; and
- Noise from reversing alarms will be controlled and as follows:
 - The site layout will be designed to limit and, where reasonably practicable, avoid the need for the reversing of vehicles. The nominated undertaker will seek to ensure that drivers are familiar with the worksite layout;
 - Banksmen will be utilised to avoid, as far as reasonably practicable, the use of reversing alarms;
 - Reversing alarms incorporating one of more of the features listed below or any other comparable system will be used where reasonably practicable;
 - Highly directional sounders;
 - Use of broadband signals;
 - Self-adjusting output sounders; and/or
 - Flashing warning lights.
- Reversing alarms will be set to the minimum output noise level required for health and safety compliance.

12.4.5 With the inclusion of best practicable mitigation measures, noise and vibration associated with the construction phase is likely result in minor adverse effects for the majority of the time, however there is potential for short-term moderate adverse effects when construction takes place in the immediate vicinity of sensitive receptors.

12.4.6 It is recommended that a more detailed assessment of construction noise and vibration is conditioned and carried out when more detailed information becomes available, in order to provide a more specific mitigation strategy, to be secured via a suitably worded Construction Environmental Management Plan (CEMP). While the mitigation provided is non-specific at this stage, the proposed development is considered to be feasible based on Hydrock experience with similar sites.

12.4.7 Furthermore, given the proximity of ESRs and potential for significant adverse effects, the implementation of a construction noise and vibration monitoring scheme may be appropriate, depending upon the findings of more detailed assessment works, which should be conditioned and carried out once further information becomes available. Particular consideration should be given to potential building damage of the Grade II listed Britons Protection public house, as a result of construction vibration.

Air Quality

Fugitive dust emissions associated with earthworks construction and trackout activities

12.2.8 Communication

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or site manager.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan (DMP) as part of the CEMP, which may include measures to control other emissions, approved by the local authority.

12.2.9 Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority upon request.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off site, and the action taken to resolve the situation in the logbook.

12.2.10 Monitoring

- Undertake daily on-site and off-site visual inspections to monitor dust, record inspection results, and make the log available to the local authority upon request.
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority upon request.
- Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

12.2.11 Site Preparation

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose specific operations where there is a high potential for dust production, and they are active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used.
- Cover, seed or fence stockpiles to prevent wind whipping.

12.2.12 Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.

12.2.13 Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques.

- Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights and use fine water sprays wherever appropriate.
- Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods.

12.2.14 Waste Management

- Avoid bonfires and burning of waste materials.

12.2.15 Construction

- Avoid scabbing (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out.

12.2.16 Trackout

- Use water-assisted dust sweeper on access and local roads, if required.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving site are covered to prevent escape of materials.
- Implement a wheel washing system, if required.

Operation

Table 12-2 Summary of supplementary mitigation measures required to reduce operational effects

Topic	Adverse effect	Mitigation measure	Responsibility/ mechanism for implementation	Timing
Noise and vibration	Internal noise levels	The use of suitable glazing and ventilation strategies	Secured via planning/ implemented by contractor	Design phase
	Plant noise	Plant noise limits – to be controlled via acoustic attenuators, screening, enclosures and/or louvres	Secured via planning/ implemented by contractor	Design phase
Air quality	No supplementary mitigation measures required.			
Wind microclimate	No supplementary mitigation measures required			
Daylight and sunlight	No supplementary mitigation measures required			
Built heritage	No supplementary mitigation measures required			

Topic	Adverse effect	Mitigation measure	Responsibility/ mechanism for implementation	Timing
Greenhouse gas emissions	In use stage (B1-B5) and end of life stage (C1-C4)	Put in place a commitment to reduce lifecycle embodied carbon 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	As soon as possible.
	In use stage (B1-B5)	Extend the longevity of the materials (e.g., specifying appliances with extended warranty and lifespan).	Developer/ contractor	As soon as possible.
	In use stage (B1-B5)	Minimise the use of materials that require more frequent replacement or refurbishment (such as carpets and floor coverings).	Developer/ contractor	As soon as possible.
	Operational energy (B6)	Explore the use of passive design measures in order to reduce the need for heating.	Developer/ contractor	As soon as possible.
	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	As soon as possible.
	Operational water (B7)	Specify water saving devices, such as low flush toilets and showers to reduce water consumption associated with the proposed development.	Developer/ contractor	As soon as possible.
	Operational water (B7)	Specify the use of water meters to measure water consumption.	Developer/ contractor	As soon as possible.
	Operational water (B7)	Explore the feasibility of specifying rainwater harvesting in order to reduce potable water consumption.	Developer/ contractor	As soon as possible.
Townscape and visual impact	No supplementary mitigation measures required			

Site B/Application B

Construction

Table 12-3 Summary of supplementary mitigation measures required to limit demolition and construction effects

Topic	Adverse effect	Mitigation measure	Responsibility/ mechanism for implementation	Timing
Various – see topic by topic list of mitigation subsequent to this table for inclusion in CEMP	Various	CEMP	CEMP to be secured by planning condition and implemented by contractor	Prior to and during construction.

