Deloitte.



Viadux Phase 2

Environmental Statement: Volume 1

November 2024

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1. Introduction

1.1. This Environmental Statement ('ES') accompanies revised proposals submitted under currently live applications for planning and listed building consent for a mixed-use development consisting of residential (Use Class C3), hotel (Use Class C1), and commercial space (Use Class E) (the 'Proposed Development'), submitted on behalf of Salboy Central Ltd (the 'Applicant') to Manchester City Council (MCC). The live Planning Application Reference is 139715/FO/2024 and the Application for Listed Building Consent Reference is 139716/LO/2024.

1.2. The revised proposals relate to the construction of a 76-storey mixed-use building comprising 452 homes with associated amenity uses and 160 bedroom hotel with associated bars and restaurant(Plot 2a) and a second 23-storey building comprising 133 homes (Plot 2b). The Listed Building Consent relates to alterations to the listed Castlefield Viaduct structure including insertion of columns and circulation cores in association with the erection of Plot 2a , removal of the deck to Great Bridgewater Street Bridge, public realm and highway alterations(the "Proposed Development").

1.3. The application is submitted to Manchester City Council ('MCC') by 'Salboy Central Limited' ('the Applicant').

1.4. For clarity, this ES, as submitted to MCC in November 2024, is an updated version to that submitted in April 2024, and supersedes and replaces the April 2024 ES. This amended Statement takes into account design changes which have taken place since the Applications were submitted and validated to amend elements of Plot 2a and to remove former Plot 2c. No changes to Plot 2b are proposed. Plot 2a, now to includes hotel rooms alongside the residential units. As part of the updated design to accommodate the mixed hotel-residential use, former Plot 2c is omitted and is replaced by an entrance for the residential and hotel use. The amendments to Plot 2a has resultant changes to the Grade II listed Castlefield Viaduct and Great Bridgewater Street Bridge. Further highway alterations are sought, namely a taxi drop off at Albion Street. The remainder of this Statement therefore presents the current design proposals as of November 2024.

1.5. Alongside the ES, all submitted stand-alone reports and plans have been updated to reflect the current proposals. The November 2024 ES, reports and plans supersede the previously submitted versions.

The Site

1.6. Extending to approximately 1.49 ha, the Site is bound by the Grade II* Listed former Manchester Central Railway Station (now Manchester Central Convention Complex (MCCC)) and Great Northern Warehouse to the north, Albion Wharf and a parking lot to the east, Beetham Tower to the west, and the Deansgate-Castlefield Metrolink station and Deansgate Locks to the south. ("the Site" – Figure 1.1).

1.7. The Site surrounds the Viadux Phase 1 development which has recently been completed. The footprint of the Phase 1 building does not form part of the application boundary and is excluded from the planning application red line boundary as detailed in Figure 1.1.

1.8. The Site is split into two Plots, Plots 2a and 2b (as Detailed in Figure 1.2) and consists of the Manchester Central Convention Complex Service Yard and the existing construction compound serving the Phase 1 development temporarily during construction. The Site contains a Grade II listed Viaduct.

1.9. The Site is also situated near the Deansgate-Castlefield Interchange Metrolink station providing convenient access to a regular tram service across the City Centre and wider Greater Manchester region. Alongside Viadux Phase 1, the Site sits within a cluster of existing, and proposed, tall buildings.

1.10. The Site is located within the Petersfield area of the City Centre, at the gateway to the Civic Quarter, which continues to see significant levels of investment in the form of various City Council projects, including the redevelopment of the Town Hall Complex, Central Library and St. Peter's Square. Complementing this there has also been significant investment in numerous private centre projects in the vicinity at St Peter's Square, Oxford Road, and the City's

Conference Quarter. Consequently, the Site benefits from proximity to extensive commercial, cultural and leisure activities and has the potential to further contribute to the creation of a vibrant city centre environment.

1.11. Further details of the Site are set out in Chapter 4 of this ES. Other relevant details are provided in each chapter where environmental designations apply.

1.12. The Proposed Development would continue construction activity in this location by extending the Viadux proposals through into subsequent phases. It comprises several interrelated elements that are collectively designed to deliver additional residential development in a key strategic site within Manchester City Centre, located in a highly sustainable location. The defined Plots associated with the Proposed Development includes:

The Proposed Development

1.13. The Proposed Development would continue construction activity in this location by extending the Viadux proposals through into subsequent phases. It comprises several interrelated elements that are collectively designed to deliver additional residential development in a key strategic site within Manchester City Centre, located in a highly sustainable location. The defined Plots associated with the Proposed Development includes:

- Plot 2a - located immediately east of the recently completed Phase 1 building, on land partially comprising the grade II listed Castlefield Viaduct. This plot will deliver a 76-storey mixed use tower comprising a hotel (Use Class C1) with associated bar and restaurant and residential units above comprising 1, 2 and 3 bed, and penthouse apartments (Use Class C3) with associated residential amenity spaces. Secure cycle spaces, serving this and the Phase 1 building, are provided at the ground floor level. At viaduct level, a redesigned service yard for the conference centre is enclosed by a new podium structure with residents' external amenity space above. A section of the Great Bridgewater Street bridge (deck) is removed to bring light into the street below.
- Plot 2b - located at the western-most section of the Site between the viaduct and Beetham Tower, consists of a 23-storey residential building accommodating 133 affordable 1-, 2- and 3-bed apartments (Use Class C3), 133 secure cycle parking spaces, 198 sq m flexible commercial units (Use Class E) opening onto the viaduct, and public realm enhancements on Great Bridgewater Street.
- Creation of new public realm, including the creation of a mix of both hard and soft landscaping, including places to sit and dwell alongside planters and trees; and
- Other associated works, including alterations to the highway, the creation of a taxi drop-off, servicing routes, service areas, back of house.

1.14. For ease of reference, and to ensure consistency throughout reports and the Environmental Impact Assessment ('EIA'), the Site has been split into the above two Plots based on the anticipated timing of when works will start on site. The Proposed Development will be delivered as on phase, however, given the build period works in relation to Plot 2a will commence first. Plot 2b will then commence and be completed within the same timeframe as Plot 2a.

1.15. The updated description of the Proposed Development on the applications for planning and listed building consent are set out below:

Full Planning Permission for the phased construction of 2 buildings to include: a tall mixed use building to include residential (Use Class C3) and hotel with associated bars and restaurant (Use Class C1) and basement (Plot 2a), and a second tall building with residential accommodation (Use Class C3) with flexible commercial units (Use Class E) (Plot 2b), landscaping and public realm, drainage, servicing and access arrangements, highways alterations, and other associated works.

Listed Building Consent for alterations to Castlefield Viaduct structure including alterations and creation of openings to facilitate structural works, localised removal of masonry, creation of basement and part removal of Great Bridgewater Street Bridge in association with the erection of two buildings

1.16. This ES sets out the findings of an Environmental Impact Assessment ('EIA') carried out in respect of the Proposed Development of the Site.

Requirements for EIA

1.17. The EIA process is the mechanism by which development proposals are appraised in terms of their likely environmental effects, in addition to engineering and technical considerations.

1.18. The purpose of the EIA is to establish the nature of the Proposed Development and the environment in which it is likely to take place, during both construction and operational phases, as to identify the likely significant effects on the environment. The assessment compares the existing situation at the start of the work (baseline) with the situation during demolition, construction and operation.

1.19. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (the 'EIA Regulations') require that any Proposed Development falling within the description of a 'Schedule 2 development' (as defined within the meaning of the EIA Regulations), will be subject to an EIA where such development is likely to have 'significant' effects on the environment by virtue of such factors as its nature, size or location (Regulations 2(b))

1.20. The Proposed Development is considered likely to fall under the category of 'urban development projects' (Schedule 2, 10, (b)) where:

- The development includes more than 1 hectare of urban development which is not dwellinghouse development; or
- The development includes more than 150 dwellings; or
- The overall area of the development exceeds 5 hectares

1.21. The Site covers an area of approximately 1.5 ha, which exceeds the threshold in relation to parts (i) listed in Schedule 2, 10, (b) of the Regulations. In addition, given that the Proposed Development results in development of a greater scale than the existing use, an EIA is therefore considered appropriate to test the likely significant effects of the Proposed Development.

1.22. A formal EIA scoping request was submitted to Manchester City Council on 20 December 2023 requesting formal confirmation of the proposed scope of the Environmental Impact Assessment required in respect of the Proposed Development. A formal scoping opinion was received on 22 of February 2024. The technical Chapters are based on a scope of assessment that has been agreed with the relevant statutory consultees through the scoping exercise. A copy of the Scoping Report and the Scoping Opinion is included in Appendix 2.1 and 2.2 of this ES.

1.23. In accordance with the EIA Regulations, this ES sets out the following information:

- A description of the Proposed Development comprising information on the Site, design, size and other relevant features of the development;
- A description of the likely significant effects of the Proposed Development on the environment;
- A description of any features of the Proposed Development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- A description of the reasonable alternatives studied by the developer, which are relevant to the Proposed Development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;
- A non-technical summary of the information, of the information specified above; and
- Any additional information specified in Schedule 4 relevant to the specific characteristics of the development or type of development and to the environmental features likely to be significantly affected.

Project Team

1.24. Deloitte has significant experience and expertise in managing the EIA process and hold the IEMA EIA Quality Mark. Details of the Project Team, EIA Technical Team and qualifications are set out in Table 1.1 and Table 1.2 below.

Table 1.1: Project Team and Technical Discipline

Consultant	Technical Disciplines
Deloitte	Planning and EIA Co-ordinator
Simpson Haugh and Partners	Architecture and design
Domis	Construction
Planit-ie	Townscape and Visual Impact
Heritage Architecture	Heritage
Hydrock	Air Quality
Jameson Acoustics	Noise and Vibration
GIA	Daylight/Sunlight/Overshadowing and Solar Glare
Renaissance	Water Resources and Structural
Architectural Aerodynamics	Wind
Ridge	Climate Change, Energy, Sustainability, BREEAM, Ventilation
Ekosgen	Socio Economic
Enfusion	Human Health
Pager Power	Broadband Connectivity, Aviation, TV Reception
Brownfield Solutions	Ground Conditions
SLR Consutling Ltd	Traffic and Transport, Waste
DFC	Fire
Penny Anderson	Ecology
CIVIC	Archaeology
Greater Manchester Police	Crime and Security

Table 1.2 EIA Technical Team

Topic	EIA Consultant	Qualifications
EIA Coordinator	Deloitte	PIEMA, MRTPI, MPlan, BA (Hons) IEMA Quality Mark Registered
Townscape and Visual Impact	Planit-ie	BA (Hons), MLA, Dip LA, CMLI
Heritage	Heritage Architecture	BA (Hons), MA (Hons), MSc, IHBC
Air Quality	Hydrock	BSc (Hons), MSc, MIAQM
Noise and Vibration	Jameson Acoustics	BSc (Hons), MIOA, MIET
Daylight/Sunlight/Overshadowing	GIA	LLB (Hons), BSc (Hons), MRICS
Solar Glare	GIA	LLB (Hons), BSc (Hons), MRICS
Wind	Architectural Aerodynamics	BEng(Hons), MSc, Eng, MIMechE, Engineering Doctorate
Climate Change	Ridge	BSc, MA, MSc, CEnv

Topic	EIA Consultant	Qualifications
Human Health	Enfusion	BSc, MSc, CEnv, FIEMA
Socio Economic	Ekosgen	BA (Hons)
Traffic and Transport	SLR Consulting Ltd	BSc(Hons), MSC in Transport Engineering & Planning, MCIHT, CMILT, BEng, CEng Chartered Highways & Transport Engineer, FCIHT
Archaeology	CIVC	BA (Hons) degree in Archaeology

EIA Scenarios

Extant Planning Permission

1.25. In preparing this ES, it should be noted that the Site is the subject to two implemented and therefore extant planning permissions:

- Planning Permission and Listed Building Consent were granted in 2017 for the redevelopment of the Former Bauer Miller Site, to deliver a 40-storey residential tower (Phase 1), and a 14-storey office block (115871/FO/2017 and 115872/LO/2017). The planning permission has been subject to several non- and minor-material amendments (126604/NMC/2020, 126868/JO/2020, 129152/NMC/2021 and 133998/JO/2022), including to increase the height of the office block by 1-storey. Planning Permission ref. 133998/JO/2022) has been implemented and Phase 1 is currently under construction. The Phase 2, 15-storey office block, whilst lawfully implemented, has not been delivered.
- Planning Permission and Listed Building Consent for an 11-storey office block was granted in October 2003 as part of the wider consent for the demolition of an existing section of viaduct at Deansgate / Great Bridgewater Street / Trafford Street, to also allow the delivery of a 47-storey hotel and residential tower block, now commonly referred to as Beetham Tower (068662/FO/2003/C3 and 068663/LO/2003/C3). Whilst the consent was implemented and the Beetham Tower was completed in 2007, the office block was never built out, and this parcel of land has remained vacant since.

1.26. It is considered highly unlikely that either of these consented office buildings will be built out as per the approvals, as each has been demonstrated to be ultimately unviable. These are therefore not included within the baseline for technical assessments.

Scenarios

1.27. It is understood the Proposed Development will be phased as defined in Chapter 5 (Construction Management) of this EIA. It is expected the larger 76 storey residential tower will commence development first, due to the timescales associated with the construction of this building. Plot 2b will commence development after Plot 2a with completion of the two buildings being within the same timeframe.

1.28. Scenarios are as follows so that environmental effects arising from the phasing of the development are robustly assessed.

- Scenario 1: (Existing Baseline) = Site as is today i.e. Phase 1 tower as built with the various amendments, Plots 2a, and 2b in their existing use.
- Scenario 2: Baseline+ Viadux Plot 2a + Viadux Plot 2b;
- Scenario 2a: Baseline + Viadux Plot 2a + Viadux Plot 2b + cumulative;

1.29. Where there is a deviation from the above scenarios this is clearly explained and justified within the relevant technical chapter, for example, both the heritage and townscape and visual impact chapters have considered an existing and future baseline for completeness. Furthermore, the wind chapter has also considered an existing and future baseline, as well as scenarios with additional mitigation against each of the baseline scenarios.

1.30. Where there is a deviation from the above scenarios this is clearly explained and justified within the relevant technical chapter, for example, both the heritage and townscape and visual impact chapters have considered an existing and future baseline for completeness. Furthermore, the wind chapter has also considered an existing and future baseline, as well as scenarios with additional mitigation against each of the baseline scenarios.

Organisation of the Environmental Statement

1.31. This ES comprises 18 Chapters and is supported by figures (located at the back for each Chapter within Volume 1) and technical appendices (within a separate Volume 2). A non-technical summary (NTS) of the full ES is provided as a separate standalone document.

1.32. Figures have been referenced using the Chapter number as a prefix followed by the number of the figure within a given Chapter. Appendices have been referenced in the same way but due to their size they are contained separately in Volume 2. Table 1.3 sets out the structure of the ES.

Table 1.3: Structure of this Environmental Statement

Chapter No.	Chapter Title	Description
VOLUME 1		
1.	Introduction	Introduction to the ES, EIA requirements, details of the project team, ES organisation and availability.
2.	EIA Methodology	Methods used to prepare each Chapter, description of ES structure and content, generic significance criteria, scoping and consultation.
3.	Alternatives and Design Evolution	Outline of the main alternatives considered by the Applicant.
4.	Site and Description of Development	Site description and details of the Proposed Development.
5.	Construction Management – Programme and Methodology	Details of anticipated programme for development and construction methodology.
6.	Townscape and Visual Impact	To assess the likely significant effects of the Proposed Development in relation to townscape and visual impact.
7.	Built Heritage	To assess the likely significant effects of the Proposed Development in relation to on and off-site heritage assets, both in terms of physical and visual impact.
8.	Air Quality	To assess the potential air quality impacts associated with the Proposed Development due to changes in traffic flows, construction etc. It also includes a cumulative assessment of impacts.
9.	Noise and Vibration	To assess the likely significant effects of the Proposed Development in relation to noise and vibration.

Chapter No.	Chapter Title	Description
10.	Daylight, Sunlight and Overshadowing	To assess the impacts of the Proposed Development in relation to daylight and sunlight for nearby residential properties and overshadowing in relation to relevant public spaces.
11.	Solar Glare	To assess the impacts on identified receptors (e.g. rail, road and light rail users) in relation to reflections of sunlight off the building in key locations.
12.	Wind	To assess the likely significant effects of the Proposed Development in relation to environmental wind, in accordance with Policy EN2 of the Core Strategy and the 'Guide to Development in Manchester'.
13.	Climate Change	To assess the nature and magnitude of Greenhouse Gas Emissions, which are likely to arise from the Proposed Development during construction and operation, and the impact of this contribution towards climate change, in addition to mitigation measures required to minimise this contribution.
14.	Human Health	To assess the likely significant effects of the Proposed Development on human health.
15.	Socio Economic	To assess the likely socio-economic impacts of the Proposed Development upon the Site and surrounding area.
16.	Traffic and Transport	To consider the level of traffic to be generated and its potential impact on existing highways, accessibility to public transport and access / servicing requirements.
17.	Archaeology	To consider the likely impacts of the Proposed Development on below ground heritage.
18.	Summary of Cumulative Effects	Summary of residual effects of the Proposed Development (including cumulative impacts alongside other committed developments).
19.	Type 1 Cumulative Effects	An assessment of the combined effects arising from the Proposed Development upon a set of defined sensitive receptors.
VOLUME 2	Technical Appendices	Technical data and reports to support the Chapters in Volume 1.
Non-Technical Summary		A short concise document written in a non-technical language, necessary to meet the requirements of the EIA Regulations, to make the ES accessible to a non-technical audience.

Other Documents

1.33. Together with this ES and its appendices, the following documents will be submitted to MCC in support of the planning application:

Table 1.4: Planning Application Supporting Documents

Document	Prepared by
Accommodation Schedule	SimpsonHaugh & Partners
Application Site Boundary and Location Plan	SimpsonHaugh & Partners
Aviation Impact Assessment	Pager Power
Broadband Connectivity Assessment	Pager Power
Covering Letter	Deloitte LLP
Crime Impact Statement	Greater Manchester Police
Design and Access Statement	SimpsonHaugh & Partners
Ecology Phase 1 Desk Survey	Penny Anderson Associates
Biodiversity Net Gain Assessment	Penny Anderson Associates
Energy Strategy and BREEAM Pre-Assessment	Ridge
Environmental Standards Statement (incl. Sustainability Statement)	Ridge
Existing and Proposed site plans, sections and elevations (including drawing schedule)	SimpsonHaugh & Partners
Fire Strategy	Design Fire Consultants
Flood Risk Assessment and Drainage Strategy	Renaissance
Listed Building Structural Reports	Renaissance
Landscaping Strategy and associated landscaping drawings	Planit-IE
Local Benefits Proposal – Statement of Intent	Salboy
Management Strategy: Residential and Operational	Salboy
Phase 1 and 2 Ground Conditions Report	Brownfield Solutions
Planning Application Form and Ownership Certificates	Deloitte LLP
Planning and Tall Statement (including Blue and Green Infrastructure Statement)	Deloitte LLP
Heads of Terms	Deloitte LLP
Site Waste Management and Servicing Strategy	SLR
Statement of Community Consultation	Deloitte LLP
TV Reception Survey	Pager Power
Ventilation Strategy	Ridge

1.34. The ES is available for public viewing on Manchester City Council's Public Access website at the following address: http://pa.manchester.gov.uk/online-applications/ once the application has been submitted and validated.

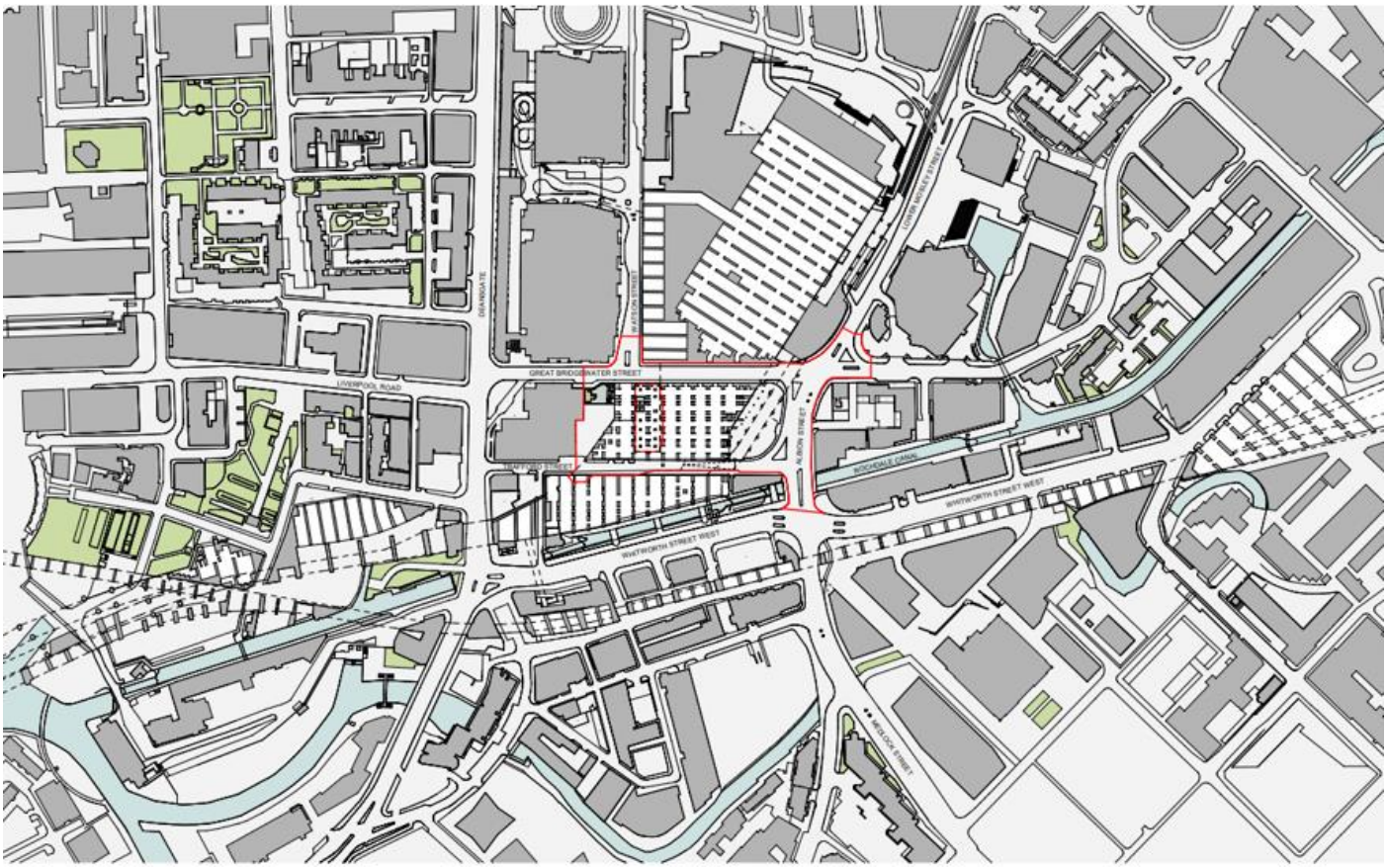
1.35. The ES may be purchased in volumes, the costs for which are set out below:

- Volume 1: ES Main Text and Figures - £150;
- Volume 2: ES Appendices - £150;
- Volume 3: Non-Technical Summary (NTS) - £15;
- Full Copy (Volumes 1 and 2, and NTS) of the ES on CD - £15.

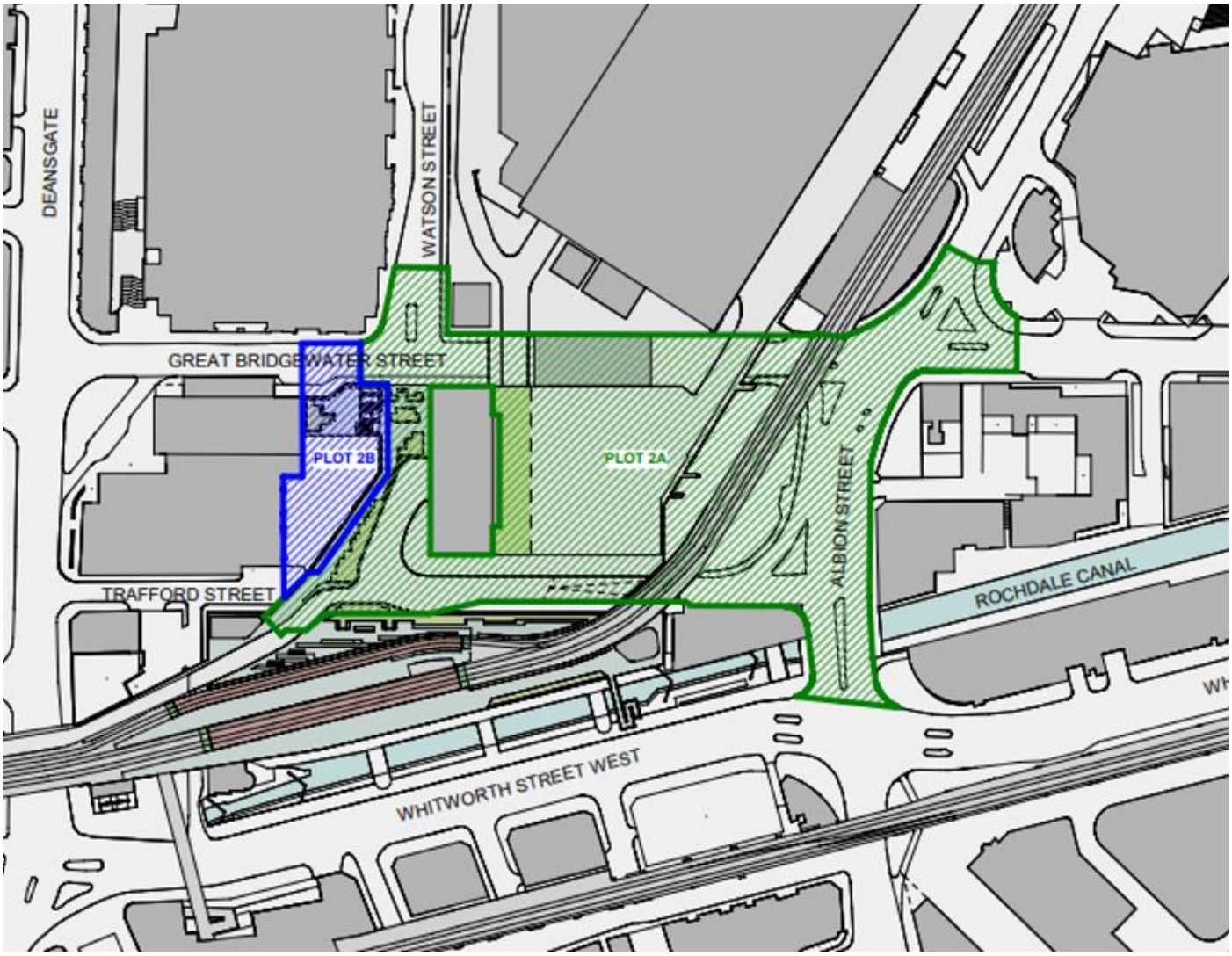
1.36. For copies of any the above, please contact the Manchester Planning Team at Deloitte:

Viadux Phase 2 – Planning and EIA Team
Deloitte LLP
100 Embankment
Cathedral Approach
Manchester
M3 7FB

Figure 1.1 Site Location Plan



Fi gure 1.2 Plot Plan



2. EIA Methodology

Introduction

2.1. This Chapter sets out the methodology used to prepare each Chapter of the ES and describes its structure and content. In particular, it sets out the process of identifying and assessing the likely significant effects of the Proposed Development on the environment as defined in Chapter 1 and described in detail in Chapter 4.

Legislation and Guidance

2.2. The ES has been prepared to comply with EIA Regulations, which implement European Council Directive No. 85/337/EEC as amended by Directive 2014/52/EU and entered into force on 17 May 2017. The EU legislation as it applied to the UK on 31 December 2020 is now a part of UK domestic legislation, under the control of the UK's Parliaments and Assemblies. The European Union (Withdrawal) Act 2018 introduced "retained EU law" which provides that EU-derived domestic legislation continues to have effect.

2.3. Reference has also been made to currently available good practice guidance in EIA including:

- Circular 02/99: Environmental Impact Assessment
- The European Commission's numerous EIA guidance documents available here: http://ec.europa.eu/environment/eia/eia-support.html
- Guidance on EIA Scoping, European Commission, June 2001
- Guidance on Transport Assessment, DCLG and DfT, March 2007
- National Planning Practice Guidance – Department for Communities and Local Government (March 2014 and continuously updated as a 'live' resource)
- Reference has been made to the Institute of Environmental Management and Assessment (IEMA) publications, including:
- IEMA ES Review Criteria
- IEMA Guidelines for Environmental Impact Assessment (2004)
- IEMA Special Report into the State of Environmental Impact Assessment Practice in the UK (2011)
- IEMA Shaping Quality Development (2015)
- IEMA Delivering Quality Development (2016)
- IEMA Delivering a Proportionate EIA (2017)

2.4. The ES has also had regard to the National Planning Policy Framework 2023 (NPPF). The NPPF sets out the Government's economic, environmental and social planning policies for England, articulating the Government's aspiration for sustainable development. The NPPF has been considered where it is relevant to EIA.

2.5. As relevant to the ES technical chapter's scope, methodology and assessment of effects, key local planning policy and guidance documents have been considered. These include:

- Places for Everyone (PfE) (2024)
- Manchester City Council Core Strategy (2012)
- Saved Unitary Development Plan Policies (1995)

2.6. Any additional planning policy or guidance documents considered relevant have been identified within the relevant technical chapters.

Screening and Scoping

2.7. A formal EIA Screening and Scoping request was submitted to Manchester City Council on 20 December 2023 (Appendix 2.1) requesting a formal opinion and confirmation as to the proposed scope of the Environmental Impact Assessment required in respect of the Proposed Development. A formal scoping opinion was received 22 of February 2024 (Appendix 2.2), which confirmed agreement to the scope and contents of the EIA. The results of the scoping exercise have determined the subject areas of the EIA and any comments received as part of this Scoping response from the LPA have been factored into this ES.

2.8. Please note the December 2023 Scoping Report and resultant February 2024 Scoping Opinion was based on an earlier iteration of the Proposed Development. All consultants have reviewed their input and confirmed the current Proposed Development does not impact on the disciplines to be scoped in/out nor the methodology taken. The element which has been updated relates to the Committed Developments in which a revised list as of October 2024 has been updated, using advice from MCC in order to inform the list.

2.9. Based on the contents of Appendix 2.1 and 2.2, the following Chapters have been scoped into the EIA:

- Townscape and Visual Impact
- Heritage
- Air Quality
- Noise and Vibration
- Daylight, Sunlight and Overshadowing
- Solar Glare
- Wind
- Climate Change
- Human Health
- Socio Economic
- Traffic and Transport

2.10. As per paragraph 2.13 below, following the receipt of the Scoping Opinion, Archaeology has been scoped into the ES given the potential for remains of archaeological subjects of potential regional significance.