Topic	Adverse effect	Mitigation measure	Responsibility/ mechanism for implementation	Timing
Noise and vibration	Construction noise	More detailed assessment and scheme of Best Practicable Means via CEMP	Secured via planning condition/implemented by contractor	Pre-construction phase until construction end
		Construction noise monitoring scheme	Secured via planning condition/implemented by contractor	During construction phase
	Construction vibration	More detailed assessment and scheme of Best Practicable Means via CEMP	Secured via planning condition/implemented by contractor	Pre-construction phase until construction end
		Construction noise monitoring scheme	Secured via planning condition/implemented by contractor	During construction phase
Air quality	No supplementary mitigation measures required			
Wind microclimate	No supplementary mitigation measures required			
Daylight and sunlight	No supplementary mitigation measures required			
Built heritage	No supplementary mitigation measures required			
Greenhouse gas emissions	Construction stage GHG emissions	Put in place a commitment to reduce lifecycle embodied carbon 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	As soon as possible.
	Construction stage GHG emissions	Reduce the demand for materials with a high carbon footprint (such as concrete), especially in the production and transport stages of the lifecycle of the proposed development (e.g. using cement replacement)	Developer/contractor	As soon as possible.
	Construction stage GHG emissions	Where practical, maximise recycled content in other key building and fit-out components (e.g., blockwork, internal plasterboard partitions, floor finishes etc.)	Developer/contractor	As soon as possible.

Topic	Adverse effect	Mitigation measure	Responsibility/ mechanism for implementation	Timing
	Construction stage GHG emissions	Materials used for hard landscaping and street furniture should explore opportunities for high recycled content and bio-based materials.	Developer/contractor	As soon as possible.
	Construction stage GHG emissions	Where practical, maximise use of recycled aggregates in the civil engineering works (e.g. sub-base, pipe bedding etc.)	Developer/contractor	As soon as possible.
	Construction stage GHG emissions	Review opportunities to reduce energy association with construction installation processes.	Developer/contractor	As soon as possible.
	Construction stage GHG emissions	Review opportunities to reduce the number and distance of construction transport trips.	Developer/contractor	As soon as possible.
	Construction stage GHG emissions	Explore the use of off-site construction to consolidate delivery requirements.	Developer/contractor	As soon as possible.
Townscape and visual impact	No supplementary mitigation measures			

Construction Environmental Management Plan

12.2.17 The Construction Environmental Management Plan should incorporate the following:

Noise and Vibration

- 12.4.18 Percussive piling is not considered to be appropriate for the site in noise and vibration terms and should not form part of the construction methodology as far as possible. Rotary, CFA or alternative lower noise/vibration piling methods should be adopted as a minimum.
- Best Practicable Means (as defined in Section 72 of the Control of Pollution Act 1974) will be used to reduce noise levels at all locations at all times. Where practicable, the control measures set out in BS 5228: Part 1:2009+A1 2014 Section 8 will be implemented. Generic noise and vibration measures to be adopted include:
 - All plant, equipment and noise control measures applied to plant and equipment shall be maintained in good and efficient working order and operated such that noise emissions are minimised as far as reasonably practicable:
 - Equipment will be shut down when not in use;
 - Equipment fitted with enclosures shall be operated with such enclosures in place at all times;
 - Specific measures will be implemented to ensure that any risk to the structural integrity of nearby buildings in close proximity to the works as a result of vibration are avoided;
 - Choice of methodology/technique for operations (including site layout) will be considered in order to eliminate or reduce emissions at sensitive locations;
 - Fixed items of construction plant will be electrically powered where practicable in preference to diesel or petrol driven;

- Noisy plant will be kept as far away as possible from sensitive areas;
- Where possible, equipment will be used in the mode of operation that minimises noise;
- A temporary builder's power supply will be applied for in advance if no existing supply is available;
- All materials will be handled in a manner that minimises noise;
- Static and semi-static plant/equipment (e.g. compressors and generators) will be fitted with suitable enclosures where practicable;
- Choice of methodology/technique for operations (including site layout) will be considered in order to eliminate or reduce emissions at sensitive locations;
- Where powered tools are required; they are to be screened as far as reasonably practicable to reduce potential impact;
- Spoil will be loaded into lorries in a such a manner as to minimise impact noise, i.e:
 - Where possible softer materials (such as soils) will be loaded into lorries first to form a cushioning barrier to rubble and other hard materials to reduce impact noise.
- The nominated contractor will liaise with the local community, when necessary, to ensure they are aware of the programme of works and to give advance notice of any noisy or disruptive works. Community engagement and notification measures include:
 - A site board, shall be erected outside the site, which shall identify the main contractor's name and address, and site manager's name and contact phone number. The board shall also state the working hours of the site;
 - Letter drops to neighbouring residents before work begins;
 - Establish contact with the relevant residents' association, meetings with residents at appropriate intervals, minutes of meeting and agreed actions circulated to residents;
 - Site will keep an observations, investigations and complaints log, to be made available to MCC on request; and
 - All complaints will be responded to.

12.4.19 With regards to mobile plant and site vehicles:

- Equipment will be shut down when not in use or throttled down to a minimum during waiting periods;
- Vehicles shall not wait or queue on the public highway with engines running (unless the engine is required to power the operation of the vehicle, e.g., concrete wagon);
- Deliveries will be co-ordinated to prevent vehicles queuing outside site; and
- Noise from reversing alarms will be controlled and as follows:
 - The site layout will be designed to limit and, where reasonably practicable, avoid the need for the reversing of vehicles. The nominated undertaker will seek to ensure that drivers are familiar with the worksite layout;
 - Banksman will be utilised to avoid, as far as reasonably practicable, the use of reversing alarms;

- Reversing alarms incorporating one of more of the features listed below or any other comparable system will be used where reasonably practicable;
- Highly directional sounders;
- Use of broadband signals;
- Self-adjusting output sounders; and/or
- Flashing warning lights.
- Reversing alarms will be set to the minimum output noise level required for health and safety compliance.

12.4.20 With the inclusion of best practicable mitigation measures, noise and vibration associated with the construction phase is likely result in minor adverse effects for the majority of the time, however there is potential for short-term moderate adverse effects when construction takes place in the immediate vicinity of sensitive receptors.

12.4.21 It is recommended that a more detailed assessment of construction noise and vibration is conditioned and carried out when more detailed information becomes available, in order to provide a more specific mitigation strategy, to be secured via a suitably worded Construction Environmental Management Plan (CEMP). While the mitigation provided is non-specific at this stage, the proposed development is considered to be feasible based on Hydrock experience with similar sites.

12.4.22 Furthermore, given the proximity of ESRs and potential for significant adverse effects, the implementation of a construction noise and vibration monitoring scheme may be appropriate, depending upon the findings of more detailed assessment works, which should be conditioned and carried out once further information becomes available. Particular consideration should be given to potential building damage of the Grade II listed Britons Protection public house, as a result of construction vibration.

Air Quality

Fugitive dust emissions associated with earthworks construction and trackout activities

12.2.23 Communication

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or site manager.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan (DMP) as part of the CEMP, which may include measures to control other emissions, approved by the local authority.

12.2.24 Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority upon request.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off site, and the action taken to resolve the situation in the logbook.

12.2.25 Monitoring

- Undertake daily on-site and off-site visual inspections to monitor dust, record inspection results, and make the log available to the local authority upon request.

- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority upon request.
- Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

12.2.26 Site Preparation

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose specific operations where there is a high potential for dust production, and they are active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used.
- Cover, seed or fence stockpiles to prevent wind whipping.

12.2.27 Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.

12.2.28 Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques.
- Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights and use fine water sprays wherever appropriate.
- Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods.

12.2.29 Waste Management

- Avoid bonfires and burning of waste materials.

12.2.30 Construction

- Avoid scabbing (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out.

12.2.31 Trackout

- Use water-assisted dust sweeper on access and local roads, if required.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving site are covered to prevent escape of materials.
- Implement a wheel washing system, if required.

Operation

Table 12-4 Summary of supplementary mitigation measures required to reduce operational effects

Topic	Adverse effect	Mitigation measure	Responsibility/ mechanism for implementation	Timing
Noise and vibration	Internal noise levels	The use of suitable glazing and ventilation strategies	Secured via planning/ implemented by contractor	Design phase
	Plant noise	Plant noise limits – to be controlled via acoustic attenuators, screening, enclosures and/or louvres	Secured via planning/ implemented by contractor	Design phase
Air quality	No supplementary mitigation measures required.			
Wind microclimate	No supplementary mitigation measures required			
Daylight and sunlight	No supplementary mitigation measures required			
Built heritage	No supplementary mitigation measures required			
Greenhouse gas emissions	In use stage (B1-B5) and end of life stage (C1-C4)	Put in place a commitment to reduce lifecycle embodied carbon 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	As soon as possible.
	In use stage (B1-B5)	Extend the longevity of the materials (e.g., specifying appliances with extended warranty and lifespan).	Developer/ contractor	As soon as possible.
	In use stage (B1-B5)	Minimise the use of materials that require more frequent replacement or refurbishment (such as carpets and floor coverings).	Developer/ contractor	As soon as possible.
	Operational energy (B6)	Explore the use of passive design measures in order to reduce the need for heating.	Developer/ contractor	As soon as possible.