Consultation

2.11. The Proposed Development has been prepared in consultation with Manchester City Council and a range of technical statutory stakeholders (refer to Table 2.1), which were also consulted upon as part of the EIA Scoping exercise.

Table 2.1: Scope of Stakeholder Consultation

Planning Application Stakeholder Consultation
Manchester City Council Planning Authority
Manchester City Council Highways
Transport for Greater Manchester
Greater Manchester Archaeological Advisory Service
Manchester City Council Environmental Health Officers

Planning Application Stakeholder Consultation
Environment Agency
Greater Manchester Ecology Unit (GMEU)
Historic England
National Air Traffic Control
Manchester Airport

2.12. In addition to the stakeholder consultation noted above, the Proposed Development has benefited from public consultation. Further details are provided in the Statement of Consultation that accompanies the application. Considerations of any legitimate alternative proposals are set out in Chapter 4 of this ES.

Non-Significant Effects

2.13. It has been confirmed via the Scoping opinion that the following disciplines will not give rise to likely significant effects on the environment and therefore do not require inclusion in the Environmental Statement. An explanation for scoping out each discipline set out below is provided in the EIA Scoping Report in Appendix 2.1:

- Agricultural Circumstances;
- Aviation;
- Archaeology;
- Ground conditions;
- Water resources;
- Electronic Interference; and
- Ecology.

2.14. Since the Scoping Opinion has been received, further technical work has been undertaken by the consultants during the preparation of the ES. This confirms that there that the effects of the Proposed Development would not be significant in EIA terms in relation to Aviation, Ground Conditions, Water Resources and Ecology.

2.15. In relation to Archaeology there is potential for prehistoric pits, Roman remains, 19th century workers' houses and part of an early 19th century mill. The potential for such remains is high and remains that exist could be of medium (regional) significance and, without mitigation, the scheme could damage or destroy these remains. There is therefore potential for there to be 'likely significant effects' in EIA terms prior to mitigation. For this reason, and for completeness, Archaeology is now scoped into the ES.

Approach to Technical Studies

2.16. Various technical studies were commenced at an early stage in the process. The findings of the baseline environmental studies played an important role in the design of the Proposed Development by defining the environmental sensitivities, constraints and opportunities associated with the Site.

2.17. Project team reviews, attended by members of the project team, were held throughout the pre-application process. These reviews provided a valuable forum for the exchange of information and ensured that the project team was fully aware of the environmental constraints and opportunities and of the interactions between disciplines. Pre-application engagement was also undertaken with Manchester City Council as the Local Planning and Highway Authority.

2.18. The technical studies have been undertaken in accordance with current best practice. Specific guidance used is referenced within each of the respective assessment Chapters.

2.19. The majority of assessments involved consultations with statutory and non-statutory bodies, desk-based research, Site inspections and surveys, impact prediction and mitigation.

2.20. The assessment and conclusions of the ES are based on the description of the Proposed Development provided in Chapter 4.

Structure of Technical Chapters

2.21. Each technical Chapter of the ES has been set out broadly in line with Table 2.2. Where chapters differ from the structure set out below, the reasons for that have been clearly articulated within the chapter introduction.

Table 2.2: Structure of the ES Technical Chapters

Technical Chapter Subheading	Summary of information
Introduction	Each of the technical Chapters begins with an introduction providing context to the EIA completed.
Policy Context	This section includes a summary of legislation and of national and local policies relevant to the environmental discipline and explains its purpose in the context of the Proposed Development and the ES.
Assessment Methodology and Significance Criteria	This section describes the method or approach employed in the assessment of impacts, the criteria against which the significance of effects has been evaluated, the sources of information used and any technical difficulties encountered. Relevant legislation is also identified.
Baseline Conditions	This section describes and evaluates the baseline environmental conditions i.e. the current situation and anticipated changes over time assuming the Site remains unchanged. This is a critical part of the EIA process as it provides a measure against which potential environmental effects can be assessed.
Identification and Evaluation of Key Impacts	This section identifies the likely significant effects on the environment resulting from the Proposed Development. A description of the likely effects of the Proposed Development and an assessment of their predicted significance is provided. The assessment of effect significance has been undertaken using appropriate national and international quality standards. Where no such standards exist, the judgments that underpin the attribution of significance are described. The guidelines, methods and techniques used in the process of determining significance of effects are contained within each of the technical Chapters presented.
Mitigation Measures	One of the main aims of the EIA process is to develop suitable mitigation measures to avoid, reduce or compensate for any significant adverse effects of a project. This section of each technical Chapter describes the measures which would be implemented to mitigate potential adverse effects. Where possible, enhancement measures have also been proposed.
Cumulative Effects	This section considers the cumulative effects of the Proposed Development identified within the vicinity of the Site. Any likely significant effects on the environment arising in this respect are set out in this section. There are two distinct types of cumulative effects:

Technical Chapter Subheading	Summary of information
	• Type 1 - Cumulative effects are the interactions between effects of the Proposed Development on a single receptor. • Type 2 - Cumulative effects are those that arise from incremental changes caused by other consented or reasonably foreseeable activities ('committed developments') together with the Proposed Development.
Residual Effects	The residual effects, i.e. the remaining effects of the Proposed Development assuming implementation of the proposed mitigation measures, have been estimated and presented. The methods used to make these estimates are described and proposed methods of treatment for any residual effects have been identified and quantified where possible.
Summary	Each technical Chapter concludes with a brief summary outlining the potential residual effects of the Proposed Development.

2.22. Chapter 5 provides information to allow the construction phase of the Proposed Development to be assessed by the disciplines set out in Chapter 1.

Magnitude

2.23. The methodology for determining the scale, or magnitude, of effect is set out in Table

Table 2.3 Methodology for Assessing Magnitude

Magnitude of Impact	Criteria for Assessing Effect
Major	Total loss or major/substantial alteration to key elements/features of the baseline conditions such that the post development character/composition/attributes will be fundamentally changed.
Moderate	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of the baseline will be materially changed.
Minor	A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible/detectable but not material. The underlying character / composition / attributes of the baseline condition will be similar to the pre-development circumstances/situation.
Negligible	Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.

Sensitivity

2.24. The sensitivity of a receptor is based upon the relative importance of the receptor using the scale in Table 2.4.

Table 2.4: Methodology for Assessing Sensitivity

Sensitivity	Examples of Receptor
High	The receptor/resource has little ability to absorb change without fundamentally altering its present character, or is of international or national importance.
Medium	The receptor/resource has moderate capacity to absorb change without significantly altering its present character, or is of high importance.
Low	The receptor/resource is tolerant of change without detriment to its character, is of low or local importance.

Significance

2.25. The significance of an environmental effect is determined by the interaction of magnitude and sensitivity, whereby the impacts can be positive or negative. Table 2.5 below shows how magnitude and sensitivity interact to derive effect significance.

Table 2.5: Methodology for Assessing Significance

Magnitude	Sensitivity		
	High	Medium	Low
Major	**Major Adverse/Beneficial**	**Major - Moderate Adverse/Beneficial**	**Moderate** or Minor **Adverse/Beneficial**
Moderate	**Major - Moderate Adverse/Beneficial**	**Moderate Adverse/Beneficial**	Minor Adverse/Beneficial
Minor	**Moderate** or Minor **Adverse/Beneficial**	Minor Adverse/Beneficial	Minor Adverse/Beneficial - Negligible
Negligible	Negligible	Negligible	Negligible

2.26. The above magnitude and significance criteria have been provided as a guide for technical specialists to assess impact significance. Where discipline specific methodology has been applied that differs from the generic criteria above, this has been clearly explained within the given Chapter under the heading of 'Assessment Methodology and Significance Criteria'.

2.27. For the purposes of this Environmental Statement, an effect will be potentially 'significant' if it is classed as either 'moderate' or 'major' (bold text in Table 2.5).

Baseline Conditions

2.28. Each technical Chapter includes a section which describes and evaluates the baseline environmental conditions (i.e. the current situation and anticipated changes over time assuming the Site remains unchanged). Baseline data has been obtained from a variety of sources, including published documents, maps, historical information and Site survey data. Given the complex nature of the Site and surroundings, each technical Chapter (Chapters 6 to 15) includes a clear description of what is assumed as the baseline against which the assessment is being made.

2.29. The method used to obtain baseline information, where relevant and possible, has been clearly identified within each technical Chapter and agreed in advance with statutory consultees.

Mitigation

2.30. Any adverse environmental effects have been considered for mitigation at the design stage and, where practicable, specific measures have been put forward. Measures have been considered based on the following hierarchy of mitigation:

- Avoidance;
- Reduction;
- Compensation;
- Remediation;
- Enhancement.

2.31. Where the effectiveness of the mitigation proposed has been considered uncertain, or where it depends upon assumptions of operating procedures, data and/or professional judgement has been introduced to support these assumptions.

2.32. Mitigation recommended during the construction phase would be set out in the Construction Management Plan (CMP) to be agreed with MCC prior to the commencement of work and implemented throughout the duration of the works. Outline mitigation measures to be included in a future CMP are set out in Chapter 5: Construction Methodology and Programme and are cross referred to in the relevant chapters. It is anticipated that a condition be attached to any subsequent consent that requires submission and approval of a CMP.

2.33. Mitigation to be implemented during the operational phase would be secured through planning conditions and obligations, which are explicitly referenced in each chapter.

Residual Effects

2.34. The likely significant effects on the environment, assuming the successful implementation of mitigation measures proposed, have been estimated within each Chapter. These are termed 'residual effects' and are considered in Chapter 16 of this Statement.

Cumulative Effects

2.35. A search of Manchester City Council's planning applications database and knowledge of the area has identified schemes for which cumulative effects are considered more likely, this includes other reasonably foreseeable schemes, i.e those contained within the Development Plan or other material considerations. A full list, as of December 2023 is contained within the Scoping Report at Appendix 2.1, to which agreement has been provided from the Local Planning Authority as part of the Scoping Opinion process. This has been updated as of October 2024 and agreement has been sought with the Local Planning Authority.

2.36. The ES considers the potential for likely significant effects on the environment resulting from consented or reasonably foreseeable activities or developments in the area, which could lead to potentially significant cumulative effects in conjunction with the Proposed Development ('Committed Developments'). Each technical Chapter (Chapters 6-15) has assessed the potential for likely significant effects on the environment, as a result of the above committed developments, together with the Proposed Development, which are known as Type 2 cumulative effects.

2.37. In addition, Chapter 17 assesses the Type 1 Cumulative effects. Type 1 cumulative effects are also known as 'inter-project' effects, which are the combined effects arising from the development upon a set of defined sensitive receptors.

Assumptions and Limitations

2.38. The principal assumptions that have been made and any limitations that have been identified in preparing the ES are set out in each technical Chapter. General assumptions include the following:

- All of the principal land uses adjoining the Site remain. Where redevelopment proposals have been granted Planning Permission, the effect of those proposals are considered as part of the Cumulative Impacts;
- Information received from third parties is complete and up to date;
- The various stages of the Proposed Development will satisfy minimum environmental standards, consistent with contemporary legislation, practice and knowledge;
- Assessments are based upon, and conclude, the 'worst case' effects that would arise from the application as defined by the description of development set out in Chapter 4, Site Surroundings and Description of the Proposals;
- Construction and demolition methods and phasing will follow the timetable and methods set out in Chapter 5, Construction Management;
- Conditions will be attached to the Planning Permission that will control disturbance during the Proposed Development; and,
- Necessary off-site services infrastructures for the Proposed Development will be provided by statutory undertakers.

Objectivity

2.39. The technical studies undertaken with the ES have been progressed in a transparent, impartial, and unbiased way with equal weight attached, as appropriate, to beneficial and adverse effects. Where possible, this has been based upon quantitative and accepted criteria together with the use of value judgements and expert interpretations.

2.40. The assessment has been explicit in recognising areas of limitation within the ES and any difficulties that have been encountered, including assumptions upon which the assessments are based. Where appropriate, the assessment of significance has been given confidence levels.

3. Alternatives and Design Evolution

Introduction

3.1. Regulation 18(3) and Paragraph 2 of Schedule 4 of the EIA Regulations requires the Applicant to provide an outline of the main alternatives studied and an indication of the main reasons for the choice made, considering the environmental effects.

3.2. Additionally, Schedule 4, Paragraph 2 of the EIA Regulations1 states that an ES should 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".

3.3. In considering the evolution of the Proposed Development, all aspects have been evaluated in response to several longstanding strategic objectives and established principles, embedded in local planning policy and guidance, as well as within the suite of planning applications and major development proposals that have come forward within the Site overall to date.

3.4. This Chapter considers the following four options in the context of these requirements and the existing Development Brief:

- The 'do nothing' alternative where the Proposed Development is not progressed.
- Alternative Locations for the Proposed Developments.
- Alternative Technologies.
- Alternative Designs (including size and scale) for the Proposed Development.

3.5. Chapter 5 of the Planning and Tall Building Statement sets out the extensive design evolution that has taken place at the Site over a number of years. The current proposals are the product of an iterative design process over the past twelve months. The design team has engaged closely with Manchester City Council, Historic England and other key stakeholders throughout this period to ensure that the optimum development proposal was produced on Site.

The "do nothing" Alternative

3.6. The "do nothing" scenario refers to the option of leaving the Site in its current use. The Site is brownfield land in Manchester City Centre, Plot 2a acts as part of a servicing area for Manchester Central Convention Centre (MCCC), Plot 2b is currently used as back-of-house for Beetham Tower. The Site contains a Grade II listed Castlefield Viaduct.

3.7. The Great Northern, Manchester Central and Castlefield Quay Strategic Regeneration Framework (SRF) (2017) was prepared to guide the future reconfiguration, re-development and re-positioning of the Great Northern, Manchester Central and Castlefield Quay Sites in Manchester City Centre. The Framework recognises that these Sites, alongside their immediate surroundings, present a significant strategic opportunity to transform a currently underutilised and underperforming area of the City Centre.

3.8. The Proposed Development sits within the Manchester Central portion of SRF, the Site represents one of the last remaining key projects to come forward in this area.

3.9. The SRF notes that this part of the Framework area represents a high profile, key arrival point into the southern part of Manchester City Centre further enhancing its importance to the city from a regeneration perspective.

3.10. The strategy for this area sets out some key objectives such as those that are outlined below:

- Creating an attractive, welcoming, safe and legible connections that successfully navigate the Site's significant level changes and provide a fantastic arrival experience into this part of the City Centre.
- Improving east-west connections along Great Bridgewater Street by addressing the quality of the environment under the existing bridge.
- Developing an animated area with high quality public spaces and high quality City Centre uses that create strong functional connections to the surrounding area.
- In contrast to the 2010 adopted SRF structural feasibility works suggested this historic feature can be retained and re-used to create a structure that can support the proposed massing of development on top.
- An opportunity lies in this area to facilitate taller buildings which complement the adjacent Beetham Tower and emerging proposals such as the Axis Tower. It is felt this will enable delivery of the quantum and quality of uses on-site that will allow its immense economic potential to be delivered.
- Responding to the setting of heritage assets in the vicinity of this site, most notably the Grade II* Manchester Central.

3.11. The SRF does not seek to prescribe the development that comes forward rather it provides a range of development principles that seeks to create a vibrant and sustainable city centre neighbourhood including a critical mass and mix of high-quality city centre uses (bullets at Para 5.3). Other key themes of the SRF at Para 5.3 include the creation of tall buildings to complement Beetham Tower and other developments in the surrounding area, improving linkages and permeability through the site, enhancement of the setting of the listed buildings and creation of improved areas of public realm.

3.12. Para 5.81 notes firstly, the area is well established as both an existing and an emerging residential location, forming part of a connected sequence of high-quality neighbourhoods that are distinctive and vibrant. The SRF goes on to note hotel use as suitable adjacent to MCCC with office use being in heigh demand (at the time of writing the SRF) therefore office accommodation with a suitably sized floorplate could provide a key connector between other office locations at the Central Business District, St Peter's Square, Barbirolli Square and First Street. It goes on to advise that the Albion Street frontage, in-front of the Metrolink line that runs around the viaduct structure would be an appropriate location for office use.

3.13. The residential, hotel and commercial development forms part of a mixed-use development with and other commercial development. The residential use proposed will contribute significantly to the continuing demand for Manchester to provide quality accommodation to support its economic growth and regeneration. The residential use complements the significant office floorspace that has come forward and mixed-use developments at and around St Peter's Square, Albert Square and the forthcoming redevelopment at Great Northern Warehouse. The provision of a hotel further aligns with the vision set out within the SRF; and supports the tourism and conferencing economy within Manchester City Centre and the associated wider benefits this brings.

3.14. The redevelopment of the Site for use as a high density residential and hotel developments in accordance with the Development Plan policies and other material considerations when read as a whole. A well-managed, high-density development in a city location such as this is critical to creating a vibrant and sustainable city centre, whilst addressing other key Policies such as design and heritage alongside local amenity issues such as air quality, noise, visual quality, environmental improvements, and safety.

3.15. The "do nothing" scenario has therefore been discounted due to the long-established aspirations for this key strategic site. The "do nothing" alternative option would not deliver on the long-standing development plan objectives that are further supported by other material considerations, nor will it secure the overall strategic objectives of the City Council. Maximising the highly sustainable location to support population growth and regeneration objectives, particularly where they are supported by significant levels of sustainable transport infrastructure is an inherently sustainable proposition.

3.16. By increasing the residential population, the Proposed Development will boost economic and social activity within Manchester City Centre and support the wider retention and attraction of talent to the city. The hotel and

commercial use will further support the tourism industry, Manchester's reputation as a conference destination, complement surrounding uses and add to the local economy. Fundamentally, the Proposed Development delivers on long standing development plan objectives that are further supported by other material considerations. In the "do nothing" scenario, there would be a clear missed opportunity to build on the city's existing strengths to deliver the social and economic benefits available.

Alternative Locations

3.17. The Proposed Development directly assesses the under-utilisation and strategic location of the Site. The Site is in a highly accessible City Centre location and is identified for redevelopment within the SRF (2017). These characteristics make the Site a highly suitable location for the Proposed Development.

3.18. As noted above the SRF identifies the Site as suitable for high density development. This will enable delivery of the quantum and quality of uses on-site that will allow its immense economic potential to be delivered. The impact of the proposals should be significant in continuing the expansion of city centre quality activities southwards. As per the approach on Viadux Phase 1, the SRF notes that proposals for buildings of the scale envisaged will be the subject of further detailed analysis and testing against adopted planning policy including guidance relevant to the consideration of proposals for tall buildings, which has formed part of this ES.

3.19. As such, there is a clear opportunity for Phase 2 of Viadux to contribute directly to new, high quality residential and hotel development which is integral to the SRF, given its proximity to the sustainable transport options.

3.20. The Site is clearly in need of regeneration and provides the opportunity to directly contribute towards the identified need for housing in this part of the City Centre and, alongside other development plots under construction or committed within the SRF area, will support the creation of a new neighbourhood. The Proposed Development will deliver extensive and high quality area of public realm and will improve pedestrian connections. The regeneration of the SRF area will bring vitality to the local area, diversify the local demographic and strengthen the local community by enhancing connections with existing nearby neighbourhoods.

3.21. Therefore, this Chapter does not consider alternative sites within the context of the planning application as there is an identified need to redevelop this specific site as a key contributor to the realisation of the regeneration area and support further growth in this part of the City Centre.

3.22. Therefore, the "alternative location" scenario has been discounted.

Alternative Technologies

3.23. Energy strategy technologies have been considered and will continue to be considered throughout the cycle of the Proposed Development. The energy strategy and targets are referenced within the supporting Energy Statement and follow the energy hierarchy (be lean, be clean, be green), in the context of meeting policy and regulatory requirements. The design team has reviewed a range of technologies, as detailed in the Energy Statement, that seek to ensure the Proposed Development meets, and exceeds where relevant, the policy and regulatory requirements. The technologies included with the Proposed Development are therefore considered to represent the most appropriate for the proposals.

Alternative Uses

3.24. Alternative uses have been tested on Site, as demonstrated by the Site's planning history. Applications 115871/FO/2017 (Viadux Phase 1) and 068662/FO/2003/C3 (Beetham Tower) both included separate office buildings.

3.25. The Applicant purchased the Site containing Viadux Phase 1 and the Office site (Plot 2a) in 2021 and has successfully delivered Viadux Phase 1. A significant amount of time and money has gone into developing the original Phase 2 office building. Following the original 2017 approval (Ref. (115871/FO/2017), detailed design led to amendments application being approved (Ref. 133998/JO/2022) in August 2022 which included the following changes:

- Internal reconfiguration of the commercial floorspace
- Creation of a triple height entrance foyer
- Encapsulation of the tram track

- Creation of amenity spaces and external terraces
- Addition of extra staircase
- Addition of extra staircase

3.26. However, it was not possible to reach agreement over the aspect of the scheme which included running the tramline through the approved office building's reception. Ultimately, this made the Phase 2 office building undeliverable. Furthermore, the reduced footprint which was now available when avoiding the tramline rendered a commercial office development unviable on the site.

3.27. This has created an opportunity for the design team to re-consider the form of development for this strategic site. Given the existing and emerging residential community in the area and identified need for a hotel at this location; it is considered that a residential and hotel and commercial use be most appropriate at the Site. We highlight here that in April 2024 an application for residual use only at Plot 2a was submitted. At that time, it was considered residential was the most appropriate use for the site and in line with the SRF in terms of the residential element. However, it was noted the desire for a hotel, as stated within the SRF, was not being delivered. The SRF specifically notes the Manchester Central site is uniquely placed to deliver a hotel use as part of a mix of uses in support of the adjacent conference centre. Over the summer months the Applicant was approached by a hotel operator to run alongside the residential element of the building. This part-residential and part-hotel use is considered to be the optimal approach for this Site and is fully aligned to the SRF and the Policy CC7 which promotes mixed use development on city centre sites.

3.28. Furthermore, whilst under separate ownership, Plot 2b has remained vacant despite having an extant Planning Permission for an office building since October 2003. The site is physically constrained due to its shape and location adjacent to Beetham Tower and the listed Viaduct. It is also has restrictions on the height of any development which must sit below the restaurant at level 23 of Beetham Tower.

3.29. In considering alternative proposals for Plot 2a, it quickly became clear that there was a unique opportunity to bring Plot 2b into the overall master planning exercise. Arguably, given the regulatory and physical constraints of that site, this is likely to be the only opportunity to bring the site into active use.

3.30. The design team undertook a number of options appraisals Plot 2b that included office development, however, it was considered that due to the complexities of dealing with the various constraints associated and given the immediate residential context, the office was deemed unviable.

3.31. The residential development forms part of a mixed-use development with and other commercial uses. The residential use will contribute significantly to the continuing demand for Manchester to provide quality accommodation to support its economic growth and regeneration. It complements the immediate residential uses (at Beetham, Viadux Phase 1 and Axis). In the Petersfield context, the residential use complements the significant office floorspace and other mixed-use developments that have been delivered at and around St Peter's Square, Albert Square, and the forthcoming redevelopment at Great Northern Warehouse.

3.32. The SRF also identifies a unique opportunity for a hotel in this location , which the Proposed Development directly responds to .

3.33. The Proposed Development is therefore a high-density residential hotel and commercial scheme for those seeking to live within, or visit, the City Centre and the social and economic benefits that provides. There is a clearly identified need for City Centre housing to meeting residential and tourism demands as identified within MCC's Core Strategy (2012), MCC's Housing Strategy (December 2023) and Greater Manchester Combined Authorities', 'Places for Everyone' (adopted March 2024), which emphasises the City Centre as providing a significant number of new homes for the region.

3.34. For the reasons above, alternative uses were discounted as the Proposed Development is considered the most appropriate in the context of this location and responds to both identified regeneration priorities as well as housing need in this part of the City Centre.

Alternative Designs

3.35. The Site is complex and affected by a multitude of physical, logistical, and regulatory constraints, not least part of the Site containing the Grade II Listed Castlefield Viaduct. It sits within a very sensitive location at the gateway to Manchester's civic heart, near many nationally significant heritage assets. A wide range of specialist consultants and other stakeholders have therefore provided valuable input into the evolving scheme which has served to inform the design process and assist the team in arriving at an appropriate solution.

3.36. Different scales and massing options have been considered for the Proposed Development during design development. The aim has been to develop proposals in the context of the SRF that will create a viable scheme that provides a wide range of public benefits and addresses strategic policy aims whilst minimising negative impacts on adjacent land uses and the environment.

3.37. The design team, continuously led by SimpsonHaugh & Partners (SHP), has considered a multitude of different development options, and has undertaken detailed analysis to design an appropriate response to the Site's context. This has been informed by expert townscape, heritage, and microclimate advice and assessments.

3.38. A cluster of tall buildings in the locality has emerged around Deansgate transport hub, including Beetham Tower (47 storeys), Viadux Phase 1 (40 Storeys) and Axis (28 storeys) already present and other tall buildings in the pipeline including Apex (26 storeys – application pending consideration), Vision (37 Storeys – planning permission approved), 325 Deansgate (22 Storeys – under construction), and Great Northern (up to 34 storeys – planning permission approved). Plot 2a site sits centrally within this established cluster.

3.39. Historic England within its Guidance Note 4 (2022) provides guidance on tall building clusters. Paragraph 4.15 outlines the importance of considering height and extent of buildings, creating variations in heights, considering cumulative impacts, understanding profiles, the impact on historic environment, and maintaining townscape benefits. Paragraph 4.16 further notes the benefits that can be gained from a consolidated well-designed cluster.

3.40. Taking this Guidance into account, the design team concludes that a building on Plot 2a that is significantly taller than the datum of existing and proposed buildings would create a central focus, adding to the layering of buildings and the townscape interest already established and emerging, to consolidate and define the cluster. A building of differentiated height at this location would also act as a landmark for the city, marking the southern entry-point to the Civic Quarter from the south and the Deansgate transport hub. This could emulate the success of the Beetham Tower some 15 years ago, which became emblematic of Manchester's post-industrial renaissance.

3.41. The height of the Plot 2a building is also influenced by the need to ensure structural stability with minimal impact on the listed viaduct and maintaining an operational service yard for MCCC. The innovative structural solution, successfully delivered on Phase 1 and now evolved for Plot 2a, requires careful positioning and sizing of the structural core and structural stilts on which the building sits resulting in a larger building footprint than may otherwise be anticipated. As a result, significant height to the building is required to elongate the form and create a slender profile. In addition, the structural plinth upon which the building sits, creates a separation between the listed viaduct structure and modern residential tower above, whilst removing the visual impact of MCCC's service yard below.

3.42. The design evolution of the building has then developed with input from the wider technical team, specifically wind and solar glare to ensure that microclimate considerations are factored into the design from the outset. This has resulted in a building with chamfered corners and inclined tapering main facade with different proportions of glazing and aluminium depending on the angel of the facet. This provides a differentiated profile which responds to changing light conditions. The top of the building tapers to create an elegant proportion when viewed in the wider townscape setting.

3.43. The materiality of the building takes cues from the surrounding glazed buildings ensuring a consistency in materiality with other buildings in the cluster so as not to create a fussy and distracting backdrop to the historic assets in the immediate locality.

3.44. Landmark buildings such as Plot 2a form markers in the city point of entry. It will be the tallest building in Manchester City Centre, reinforcing this location as a gateway into the city. A design is therefore required that complements the existing cluster whilst ensuring that the building is cognisant of its landmark status – the design evolution has therefore resulted in a building that responds to its immediate context whilst providing a slender marker for the city.

3.45. Similarly, given its location within the cluster, a building of scale is required at the Plot 2b site. This site is physically constrained by the requirement for any building to sit below the restaurant at level 23 of Beetham Tower. Given the heights of existing buildings in the cluster and constrained footprint of the site it is considered that a building that maximises this scale is appropriate. The design has developed to take into consideration the proposed residential use and results from the microclimate studies.

3.46. The materiality of this building has evolved within the curtain wall system with varying amounts of glazing, aluminium panels and perforated vents proposed. With the final solution seeking to emphasise the verticality of the building, whilst providing the optimal solution for natural light and ventilation.

3.47. The final design has evolved as the brief for the Proposed Developed has developed. Whilst the ethos and approach has been retained throughout the design evolution, changes have included improving the street scene along Great Bridgewater Street and Albion Street, retention of more of the listed bridge and allowing more public access to the arches to restore and maximise activity while ensuring minimal impact on the listed viaduct. Furthermore, the footprint of Plot 2a has been stepped back from Albion Street to avoid the tramline and better respect Manchester Central. As well as the development of a prominent main entrance to the hotel. The design has seen a slight increase in height which has been determined by the size of the tower footprint. The development of the plan arrangement has been driven by the spatial constraints of the viaduct below, to ensure that all proposed structure is brought to ground in optimal locations to limit demolition of the listed viaduct structure. The height of the tower is proportionate to the larger footprint which prevents the massing from appearing too wide and bulky, and creates a slender elegant landmark.

Summary

3.48. Where possible, alternative options have been considered throughout the design process. The above has set out why the Site is considered suitable for the Proposed Development.

3.49. The Proposed Development builds on the significant progress to date in this area to continue to deliver at pace and scale with new high quality residential development and supporting. Where possible, alternative options have been considered throughout the design process and the above summary has set out why the Site is considered suitable for the Proposed Development. This process has been informed by the SRF, viability, and the desire to create a landmark building that has positive relationship with the surrounding developments.

3.50. The Proposed Development has been influenced by pre-application consultation with key stakeholders including local landowners, residents, businesses, statutory consultees, as well as with MCC. On this basis, Regulation 18(3) and Paragraph 2 of Schedule 4 of the EIA Regulations has been considered.

4. Site Surroundings and Description of Proposals

Site Description

4.1. The Site is bound by the Manchester Central Convention Complex (MCCC) to the north, Albion Wharf, and a parking lot to the east, Beetham Tower to the west and the Deansgate-Castlefield Metrolink station and Deansgate Locks to the south. The Site extends to approximately 1.49 hectares. The Site incorporates the eastern-most end of the Grade II Listed Castlefield Viaduct.

4.2. The Site is split into two Plots, Plot 2a and 2b; with Plot 2a located within the centre of the Site, and 2b to the west. The Viadux Phase 1 building footprint, which also sits centrally in the site, has been excluded from the application red line boundary. The Metrolink line, running between Deansgate-Castlefield Metrolink Station and St. Peters Square, bisects the Site between Plots 2a and 2b.

4.3. The Site is complex and exists across two different levels where Plot 2a (and Viadux Phase 1) is located. Plot 2a at Ground / Street level comprises Great Bridgewater Street and the arches situated underneath the Castlefield viaduct. At viaduct level / Level 01 the existing service yard to MCCC sits on top of the viaduct structure. In addition, Plot 2a includes the viaduct / Level 01 to the west of Viadux Phase 1.

4.4. Plot 2b is located on a single level. Plot 2b is adjacent to the Beetham Tower, it is a constrained irregular site slotted between the listed Viaduct and the Tower. In addition, it contains a new staircase and lift that has been delivered as part of Viadux Phase 1 to connect the viaduct level with Great Bridgewater Street.