Topic	Adverse effect	Mitigation measure	Responsibility/ mechanism for implementation	Timing
	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	As soon as possible.
	Operational water (B7)	Specify water saving devices, such as low flush toilets and showers to reduce water consumption associated with the proposed development.	Developer/ contractor	As soon as possible.
	Operational water (B7)	Specify the use of water meters to measure water consumption.	Developer/ contractor	As soon as possible.
	Operational water (B7)	Explore the feasibility of specifying rainwater harvesting in order to reduce potable water consumption.	Developer/ contractor	As soon as possible.
Townscape and visual impact	No supplementary mitigation measures required			

12.4 SUMMARY OF SIGNIFICANT RESIDUAL EFFECTS

12.2.1 Table 12-5 shows a summary of the significant residual effects associated with construction and operation of the proposed development, following the implementation of mitigation measures.

Table 12-5 Summary of significant residual effects

Topic	Receptor	Effect	Residual significance
Effects during construction			
Noise and Vibration	ESR2 (the Briton's Protection Public House)	Construction Noise	Minor to short-term moderate adverse
		Construction Vibration	Negligible to short-term moderate adverse
	ESR4 (the Jurys Inn Hotel)	Construction Noise	Negligible to short-term moderate adverse
		Construction Vibration	Negligible to short-term moderate adverse
Greenhouse Gas Emissions	The global atmosphere	GHG emissions associated with the construction phase	Moderate adverse. Effects are long-term
Townscape and Visual Impact	Townscape features and character of the site	Site clearance and general construction activities in addition to views of scaffolding, cranes and plant movement.	Moderate/minor adverse
In-combination cumulative effects during construction			
Greenhouse Gas Emissions	The global atmosphere	GHG emissions resulting from the construction of the proposed development	Major adverse. Effects are long-term

Topic	Receptor	Effect	Residual significance
Effects during operation			
Greenhouse Gas Emissions	The global atmosphere	Embodied carbon associated with the in-use stage for the proposed development (lifecycle stages B1-B5).	Moderate adverse. Effects are long-term.
		GHG emissions associated with operation energy for the proposed development (lifecycle stage B6).	With supplementary mitigation measures in place, residual effects may be reduced to minor to moderate adverse (depending on the level of energy reduction is achieved). Effects are long-term.
		GHG emissions associated with operational water (lifecycle stage B7)	Moderate adverse. Effects are long-term.
		GHG emissions associated with the end-of-life stage (lifecycle stage C1-C4).	Moderate adverse. Effects are long term.
In-combination cumulative effects during operation			
Greenhouse Gas Emissions	The global atmosphere	GHG emissions resulting from the operation of the proposed development	Major adverse. Effects are long-term

12.4 CONCLUSIONS

12.4.1 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 significant with mitigation measures in place.

Construction

12.4.2 The following significant adverse residual effects (i.e. taking into account supplementary mitigation measures) have been identified during the construction phase:

- **Noise and Vibration:** construction noise and construction vibration effects on the Briton's Protection Public House and the Jurys Inn Hotel;
- **Greenhouse gas emissions:** emissions associated with the construction phase; and
- **Townscape and visual impact:** effects relating to townscape features and the character of the site.

12.4.3 When considering in-combination cumulative effects during construction, long-term moderate adverse effects were identified in relation to greenhouse gas emissions.

Operation

12.4.4 The following significant adverse residual effects (i.e. taking into account supplementary mitigation measures) have been identified during the operation phase:

- **Greenhouse gas emissions:** Greenhouse gas emissions associated with embodied carbon, operation energy, operational water, the in-use stage and the end of life stage for the proposed development.

12.4.5 When considering in-combination cumulative effects during operation, long-term moderate adverse effects were identified in relation to greenhouse gas emissions.

12.4 GLOSSARY

Term	Definition
CEMP	Construction Environmental Management Plan
DMP	Dust Management Plan
GHG	Greenhouse Gas
ES	Environmental Statement
ESR	Existing Sensitive Receptor
SCA	Strategic Character Area