4.5. The Site is currently underutilised within an existing tall building cluster and has long been a regeneration priority for the City as identified within Manchester City Council's Civic Quarter Regeneration Framework (2010) and Great Northern, Manchester Central and Castlefield Quay SRF, which was approved in 2017.

4.6. The Proposed Development sits within the Manchester Central portion of SRF and represents one of the last remaining key projects to come forward in this area. The SRF notes that this part of the Framework area represents a high profile, key arrival point into the southern part of Manchester City Centre further enhancing its importance to the city from a regeneration perspective.

Site Surroundings

4.7. The Site is located within Petersfield in Manchester City Centre, which continues to see significant levels of investment in the form of various City Council projects, including the redevelopment of the Town Hall Complex, Central Library and St. Peter's Square. Complementing this there has also been significant investment in numerous private sector projects in the surrounding areas including at St Peter's Square, Oxford Road and the City's Conference Quarter. Consequently, the Site benefits from being in close proximity to extensive commercial, cultural and leisure activities and has the potential to further contribute to the creation of a vibrant city centre environment.

4.8. The Great Northern, Manchester Central and Castlefield Quay Strategic Regeneration Framework (SRF) (2017) was prepared to guide the future reconfiguration, redevelopment, and re-positioning of the Great Northern, Manchester Central and Castlefield Quay Sites in Manchester City Centre. The SRF recognises that these Sites, alongside their immediate surroundings, present a significant strategic opportunity to transform a currently underutilised and underperforming area of the City Centre. Alongside Viadux Phase 1 the Site sits within a cluster of existing, and proposed, tall buildings and represents the final piece to complete development within this area as well as being the last available Site located within the City Centre suitable for a building of this scale.

4.9. The Site is located within a highly accessible location within Manchester City Centre, at a key entry point into the heart of the Civic Quarter.

4.10. The Deansgate-Castlefield Metrolink station and Deansgate Rail Station to the South Serve serves as a major gateway into the city centre. This offers residents a convenient and sustainable transport option, providing regular services across the city centre and the Greater Manchester region.

4.11. Located immediately to the south-east is Axis a 28 Storey residential Tower. Beyond this is New Jackson a strategic regeneration area delivering dense, tall residential development set within landscaped areas. First Street is also located to the south providing a range of commercial, Food and Beverage (F+B) and entertainment uses, including Home Cinema.

4.12. To the north of the Site is MCCC and Great Norther Warehouse, which offers an array of leisure and entertainment facilities, and is also subject to Planning Permission for office and residential development. Bridgewater Hall, a concert venue, is located to the to the north-east. Beyond these, further north, is St Peter's Square, home to the Town Hall, Library, Midland Hotel and commercial developments. This represents the heart of the Civic Quarter.

4.13. Directly to the east is the Briton's Protection Public House and adjacent car park, proposed to be redeveloped for housing.

4.14. Directly west is Beetham Tower and beyond this Deansgate, again home to an array of commercial and F&B uses.

4.15. Due to its City Centre location the Site is also located within walking distance of a wide array of services and amenities, facilitating sustainable travel for residents to various destinations from the Proposed Development.

Site Specific Environmental Designations

Air Quality

4.16. The Site is located within the Greater Manchester Air Quality Management Area (AQMA).

Archaeology

4.17. The Site lies within the Castlefield area of Manchester, which is of high archaeological significance. Previous investigations related to the Viadux Phase 1 development revealed Roman remains within the north-west and central part of the Site. Based upon this, the potential for the Site to contain further buried archaeological remains is considered to be high.

Ecology

4.18. The Site is not located within a statutory or non-statutory nature conservation site and no record of protected species have been found at the Site. The Site has been calculated to have a Biodiversity value of 0.01 habitat biodiversity units.

Flood Risk

4.19. The Environment Agency Flood Map for the area indicates that the Site is located within Flood Zone 1 and is therefore at low risk of flooding. The Site is located within a Critical Drainage Area meaning a Flood Risk Assessment has been prepared in support of this application.

Heritage

4.20. The Site is not located within a Conservation Area. St. Peter's Square Conservation Area, Albert Square Conservation Area, Deansgate Conservation Area, St John Street Conservation Area and Castlefield Conservation Area are located in close proximity to the north and west.

4.21. The Site comprises part of the Grade II Listed Castlefield Viaduct. The brick arches underneath and the Great Bridgewater Street Bridge are integral parts of the viaduct and are included under the listing.

4.22. Furthermore, there are 104 Listed Buildings within a 500m radius, most notably including the following buildings and structures:

- Manchester Central (Grade II* Listed)
- Deansgate Station (Grade II Listed)
- Midland Hotel (Grade II* Listed)
- Central Library (Grade II* Listed)
- St Ann's Church (Grade I Listed)
- Town Hall (Grade I Listed)
- Town Hall Extension (Grade II* Listed)
- Albert Monument (Grade I Listed)
- Rochdale Canal Lock Number 90 (Grade II Listed)
- 13 to 17 Albion Street (Grade II Listed)
- The Britons Protection Public House (Grade II Listed)
- Rochdale Canal Lock Keepers Cottage (Grade II Listed)
- Free Trade Hall (Grade II* Listed)

Planning History

4.23. Planning Permission (Ref.115871/FO/2017) and Listed Building Consent (Ref.115872/LO/2017) were granted in 2017 for the redevelopment of the Former Bauer Miller Site, to deliver a 40-storey residential tower and 14 storey office block on land comprising Plot 2a of the Site.

4.24. The planning permission was later amended under a series of non- and minor-material amendments and a "drop-in" application pursuant to the main consent (Ref. 126604/NMC/2020, 126868/JO/2020, 127260/FO/2020, (drop in application), 129153/NMC/2021, 131326/NMC/2021 and 133998/JO/2022). Changes approved under these permissions included a new staircase approved under drop-in application ref. 127260/FO/2020 and an additional storey on the approved office building under minor material amendment ref. 133760/JO/2022 .

4.25. Planning Permissions Ref. 126868/JO/2020, 127260/FO/2020 and 127365/LO/2020 have been implemented and the 40-storey tower has recently been completed as Viadux Phase 1. The 15-storey office block, whilst lawfully implemented, has not been delivered. The office block 'bridged' the existing Metrolink line, and removed the left hand exist from the MCCC service access Road.

4.26. Land comprising Plot 2b of the Site was granted Planning Permission and Listed Building consent in October 2003 for an 11 storey office block (Ref. 068662/FO/2003/C3 and 068663/LO/2003/C3). Under the same applications, Planning Permission and Listed Building consent were granted for the demolition of an existing section of viaduct at Deansgate / Great Bridgewater Street / Trafford Street, to deliver a 47-storey hotel and residential tower block (the Beetham Tower). The latter has been fully-built out, with the Beetham Tower opening in 2007. The office block was never built out and this parcel of land has remained vacant.

Proposed Development

4.27. The Proposed Development will be delivered across two plots and can be summarised as below:

- Plot 2a will deliver a 76-storey residential tower providing 452 residential homes comprising 151 one bed, 278 two bed, 20 three bed (Use Class C3) with associated residents amenity space And a 160 bed hotel with associated restaurant and bars. At viaduct level, a redesigned service yard for Manchester Central Convention Complex (MCCC) is enclosed by a new podium structure with residents' external amenity space above. 390 secure cycle spaces, serving this and the Phase 1 building, are provided at the ground floor. A section of the Great Bridgewater Street bridge (deck) is removed to bring light into the street below. Highway and public realm enhancements are sought to Albion Street.

- Plot 2b consists of a 23-storey residential building accommodating 133no. affordable 1-, 2- and 3-bed apartments (Use Class C3), 133 secure cycle parking spaces, circa 200 sq m flexible commercial units (Use Class E) opening onto the viaduct, and public realm enhancements on Great Bridgewater Street.

Table 4.1 Outlines the Quantum of the Proposed Development

Parameters for Development		Plot 2a	Plot 2b
Site Area	Ha 0.661		
Gross Floorspace (GEA)	Sqm	Approx. Total 83,212	Approx. Total 12,122
Residential (homes)	Total Apartments (homes)	452	133
Hotel Rooms	Total Rooms	160	n/a
Maximum Height	Total Storeys (including ground)	76	23
	Building heights (m)	245.645.0	70.035
	AOD (m)	281.575	105.666
Cycle Parking	Spaces	390 (to serve Phase 1 and Phase 2)	133
Public Realm	TOTAL Public realm (sqm) across the Site	TBC	
Commercial Space	TOTAL (sqm) – including shops / F&B / community / Other uses	-	198
Private Amenity Space	Private Amenity Space (sqm)	Internal Amenity – 2,048m2 External Amenity – 1,189m2	72

5. Construction Methodology and Programme

Introduction

5.1. This chapter has been prepared by Domis Construction to outline the approach to managing the risk and impact associated with the works to construct the Viadux Phase 2 - Plots 2a and b , and all associated landscaping elements of the Proposed Development. It provides an overview of the anticipated site and construction activities, including:

- Site access and logistics.
- Site establishment.
- Construction operations.
- Control and management of construction activities.
- Waste management.

5.2. It is supported by technical appendices as follows:

- Appendix 5.1 Construction Management Plan (CMP)

5.3. The Contractors will fulfil the obligations as Principal Designer and Principal Contractor for the works associated with the Proposed Development as described in Chapters 1 and 4 of this ES, comprising Viadux Phase 2 and all associated landscaping elements of the Proposed Development.

5.4. Assessments of suitable sub-contractors for the project will be undertaken to establish capability/ suitability, ability to work within confined sites and Listed Buildings and management procedures to be implemented to ensure successful project delivery. In executing the works, the appointed sub-contractors will implement the appropriate Risk Assessments and Method Statements (RAMS) to ensure the works are executed in a safe and suitable manner and in accordance with the CDM 2015 regulations.

5.5. Whilst defining the obligations and limitations placed on the Contractor when executing the works, this will form the basis for the Construction Phase Health & Safety Plan (CPHSP). The CPHSP will identify key project specific risks associated with the execution of the works and measures implemented place to reduce or mitigate these risks.

5.6. Further detailed CMPs will be prepared by the appointed Contractors in due course and updated as appropriate to reflect comments received and the wording of any planning conditions attached to any future permissions. These documents will form a primary mechanism for maintaining the communicative relationship with Manchester City Council and other third parties in understanding the nature of the Proposed Development and the associated construction activities. Where comments or third-party approvals affect the CMPs, the plan will be reviewed and updated as appropriate prior to submission to the Local Planning Authority.

5.7. The CMPs would be periodically updated as required advising of any proposed changes / improvements to the construction methodology.

Overview of the Works

5.8. The primary construction activities related to the Proposed Development are set out in detail in this Chapter and the supporting Appendix 5.1 (Volume 2), and can be summarised as follows: -

- Works under the arches, such as temporary works, piling mat, installation of piled foundations, sub-structure and 1st lift of column and core in-situ concrete works.
- Construction of the Proposed Development, comprising the construction of Plots 2a and 2b.
- Public Realm and associated landscaping works.

Programme

Key Dates

5.9. The current master programme is a development-based programme with the following key dates:

- The Planning Submission Q4 2024
- Contract Award Q3 2025
- Site Mobilisation Q1 2026
- Completion Q1 2032

5.10. Subject to planning, the works will be undertaken on a phased approach, detailed below;

- Plot 2a Commence – Q1 2026
- Plot 2b Commence – Q3 2028
- Overall completion of Plot 2a and 2b – Q1 2032

5.11. A detailed programme of construction activities and sequencing will be provided by the Contractors as part of the detailed CMP.

Enabling Works

5.12. The enabling works element of the Proposed Development are limited in nature and contained within the Viaduct arches of Plot 2a. These comprise the preparation of a piling mat and temporary works to enable the sub-structure solution to commence. Movement and vibration monitoring installation and initial readings will be set up on Site in line with the agreed vibration and movement report, which will be completed during Stage 3 and 4 of the design period.

Substructure

5.13. The substructure is proposed to be a pile assisted raft solution, with the raft founding at weathered sandstone level. Due to the adjacency of the arches at ground level, ground settlement analysis has been completed, in principle, and movement and vibration monitoring will be installed. Due to the spatial constraints within the arches Sectional Flight Auger (SFA) piling is proposed to be used for the foundations of the Proposed Development. Pile sizes and depths will be determined by the specialist designers (Geo-technical and structural) and piling contractors. The Contractor's preferred build methodology and design will dictate the quantity of waste from these activities; therefore, this cannot be quantified at this stage. The quantity of material will be calculated by the Contractor and addressed as part of the Contractors' Site Waste Management Plan.

Substructure Viadux Plot 2b

5.14. The substructure solution is proposed to be a piled foundation, likely to be contiguous flight auger piling with a series of pile caps and ground beams and main core base providing the sub-structure solution for this 23-storey concrete framed building.

Arch Interventions

5.15. Due to the nature of the works, a series of arch interventions are required to form the opening through existing arches for 10 no. columns and the dual staircase core. The methodology for these has been assessed and designed based around the methodology and design solutions used on Viadux Phase 1.

Superstructure Viadux Plot 2a and b

5.16. The superstructure of Viadux 2a and 2b is a concrete framed solution, with a concrete transfer structure up to level 5 on Viadux 2a with more traditional concrete core, columns, and flat slab construction above to level 76, The concrete frame solution on 2b is a more traditional solution columns, core, and flat slabs from 1st floor to level 23.

Building Façade

5.17. At Viadux 2a, a unitised glazed façade has been proposed with an appearance and method of install in line with the Viadux phase 1 development, albeit with a varied geometry as per the architectural intent shown within the plans and Design and Access Statement submitted with the application. At Viadux 2b, a glazed and metal cladding façade is proposed, however, the system and method of installation is to be finalised and will be further developed during the technical design stage. Further development of the design will inform the choices of materials and systems for the façade.

Health and Safety

5.18. Health and Safety is of paramount importance to ensure safe working conditions for site operatives. Activities pertaining to the works will be reviewed and assessed at every stage of the construction process ensuring the appropriate RAMS are in place and always adhered to.

5.19. The Contractors will undertake the Principal Designer and Principal Contactor roles for the duration of the works. A Principal Designer role will be retained by the Employer to assist in compliance with duties under CDM 2015.

5.20. As the foundations are due to be installed post the 5 April 2024 cut-off date for the Building Safety Act, the development will follow the full Building Safety Act gateway 1-3 process.

5.21. Work will be undertaken in accordance with Health and Safety at Work Act 1974 and other legislative requirements including (but not limited to) the Manual Handling Operations Regulations 1992 and the working at Height Regulations 2005. Designer's risk assessments will be provided to the Contractor to provide a greater understanding of any design considerations or assumptions in the preparation of the RAMS.

5.22. Trained first aid personnel will be available and clearly identifiable on site. The Contractor will develop a site fire plan, identifying evacuation procedures and muster points. Trained fire marshals will be clearly identifiable.

Construction Activities

Site Access

5.23. Vehicles accessing the Site from outside the city centre will utilise the motorway network to access the M60 Manchester circular. Appropriate delivery routes will be established to limit the duration of vehicles occupy the network. Diverse routes will be managed by the Contractors to distribute vehicle movements across the network. Where possible, deliveries will be scheduled outside of peak traffic flow times to minimise the impact on the surrounding areas.

5.24. Deliveries to Site made from the M60 Manchester circular will utilise the M60 as far as reasonably practical to reduce the impact on traffic within the city centre. Where this is not practical, the use of main A road routes will be prioritised.

5.25. A detailed traffic management plan has been prepared and is attached as an appendix to the draft CMP, located in Appendix 5.1, these are applicable to Plots 2a and 2b.

Deliveries and Removals

5.26. All delivery access to the Site will be made via Albion Street and Great Bridgewater Street, hence removing the requirement to use the Manchester Central Convention Complex (MCCC) service yard unless agreed between all parties. For the 1st 12 months of the construction of Plot 2a the Plot b will be utilised as a materials compound to store materials and construct reinforcement cages, etc.

5.27. Where practical, off-site construction and 'just in time' deliveries will be promoted. Deliveries and waste removal will be managed by the Contractor. No off-site stacking of deliveries will be permitted.

5.28. Materials and components will be locally sourced where practical to minimise transportation distances.

Contractor Parking

5.29. The Contractors will provide and maintain a Construction Travel Plan for all Contractor and Subcontractor employees for the duration of the works promoting public transport reduce the vehicular movement associated with the works and promote the projects suitability approach to construction.

Plant and Equipment

5.30. Tower cranes, MEWP's, Mast climbers and mobile cranes will be utilised for the construction of the Proposed Development. Where practical, construction techniques and the associated plant and equipment will be selected to minimise acoustic intrusions on surrounding areas.

5.31. The Contractors will develop a detailed schedule of plant and equipment to confirm these assumptions in due course.

Operating Hours

5.32. Site operating hours will adhere with Manchester City Council's (MCC) 'Environmental Protection Information for Developers':

- Monday – Friday 07:30 – 18:00hrs

5.33. Saturday 08:00 – 14:00hrs

- Sunday/ Bank Holidays No works permitted

5.34. To reduce the impact on the existing transport and public transport infrastructure of operatives attending site, arrival of the workforce on site 30 minutes prior to the permitted operating hours for setting up will be encouraged.

5.35. No works will commence outside of the above permitted times without prior agreement by Manchester City Council.

Site Setup and Operations

5.36. The following site setup and operational requirements apply to the Proposed Development and will be developed in further detail by the Contractors.

Site Establishment

5.37. The Site compound will be located within the existing site office premises on Albion Street. The following will be provided for the works as temporary facilities:

- Project offices.
- Meeting and conference facilities.
- Induction and training centre.
- Canteen and rest area.
- Toilets and washroom facilities

5.38. Material storage and waste segregation will be managed by the Contractors to prevent cross contamination of materials whilst promoting recycling and reducing waste to landfill. All flammables waste streams and those with potential environmentally adverse impacts will be appropriately contained and managed by the Contractors.

5.39. Fuel and oil will be stored in accordance with the Control of Substances Hazardous to Health (England) Regulations with refueling and transfer of fuel oils undertaken in designated areas of hardstanding by trained personnel, equipped with the appropriate spill kits and emergency action plans.

5.40. Lighting associated with the Site and site establishment will be designed to minimise light spillage to limit the impact on adjacent properties, highways, and canals

Site and Boundary Fencing

5.41. The Site is secured to all site boundaries by a full hoarding. When on a public highway a bespoke design system is to be utilised, such as "Hoard-it". In areas away from this water filled tubs with metal panels above will be utilised. This will be retained throughout the development to maintain segregation of the works and the protection of the public.

5.42. This hoarding will be used to the perimeter of the Site and sealed to the ground to further reduce dust arising and further prevent materials and debris leaving the Site and potentially entering water bodies.

5.43. Site hoardings will be utilised to inform others of the Proposed Development and coloured as appropriate.

Access and Points

5.44. The method of delivery for plant and materials, and removal of waste from the Site will be defined by the Contractors using key access roads into the Site and surrounding areas.

5.45. Turnstiles to secure the Site from unauthorised access will be in place at all pedestrian access points. Banksman will be present at all vehicular access points.

5.46. Details of the proposed site access arrangements are identified on the Site Logistics Plan within the outline CMP at Appendix 5.1.

Housekeeping

5.47. The Contractors will maintain a high level of site cleanliness to:

- Reduce potential Health and Safety issues arising from poor working conditions.
- Improve working conditions and operational productivity.
- Reduce waste material on site.
- Remove the potential for waste material inadvertently leaving site (wind conditions etc.).

5.48. In maintaining the cleanliness of the Site, the Contractor will also ensure:

- The appropriate behaviour of the works force (including subcontractors) is appropriate both on and off-site.
- Waste is removed from the Site at regular intervals to prevent local wildlife being attracted onto site and the potential for fire hazards on site.
- Cleanliness of adjacent roads affected by the works are maintained (wheel washing, road sweepers etc.).
- No fires are permitted on site.

Wheel Wash Facilities and Road Sweeping

5.49. A road sweeping regime will be implemented and tailored to suit on site activities on an appropriate basis where required.

Lighting of the Site

5.50. To minimise light spill from the Site and reduce the impact of the localised townscape and ecology, directional lighting will be used to illuminate the Site. Localised task lighting will be provided as required by the Contractor to execute the Proposed Development.

5.51. In line with the UK National Energy Efficiency Action Plan, the Contractor will implement, where possible, greener sources and more energy efficient plant to assist in cutting carbon dioxide emissions by:

- Monitoring and reducing energy consumption during construction.
- Maximising plant and equipment fuel / energy usage efficiency.
- Maximising renewable energy sources.
- Reducing workforce travel and promoting sustainable modes of transport.
- Utilising localised supply chains to reduce transportation.

Materials

5.52. In the selection of materials, consideration will be given to the embodied carbon footprint and its recyclability and recycled values / content. The Contractor will employ procurement procedures, ensuring the environmental impact of materials are considered in their selection.

5.53. The use of local supply chains will be promoted to reduce the transportation impact of materials to and from site, whilst investing capital into the local economy and supply chains.

5.54. All timber used on site will be FSC or PEFC compliant and obtained from sustainable sources.

Waste

5.55. Prior to commencing the works, the Contractors will establish a Construction Waste Management Plan (CWMP). The CWMP will identify:

- The various waste streams generated by the construction of the Proposed Development.
- Methods of waste segregation.
- Estimated quantity of each waste type.
- The waste management action for eradicating waste in the first case and, where not possible, implementing the re-use, reduce, recycle, and disposal for each waste type.

5.56. The Contractor will:

- Review the CWMP.
- Record quantities and types of waste produced.
- Record the types and quantities of waste that have been::
    - Reused (on or off site).
    - Recycled (on or off site).
    - Sent of other forms of recovery (on or off site).
    - Sent to landfill.

- Otherwise disposed of.
- Update the plan to reflect the progress of the project

5.57. Where practical, off-site modular construction will be promoted to reduce waste material going off site.

Construction Methodology

5.58. At this stage of design development, the structure of the Proposed Development can be summarised as follows:

Plot 2a

- Piled foundations with pile assisted raft and concrete core base.
- Structural works to the top of the existing arch structures.
- Structural interventions to the existing arches
- Construction of concrete transfer structures up to level 05
- Construction of the remainder of the development.

Plot 2b

- Pile substructure with pile caps and ground floor slab
- Concrete frame and façade
- Completion of all construction works up to completion of the development.

5.59. Following site preparation completed as part of the enabling works, the outline construction programme and methodology can be summarised as follows:

Table 5.1: Programme of Works

Viadux Plot 2a	Completion by Week number	Viadux Plot 2b	Completion by week	Notes
Substructure and all works up to level 5	Wk 96-100	Substructure	Wk 14	
Structural Frame	Wk 220		Wk 70	
Facade	Wk 230	Facade	Wk 90	
Fit out	Wk 318	Fit out	Wk98	Installation of partitions, ceilings and finishes etc.
External Works	Wk 318	External Works	Wk 100	Installation of hard/ soft landscaping and planting

5.60. The above is an indicative construction timeline and construction methodology. A detailed programme of construction activities and sequencing will be provided by the Contractor.

Control Measures

Personnel Protection

5.61. In maintaining a safe site, the Contractor will implement a Health & Safety regime for all site operatives and site visitors to ensure a standardised ethos to safety through the implementation of appropriate PPE. The Principal Contractors will review operation specific Risk Assessments and Method Statements (RAMS), ensuring process specific measures are implemented as appropriate.

Protection of Environmental Features

5.62. Measures for protection will be identified during completion of our Environmental Risk Assessment.

Noise and Vibration

5.63. Noise and vibration of site activities will be kept to a minimum as far as reasonably practical for the duration of the works and particularly during the first operating hour of the Site. Where the Contractor is required to operate the Site outside of these times, this will only be permitted following consultation and agreement with Manchester City Council's Environmental Health Officer. The Contractors will prepare a specific Management Plans for the control and monitoring of noise and vibration relating to the works, identify noise generating plant and equipment used on site (including type, size and quantity)

5.64. The Contractor makes the necessary Section 61 Control of Pollution Act 1974 applications to the local authority at least 28 days prior to the works, obtaining the relevant consents prior to undertaking the works. Works will be executed in accordance said consents.

5.65. In addition to any restrictions, limitation and or obligations imposed by the Section 61 consent, the Contractor complies with the requirements of the statutory code of practise BS: 5228.

Air Quality

5.66. Prior to the commencement of the works, the Contractor undertakes an air quality assessment and management plan identifying the management and monitoring of dust, smoke, and other airborne pollutants.

5.67. Following completion of the air quality assessment, the Contractor makes all necessary applications pertaining to the works, seeking consent from the relevant Pollution Control Authority (Local Authority and/or Environment Agency) in accordance with the Environmental Protection Act 1990 and Pollution Prevention Control Act 1999.

Site Deliveries

5.68. Selection of appropriate vehicles sizes relative to the delivery load will be managed by the Contractor to minimise vehicle pollutants. Where possible these will be co-ordinated with deliveries to nearby sites to minimise vehicles mileage to and from distribution centres

5.69. Vehicles carrying loose material to and from site will be sheeted to prevent spillage and reduce dusty emissions during transit.

5.70. Implementation of these measures is the responsibility of the Contractor. The Contractor records and reports activities in relation to these measures and any subsequent corrective measures employed, ensuring records are available at all times.

Construction Vehicles

5.71. All vehicles regularly used on Site will comply with the relevant emissions standards/ legislation and will be serviced in accordance with the manufacturer's recommendations. Vehicles also using public highways will comply with all MOT requirements. The Contractor shall provide all MOT and service documentation for Local Authority inspection upon request and a running log of:

- Any complaints relating to emissions alleged because of construction activities, received from either a resident or local business;

- The date and vehicle identification number of any construction vehicle observed to be carrying material that has the potential to release dust and does not have the appropriate sheeting measures in place; and
- The date and location of any cleaning of paved areas and roads

5.72. The Contractor ensures no construction plant or vehicle engines are left running when not in use except when the Employer's Project Manager considers there is a valid operational reasoning or justification. The Contractor is encouraged to use low pollutant vehicles or 'green' vehicles in the execution of the works.

5.73. All construction vehicles tracking the site will adhere to the site speed limit and route controls.

Dust Suppression

5.74. The Contractor employs dust suppression systems as appropriate during the works to reduce the quantity of airborne pollutants, providing suitable water bowsers and/or sprays for the task. To limit the generation of dust on and off site, the Contractor will employ appropriate dampening and wheel wash measures for all vehicles trafficking site. Unloading of loose material (spoil) will adhere to the control drop height to control dust release. Smaller hand held tools will be fitted with localised dust collectors or dust suppression systems.

5.75. To reduce any windblown dust arising from stacked materials, the Contractor ensures stacked materials are profiled to minimise wind and rain impact and subsequent erosion. Earth mounds will be kept sufficiently damp to further limit wind impact. Where appropriate, seeding of earth mounds will be encouraged. Where possible, stacked materials with the potential to create dust emissions will be located away from site boundaries.

Hard Standing s

5.76. The use of existing hard standings will be promoted to reduce site churn and airborne dust during site operations. Extensions of existing hardstanding will be promoted in favour of new hardstanding. Hardstanding will be incorporated within the permanent works where practical.

Water Quality and Drainage

5.77. In executing the works, the Contractor will adopt good construction management practices to reduce the risk of accidental discharge and contamination of rivers, streams, ponds and ground water. These practises will be incorporated into the CMP and include:

- The extent and status of all ground water to the land below the works and any temporary works and land use for the removal of material from site.
- Comply with the 'Policy and Practice for the Protection of Groundwater Environment Agency TSO 1998'.
- Control of sediment and loads to surface water systems.
- The Pollution Control and contingency plan to identify the requirements for pollution control and emergency procedures for the works
- Measures for minimising water consumption during the construction process.
- Details of the construction phase drainage strategy during the works (using permanent drainage systems where possible).

Nearest Water Course – Rochdale Canal

5.78. The Rochdale Canal is the nearest water course to the Proposed Development, with a section passing roughly 50m south of the site boundary.

5.79. It is not anticipated that the site will have any bearing on the Canal, nor are they expected to impact on site.

Unexploded Ordinance

5.80. The Detailed Unexploded Ordnance (UXO) Threat and Risk assessment study for the site has been deemed as low risk for the presence of UXO. There have been no risk mitigation measures recommended on the development site.

Vapour / Ground Gases

5.81. Prior to execution of the Works, an assessment of the potential and extent of any ground gasses associated with the Works will be undertaken. If deemed necessary, the design will ensure appropriate gas protection measures are implemented to protect the building and its occupants and are addressed in connection with undertaking the Works to ensure safety of all site operatives. The control measures implemented for entering and working within confined spaces will be clearly identified within all RAMS.

Archaeology and Cultural Heritage

5.82. All archaeological works have been carried out and completed by the University of Salford during the enabling works phase of the previously consented application.

Pollution Control and Contingency

5.83. An environmental emergency plan will be developed by the Contractor to reflect construction activities and will form part of the Environmental Management Plan.

5.84. Measures will be developed by the Contractor to minimise and control site runoff to prevent contamination. These measures will take account of the Environment Pollution Prevention Guidelines:

- PPG1 General guide to the prevention of pollution
- PPG5 Works and maintenance in or near water
- PPG6 Working at construction and demolition site
- PPG18 Managing fire-water and major spillage
- PPG21 Pollution incident response planning
- PPG22 Dealing with spillages on highways

Definition of a Pollutant

5.85. Pollutants are substances that pollute the environment which renders the air, soil, water, or other natural resource harmful or unsuitable for a specific purpose. Environmental incidents occur when an activity or event causes or has the potential to cause harm to people or damage to property and or the environment.

Pollution Prevention

5.86. Works will be undertaken in close proximity to the existing drainage networks. Works may also affect the existing ground water table. Appropriate prevention methods will be implemented throughout the duration of these works.

Concrete and Cementitious Materials

5.87. Concrete and cementitious based materials are alkaline and are potential pollutants. To reduce the risk of any runoff entering watercourse, mixing will be undertaken a minimum of 10 meters away from watercourses. Wash from concrete and cement works is not discharged into a watercourse.

Oils and Fuels

5.88. All oil and fuel will be stored in accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001, ensuring safe storage of material and controlled access at all times and:

- Storage areas are not located within 10 meters of a watercourse or highway gully.

- Mobile bowsers are bunded and comply with the requirements of Control of Pollution (Oil Storage) (England) Regulations 2001.
- Storage drums are contained within bunded areas with a minimum of 25% of the total volume of the volume contained within the bund or, 110% of the largest container, whichever is the greater.
- Refuelling of plant and equipment is undertaken by trained operatives.
- Plant is regularly checked for leaks and is regularly maintained.
- Drip trays are placed below any standing plant and equipment.
- Static combustion engine plant (e.g. compressors etc.) are fully integrally bunded or placed on drip trays.
- Spill kits are provided within close proximity to oil and fuel storage areas, ensuring operatives are trained in their use.

5.89. The use of non-toxic biodegradable fluids and oils is encouraged and must be used in all sensitive locations or areas of increased pollution risk.

Plant Maintenance

5.90. Maintenance of any plant will be undertaken at least 10 meters from any watercourse or drain. Spill kits must be available and on hand during all maintenance operations with drip trays to contain any leakage of oil or fuels.

5.91. Any plant or equipment considered a pollutant risk will be repaired or removed from site.

Excavated Spoil

5.92. Excavated spoil will be removed from site as works progress. Where practical materials will be reused on site. Removed materials will be treated off site or disposed of as appropriate.

Construction Waste Materials

5.93. Waste materials will be controlled in line CWMP and secured to prevent cross contamination of waste streams or pollution of any water courses. Any liquid waste will be secured in a suitably lined container within a bunded area.

Trade Effluent

5.94. Trade effluent (toilets etc.) will be connected to a foul water drainage system for the duration of the works. Where temporary chemical recirculating toilets are used, their use will be limited as far as reasonably practical and appropriately secured/ weighted to prevent spills. Emptying and refilling will be undertaken by a licensed contractor.

Notification Procedures

5.95. Procedures for the notification and reporting of spillages, pollutants or environmental incidents will be clearly set out within the Contractor's CMP and reinforced through site inductions and toolbox talks.

5.96. The procedure will include details of the recording and reporting process of incidents and details of those notified.

5.97. Contact details for key on site personnel and emergency response persons responsible for environmental protection will be displayed in key locations around the Site and include details of:

- Contractor's Project Manger
- Construction Site Manger
- Contractor's Environmental Manager
- Employer's Project Manager

- Community Liaison Officer
- Emergency Services
- Environment Agency

5.98. The Contractor will promote a system of good working practices, actively encouraging suggestions from operatives to improve operational procedures to reduce the risk of environmental incidents, and anonymous reporting of works not being undertaken in accordance with the CMP.

Communications

Project Communications

5.99. To ensure the Health and Safety, Operational and Environmental requirements of the project are communicated effectively and efficiently, this CMP will be distributed to all members of the project team (incl. sub-contractors). Control and mitigation measures associated with key activities or potentially environmentally sensitive operations will be agreed and regularly reviewed between the Contractor and Employer. The Contractor will ensure copies of the following are available on site for review at all times:

- this CMP (Appendix 5.1) and/or Contractor's CMP.
- the project, Employer and any company environmental policies.
- the list of key contacts associated with the works.

5.100. During the construction phase of the works, regular internal meetings will occur to identify:

- Progress over the period.
- Works planned over the next period.
- Inductions and training undertaken over the period.
- Health and safety issues incurred (incl. near misses etc.)
- Records on inspections and audits, with a schedule of non-conformances issued.
- Feedback from Community liaisons, copes of any complaints received and mitigation measures implemented.
- Visits and inspections by third parties, including statutory bodies and H&S monitoring officers.
- Records and compliance with the environmental performance and objectives.

5.101. Internal and external communication methods will be defined by the Contractor, maintaining dialogue through the Community Liaison Officer as appropriate. External communications will be coordinated with the Employer's Project Manager to ensure effective and appropriate communications.

Community Liaisons

5.102. Community liaisons will be coordinated with the Employer's CLO during the construction process, providing the community with regular updates on the works.

Compliance

5.103. Successful implementation of this CMP relies on regular review and updates in response to evolving site conditions. The Contractor will define appropriate measures and procedures to review activities against the CMP and legal/ statutory requirements and any measures implemented in response to complaints, compliments and inquiries procedure (CCIs).

Recording

5.104. The Contractor maintains a register of compliance issuing Non-Conformance Reports (NCR's) identifying actions or works not undertaken in accordance with the CMP, method statements or legislative requirements and obligations. The NCR will be accompanied with the appropriate Corrective Action Report (CAR) detailing:

- Action owner(s).
- Corrective measures required.
- Monitoring/ inspection and signoff procedures to be implemented.
-
- Timescales for close out.
- 3rd party approvals upon completion of the corrective measures.

5.105. As part of the CAR process, a lessons learnt workshop will be conducted to prevent reoccurrence of the event.

Monitoring

5.106. Environmental monitoring of the works will be undertaken during the construction phase to evaluate the environmental impact of the works. This information will be assessed in conjunction with the CMP and improvements/ revisions to the CMP made where appropriate.

5.107. A programme of environmental monitoring will be established by the Construction Environmental Manager to suit the construction programme and works on site. Monitoring will be undertaken and assessed against the legal/ legislative requirements, consents and project targets/ requirements.

Review Process

5.108. Records of waste management and environmental aspects pertaining to the works will be mainlined in accordance with the CMP or respective organisational requirements (whichever is the greater). Records are to be maintained in both digital and hard copies to protect against damage, deterioration or loss and made available to the Employer's Project Manager upon request. Disposal will be upon express consent of the Employer's Project Manager.

Complaints, Compliments and Inquires

Procedures

5.109. A CCI will be implemented to ensure members of the public wishing to complain, provide feedback or make inquiries can do so. Contact details will be published for use by members of the public with the public actively encouraged to engage as part of the Community Liaison. Liaisons with local councillors, Town/ Parish Councils and the local authority (incl. environmental health) will be undertaken to address any concerns or issues raised directly to councillors by the general public.

5.110. Any CCI's received will be recorded and reported to the Employer's Project Manager and include:

- Parties affected/ reporting
- Timing
- Location
- On site activities being undertaken

5.111. All complete with details of any reactive measures implemented where appropriate.

Reporting

5.112. Any CCIs raised will be reported at internal progress meetings to ensure appropriate measures are being implemented, improving the impact on the community during the construction phase.

5.113. The Environmental Health Team at MCC may be the first contact for residents affected by the works. Ongoing dialogue will be undertaken with the Environmental Health Team to ensure responses to any complaints can be provided swiftly.

5.114. Due to the nature of the proposals and proximity of adjacent residents, the works may be subject to a Section 61 application under the Control of Pollution Act 1974 prior to commencing the works. The Contractor will agree any mitigation measures in connection with this application with the Local Authority, obtaining the required permits/ licenses prior to commencing the works.

Feedback

5.115. To validate the CCI process, feedback on any CCIs raised will be provided as part of the community liaison process. Feedback sessions will identify:

- Details of the CCI.
- Assessment undertaken.
- Mitigation measures implemented.

5.116. Any additional beneficiary measures and options will be discussed with the community to further improve the impact of the community during the construction phase.

6. Townscape and Views

Introduction

6.1 This Chapter of the ES has been prepared by Planit and asseses townscape and visual impacts.

6.2 The Chapter should be read in conjunction with the following appendices:

- Appendix 6.1: Townscape Baseline and Assessment.
- Appendix 6.2: Visual Baseline and Assessment.
- Appendix 6.3: Verified Kinetic Views Assessment.

6.3 The report contains a summary of the key assessment findings and key conclusions. The full assessment is contained within the appendices.

6.4 The authors of this Chapter are Gillian Webb and John Willerton and have the following qualifications:

	Lead Author	Reviewer
Name	Gillian Webb	John Willerton
Company	Planit	Planit
Qualifications/Accreditations relevant to technical area	BA (Hons) MLA CMLI	BA (Hons) Dip LA CMLI
Does the practitioner hold any IEMA qualification?	No	No
Company hold IEMA QMark?	No	
Years technical experience (in technical area)	15+	15+
Number of EIA's delivered to date	30+	30+

Assumptions and Limitations

6.5 To ensure transparency within the EIA process, the following limitations and assumptions have been identified.

- The assessment will rely on available data, and best endeavours will be made to ensure that the data is accurate and up to date. It is assumed that OS mapping information, topographic and 3D data and Historic England heritage mapping information are all up to date.
- The GLVIA methodology provides a robust and transparent process for assessment of townscape and visual effects and is used alongside visually verified photomontages which provide a high level of detail and technical accuracy. Significant effects will be determined through professional judgment, carried out by a team of assessors to provide scrutiny where this is relied upon.
- Although not fully complete and visible within the baseline views, all developments that are currently on-site have been considered as part of the future baseline for the purposes of this townscape and

visual assessment. Together, they form part of the 'future baseline' for the city, which assumes that any development currently under construction will come forwards as consented.

- Kinetic Views were produced in April 2024, based on a scheme that was circa.5m shorter than the Proposed Development. The kinetic views have not been updated as the change in height is de-minimis when taking into consideration the building height and design as a whole and the slight change in height would not impact any conclusions that have used for these kinetic views.

Relevant Legislation, Policy and Guidance

Legislation

6.6 The European Landscape Convention (ELC, 2000) provides a foundation for closer co-operation on landscape issues across Europe and was ratified in the UK on the 21 November 2006, and became binding on 1 March 2007. The convention identifies the need to recognise landscape in law, to develop and promote landscape policies dedicated to the protection, management and creation of landscapes, and to establish procedures for the participation of the general public and other stakeholders in the evolution and implementation of landscape policies. It also encourages the integration of landscape into all relevant areas of policy, including cultural, economic and social policies.

6.7 The ELC defines landscape as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'. It recognises that landscape has important cultural, ecological, environmental and social dimensions and is a key element of achieving sustainable development. In this context the use of the word 'landscape' is more appropriately termed 'townscape' though the constituent factors remain consistent.

Policy

National Planning Policy

6.8 The assessment of likely significant effects to sensitive receptors will consider the sensitivity of the receptor and the magnitude of change to determine significance, on a scale or large or high, medium, small or low and negligible. Significant effects will be determined through professional judgment.

6.9 The National Planning Policy Framework was updated in December 2023 and sets out the government's planning policies for England and how these are expected to be applied.

6.10 The purpose of the planning system is to contribute to the achievement of sustainable development through three overarching objectives:

- An economic objective - to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;
- A social objective – to support strong, vibrant, and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and,
- 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, minimizing waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

6.11 The environmental objective is of particular relevance to the purpose of townscape and visual impact assessment.

6.12 Section 12 of the NPPF deals with the requirements of good design. The overarching principle is set out in paragraph 131, which state, "the creation of high quality buildings and places is fundamental to what the planning and development process should achieve. Good design is a key aspect of sustainable development, creates better places in which to live and work and helps make development acceptable to communities."

6.13 Paragraph 135 of the NPPF sets out a number of principles of good design. In order to accord with these principles, it should be ensured that new developments:

- will function well and add to the overall quality of the area, not just for the short term but over the lifetime of the development.
- are visually attractive as a result of good architecture, layout and appropriate and effective landscaping.
- are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change (such as increased densities).
- establish or maintain a strong sense of place, using the arrangement of streets, spaces, building types and materials to create attractive, welcoming, and distinctive places to live, work and visit;
- optimise the potential of the site to accommodate and sustain an appropriate amount and mix of development (including green and other public space) and support local facilities and transport networks, and;
- 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; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion and resilience.

6.14 Section 16 of the NPPF concerns conserving and enhancing the historic environment. Paragraph 195 states that heritage assets are, "an irreplaceable resource, and should be conserved in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of existing and future generations".

6.15 The site is not located in a Conservation Area. It does include the eastern-most extent of the Grade II listed Castlefield Railway Viaduct. Heritage is an intrinsic part of townscape assessment and potential views from Conservation Areas listed buildings have been considered as part of the assessment. The site is located within close proximity to the Castlefield Conservation Area to the west, the St John's, St Ann's and Deansgate Conservation Areas to the north/north-west, and the St Peter's Square Conservation Are to the north-east. Notable buildings within the city centre with potential for a visual relationship with the Proposed Development include but are not limited to: the Grade II* listed Manchester Central; Grade II* listed Midland Hotel; Grade II* listed Central Public Library; Grade I listed Town Hall; Grade I listed Albert Memorial; Grade II* listed Town Hall Extension; and Grade I listed St Ann's Church. Reference should be made to Heritage (Chapter 7) of the Environmental Statement. There is also an overarching desirability set out within the NPPF for new development to contribute positively to local character and distinctiveness.

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

6.16 Manchester's Core Strategy was adopted in July 2012. Relevant policies from the Strategy for the purposes of this chapter are outlined below.

Policy EN1 Design Principles and Strategic Character Areas

6.17 All development in Manchester will be expected to follow the seven principles of urban design, as identified in national planning guidance and have regard to the strategic character area in which the development is located. Opportunities for good design to enhance the overall image of the City should be fully realised, particularly on major radial and orbital road and rail routes.

Policy EN2 - Tall Buildings

6.18 Tall buildings are defined as buildings which are substantially taller than their neighbourhoods and/or which significantly change the skyline. Proposals for tall buildings will be supported where it can be 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, by terminating a view, or by signposting a facility of significance; and
- Will bring significant regeneration benefits.

6.19 A fundamental design objective will be to ensure that tall buildings complement the City's key existing building assets and make a positive contribution to the evolution of a unique, attractive and distinctive Manchester, including to its skyline and approach views. Suitable locations will include sites within and immediately adjacent to the City Centre with particular encouragement given to non-conservation areas and sites which can easily be served by public transport nodes.

6.20 Elsewhere within Manchester tall building development will only be supported where, in addition to the requirements listed above, it can be shown to play a positive role in a coordinated place-making approach to a wider area. Suitable locations are likely to relate to existing district centres. The height of tall buildings in such locations should relate more to the local, rather than the City Centre, urban context. By their very size tall buildings can have a significant impact on the local environment and its micro-climate.

6.21 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. It will be necessary for the applicant/developer to demonstrate that proposals for tall buildings are viable and deliverable.

Policy EN3 Heritage

6.22 “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”.

6.23 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.

6.24 Proposals which enable the re-use of heritage assets will be encouraged where they are considered consistent with the significance of the heritage asset.

Policy EN9 Green Infrastructure

6.25 New development will be expected to maintain existing green infrastructure in terms of its quantity, quality and multiple function. Where the opportunity arises and in accordance with current Green Infrastructure Strategies the Council will encourage developers to enhance the quality and quantity of green infrastructure, improve the performance of its functions and create and improve linkages to and between areas of green infrastructure. Where the benefits of a proposed development are considered to outweigh the loss of an existing element of green infrastructure, the developer will be required to demonstrate how this loss will be mitigated in terms of quantity, quality, function and future management.

6.26 The continued development of a network of green spaces, water bodies, canals, paths and cycleways, with priority given to those parts of the City where there is an identified existing lack of open space. The Council will seek to protect existing street trees and promote new planting, particularly where this can enhance green links in the urban area.

6.27 The provision of new, and improvements to the quality and accessibility of existing green infrastructure assets, to mitigate for any loss of green infrastructure.

6.28 The encouragement of green roofs, green walls, tree planting and other forms of green infrastructure to allow for the adaption to climate change in heavily urbanised areas. New green infrastructure provision should be an exemplar of best practice and innovation in terms of both its design and management.

Place Making and Design

6.29 In accordance with NPPF development in Manchester will be expected to follow the seven design principles set out below:

- Character: a place with its own identity.
- Continuity and enclosure: a place where public and private places are clearly distinguished.
- Quality of the public realm: a place with attractive, and successful outdoor areas.
- Ease of movement: a place that is easy to get to and move through.
- Legibility: a place that has a clear image and is easy to understand.
- Adaptability: a place that can change easily.
- Diversity: a place with variety and choice.

6.30 The protection and enhancement of local environmental quality, however, involves understanding and respecting the character and distinctiveness of place and townscape. A Character Study was prepared which considered Manchester's historical development and topography and identified eleven strategic character areas. New development in Manchester will be expected to take into consideration its location within the specific character areas and reinforce the sense of place and local distinctiveness of the City.

Guidance

6.31 The following guidance has been used in the assessment:

- Guidelines for Landscape & Visual Impact Assessment, 3rd Edition, 2013 (hereafter referred to as the Guidelines);
- Planning Practice Guidance; and
- IEMA Environmental Impact Assessment Guide to Shaping Quality Development, 2015.

6.32 The Places for Everyone Plan took effect and became part of the statutory development plan for nine PfE authorities on March 21, 2024. It is a long-term plan of nine Greater Manchester districts (Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan) for jobs, new homes, and sustainable growth. It has been published by the GMCA on behalf of the nine districts. The policies contained within PfE of relevance to this assessment are outlined below.

Policy JP-Strat2: City Centre

6.33 The policy states that, "The role of the City Centre as the most significant economic location in the country outside London will be strengthened considerably. The City Centre will continue to provide the primary focus for business, retail, leisure, culture and tourism activity in Greater Manchester, but the increasingly important residential role of the City Centre will be expanded. Development will generally be high density".

Policy JP-P2: Heritage

6.34 The policy aims to "conserve, sustain and enhance our historic environment and heritage assets and their settings", with the aim of "the promotion, enjoyment, understanding and interpretation of heritage assets, as a means of maximising wider public benefits and reinforcing Greater Manchester's distinct character, identity and sense of place".

Assessment Methodology and Significance Criteria

Scenarios Tested

6.35 As a result of the proposed phasing, it will be necessary to test a number of scenarios within the Townscape and Impact Assessment to ensure robustness. The TVIA scenarios to be assessed are:

- Scenario 1: (Existing Baseline) = The Existing Baseline is the Site as is today i.e. Phase 1 tower as built with the various amendments. The baseline visual assessment also includes a series of views which include a 'Future Baseline'. In essence, this includes consented schemes which are currently under construction. As stated in GLVIA3 guidance, "the approach taken to consented developments may vary on a case by-case basis. Where it is likely that a consented development will be constructed before the project under consideration, it may be appropriate to include it as part of the future baseline in the main assessment so that the effects of the proposed development are reported against that baseline." For the purposes of this assessment the following schemes are considered part of the 'Future Baseline' and are illustrated with a wireline where relevant within the 'Future Baseline' images presented in Appendix 6.2.

  - 70 Great Bridgewater Street 129081/FO/2021

  - Plot 11 First Street 125573/FO/2019

  - Plot 9a First Street 132600/FO/2021

  - St Michael's/Land Bounded by Jacksons row, Bootle Street, Southmill Street and 201 Deansgate 114664/FO/2016

  - 325-327 Deansgate 125804/FO/2019

  - Plot 10b First Street 136170/FO/2023

  - Deansgate South (Fusion) 129406/FO/2021

  - Plot F Great Jackson Street (Contour) 132199/FO/2021.

  - Number 3 Circle Square 134288/FO/2022

- Scenario 2: Existing Baseline + Viadux Plot 2a + Viadux Plot 2b.

- Scenario 2a: Existing Baseline + Viadux Plot 2a + Viadux Plot 2b + cumulative.

6.36 The cumulative visual assessment only assesses identified developments that are visible in the viewpoints. The 10 committed developments assessed are:

- Vision Tower 111003/FO/2016/C1
- Bridgewater House Great Jackson Street 134694/FO/2022
- One City Road 128002/FO/2020
- Park Place (Plot G, Great Jackson Street) 129273/FO/2021
- Metropolitan University Library 138424/FO/2023
- Student Castle 121252/FO/2018
- Plot 11C First Street South 138831/FO/2023
- Land Bounded by Deansgate, Great Bridgewater Street, Watson Street and Peter Street (Great Northern) 135565/FO/2022.
- Land Bounded By Trumpet Street, Albion Street & Great Bridgewater Street (Apex Tower) 133172/FO/2022 & 133176/FO/2022
- 1 Commercial Street 128433/FO/2020
- One Medlock Street (Premier Inn) 135419/FO/2022
- Land Bounded by River Street to the North, Plot 10b to the East, Hulme Street to the South and Plot 9a to the West (Plot 10, First Street) 136043/FO/2023
- Part Of Plot C And Plot E Great Jackson Street (Crown Street Phase 3 'The Green')137226/FO/2023
- Plot D Great Jackson Street (The Lighthouse) 137227/FO/2023

The Study Area

6.37 The study area for the townscape assessment is approximately 500m from the centre of the Site, in order to encompass the full extents of the Site, the townscape context, and the immediately adjacent townscape character areas which the Proposed Development may significantly influence. The study area has been defined through a process of desktop and on-site survey and assessment, combined with professional judgement, in accordance with the Guidelines for Landscape and Visual Impact.

Methodology

6.38 The assessment has been based on the architectural masterplans, and the Design and Access Statement which accompanies the application, and verified photomontage views of the Proposed Development.

6.39 Desk based studies were carried out to collate and map baseline townscape information and carry out a review of policy and guidance to inform the assessment.

6.40 Potential viewpoints were initially identified through a process of desktop and on-site survey before being checked on the ground. Viewpoints were excluded where there was likely to be no impact beyond that which was already identified within the selected views.

6.41 Photographs for the selected viewpoints were taken by a professional photographer in November and December 2023.

6.42 In order to provide the most comprehensive, rounded and objective view of the townscape and visual effect of the proposed development, the scale of the assessed effects have been agreed following round-table review by a team of individual assessors within Planit-IE.

6.43 The criteria used to assess the scale of effect are set out in the subsequent sub-sections. This has been determined by consideration of the sensitivity of the receptor, and the magnitude of impact.

Townscape Receptor Sensitivity Criteria

6.44 The sensitivity of townscape receptors is determined through combining judgments about the susceptibility of the receptor to change and the value of the receptor.

Value of Townscapes

6.45 Whilst the assessment of townscape value is partly based on the planning policy importance of the townscape, the value of undesignated assets has also been considered based on criteria taken from the Planning Practice Guidance.

6.46 Table 6.1 sets out the scale of value for designated townscape receptors (in the case of this project, this applies to conservation areas). Table 6.2 and 6.3 together set out the scale of value for non-designated townscape receptors (all other townscape receptors considered in the assessment).

Table 6.1 Criteria for assessing the Value of Designated Townscapes

Value	Description
High	Sites, features, or areas of national or international importance with settings of high quality such as World Heritage Site, AONB, National Parks, Grade I and Grade II* Listed buildings or Registered Parks and Gardens.
Medium	Sites, features, or areas of local or regional importance with intact character such as Grade II* and Grade II Listed Buildings or Registered Parks and Gardens, Conservation Areas, Scheduled Monuments, local nature site, long distance recreational routes. Tree Preservation Orders (TPO) and local designations that exhibit wider geographic, cultural or townscape significance.
Low	Areas or features of local importance such as Tree Preservation Orders (TPO), Public Right of Way (PROW) and locally listed buildings.

Table 6.2 Criteria for assessing the Value of Non-Designated Townscapes

Value	Description
Functional	A building or place should be fit for purpose, designed, and delivered in a way that delivers the intended function and achieves value for money in terms of lifetime costs.
Mix of uses	Mix of uses to ensure easy access to facilities and encourage a healthier environment, reducing the need to travel.
Well-designed public space	Functional and attractive hard and soft landscape elements, well orientated and designed routes, inclusion of facilities such as seats and play equipment and public art.
Buildings designed to be adaptable	Flexibility to be able to respond to a range of future needs – how easily buildings change be adapted for change of use, places that are easy and practical to manage with good access, natural surveillance and hard-wearing materials that are easy to repair.
Distinctive character	Consideration of the local pattern of street blocks and plots; building forms; details and materials; style and vernacular.
Attractive spaces	Consideration of streetscapes, townscapes, buildings and elements within them all, microclimates and views should all be considered. This is also affected by the way a townscape is perceived using the senses and the effect of transient elements such as the presence of human activity and resulting tranquility or vibrancy.

Promotes ease of movement	All users should be able to move safely, conveniently, and efficiently to and within a place, appropriate number of legible routes to and through it, good connections with each other and other destinations.

Table 6.3 Value of Non-Designated Townscapes

Value	Description
High	Sites, features or areas that display the relevant criteria above to a 'high' extent.
Medium	Sites, features or areas that display the relevant criteria above to a 'medium' extent.
Low	Sites, features or areas that display the relevant criteria above to a 'low' or 'negligible' extent.

Susceptibility of Townscape Receptors to Change

6.47 Susceptibility to change is the ability of a townscape receptor to accommodate the specific proposed development without undue negative consequences.

6.48 The susceptibility of townscape receptors to change has been assessed using the criteria set out in Table 6.4 with reference to the baseline conditions.

Table 6.4 Townscape Receptor Susceptibility to Change

Susceptibility	Criteria
High	Little ability to accommodate the proposed development without undue harm.
Medium	Some ability to accommodate the proposed development without undue harm.
Low	Substantial ability to accommodate the proposed development without undue harm.

Overall Sensitivity of Townscape Receptors

6.49 The assessment of receptor sensitivity combines judgements on the susceptibility of the receptor to the specific type of development proposed and the value attributed to that receptor in accordance with the matrix below.

Table 6.5 Overall Sensitivity of Townscape Receptors

Townscape Value	Susceptibility to change		
	High	Medium	Low
High	High	Moderate to high	Moderate
Medium	Moderate/high	Moderate	Low/moderate
Low	Moderate	Low/moderate	Low

Visual Receptor Sensitivity Criteria

Type of View and Number of Viewers

6.50 In accordance with the Guidelines, in order to analyse the visual baseline the following range of factors have been considered:

- The nature of the view - glimpsed (i.e. in passing)/filtered/oblique/framed/open views;
- The number of viewers - few/moderate/many viewers,
- The distance between the viewpoint and the site,

- Whether it is a stationary or transitory view from a footpath or moving vehicular, and
- The current skyline, visual complexity of the view and current focus.

Value of Views

6.51 The value attached to views has regard to a number of factors, including:

- Recognition through planning designations or heritage assets; and
- The popularity of the viewpoint, its appearance in guidebooks, literature or art, on tourist maps and the facilities provided for its enjoyment.

6.52 The assessment of the value of views is summarised in Table 6.6 below, in terms of High, Medium and Low value. These criteria are provided for guidance only and are not intended to be absolute.

Table 6.6 Value of Views

Value	Description
High	Views from townscapes/viewpoints of national importance, or highly popular visitor attractions where the view forms an important part of the experience, or with important cultural associations.
Medium	Views from townscapes/viewpoints of regional/district importance or moderately popular visitor attractions where the view forms part of the experience, or with local cultural associations.
Low	Views from townscapes/viewpoints with limited designations, not particularly popular as a viewpoint and with minimal or no cultural associations.

Visual Receptor Susceptibility to Change

6.53 The susceptibility of different types of visual receptor to changes in views is mainly a result of:

- The occupation or activity of the viewer at a given location; and,
- The extent to which a person's attention or interest may therefore be focused on a view and the visual amenity experienced at a given view.

6.54 The assessment of a visual receptor to change is specific to the proposed development. However, the Guidelines for Landscape and Visual Impact Assessment offers the generic guidance identified in Table 6.7 as a starting point for the assessment.

Table 6.7 Visual Receptor Susceptibility to Change

Susceptibility	Criteria
High	Users of public space, including users of public rights of way, whose attention is likely to be focused on the townscape and on particular views. Visitors to heritage assets or other attractions where views of the surroundings are an important part of the experience, Communities where views contribute to the townscape setting enjoyed by residents. Travellers on scenic routes.
Medium	Travellers on road, rail or other transport routes, where the view is moderately important to the quality of the journey. Users of public space, where the view is a part of the wider experience of the place.
Low	People at their place of work, where the setting is not important to the quality of working life.

	Travellers on road, rail or other transport routes, where the view is fleeting and incidental to the journey. People engaged in outdoor sport or recreation, or users of a public space, which does not involve appreciation of views.

6.55 The Guidelines for Landscape and Visual Impact Assessment qualifies the above examples as follows:

6.56 "This division is not black and white and in reality, there will be a gradation in susceptibility to change. Each project needs to consider the nature of the groups of people who will be affected and the extent to which their attention is likely to be focussed on views and visual amenity." (page 114, paragraph 6.35).

Overall Sensitivity of Visual Receptors

6.57 The assessment of receptor sensitivity combines judgements on the susceptibility of the receptor to the specific type of development proposed and the value attributed to that receptor in accordance with the matrix below (Table 6.8), alongside professional judgement.

Table 6.8 Overall sensitivity of visual receptors

Value	Susceptibility to change		
	High	Medium	Low
High	High	Moderate to high	Moderate
Medium	Moderate/high	Moderate	Low/moderate
Low	Moderate	Low/moderate	Low

Magnitude of Impact Descriptors

6.58 In accordance with the GLVIA3, the magnitude of a given townscape or visual impact has been evaluated in terms of its size or scale, the geographical extent of the area influenced, and its duration and reversibility. A description of this terminology is provided in the following sub-sections.

Size and Scale of Impacts

The size and/or scale of impacts relates to the scale of physical changes in the townscape and the scale of the visible change in views, such as the loss or addition of features. This is broadly rated along the following scale:

- No Change – change would not be perceptible.
- Very Small – change would be just discernible.
- Minor – a small change would be perceptible.
- Moderate – change would be clearly noticeable.
- Major – total change would occur.

Geographical Extent of Impacts

6.59 The geographical extent of impacts relates to:

- The area over which townscape impacts are likely to be experienced, i.e. this could be at the site level, the immediate locality, across a neighbourhood or across a series of neighbourhoods (city-wide).

- The area over which the visual changes are likely to be visible, i.e. viewpoint within the site, viewpoint within the immediate locality, viewpoint across/ through a neighbourhood or a vista or vantage point across neighbourhoods or the city skyline (city-wide).

Duration/Reversibility

6.60 Impacts (and the resulting effect) may be experienced over a range of timescales. For this assessment, the following timescales are considered appropriate:

- Short-term: less than seven years in duration;
- Medium-term: Between eight and 12 years in duration.
- Long-term: Greater than 12 years in duration.

Townscape Impacts Magnitude Criteria

6.61 Alongside the size, scale, geographical extent, and duration and degree of reversibility a townscape impact also considers:

- The extent / proportion of townscape elements lost or added;
- The contribution of that element to townscape character and the degree to which aesthetic / perceptual aspects are altered; and,
- Whether the impact is likely to change the key characteristics of the townscape, which are critical to its distinctive character.

6.62 The magnitude of impact criteria for townscape receptors are shown in Table 6.9.

Table 6.9 Magnitude of Townscape Impacts

Category	Criteria
Major adverse	The proposals will result in a total change in the key characteristics of townscape character; will introduce elements totally uncharacteristic to the attributes of the receiving townscape; and/or will result in a substantial or total loss, alteration, or addition of key elements/features/characteristics.
Moderate adverse	The proposals will result in a partial change in the key characteristics of townscape character; will introduce elements partially uncharacteristic to the attributes of the receiving townscape; and/or will result in partial loss, alteration, or addition of key elements/features/characteristics.
Minor adverse	The proposals will result in a small change in the key characteristics of townscape character; will introduce elements that are not characteristic to the attributes of the receiving townscape; and/or will result in a minor loss, alteration, or addition of elements/features/characteristics.
Negligible adverse	The proposals will result in a just discernible change to townscape character/elements/features/characteristics.
No change	The proposals will cause no change to the townscape character/elements/features/characteristics.
Negligible beneficial	The proposals will result in a just discernible improvement to the townscape character/elements/features/characteristics.
Minor beneficial	The proposals will achieve a degree of fit with the townscape character/elements/features/characteristics and go some way towards improving the condition or character of the townscape.
Moderate beneficial	The proposals will achieve a good fit with the townscape character/elements/features/characteristics or would noticeably improve the condition or character of the townscape.
Major beneficial	The proposals will achieve a complete fit with the townscape character/elements/features/characteristics, or would substantially improve the condition or character of the townscape

Visual Impacts Magnitude Criteria

6.63 The magnitude of a visual impact is assessed in terms of its size or scale, the geographical extent of the area influenced by that impact, its duration and degree of reversibility and the impact these are likely to have on the baseline character of the view.

6.64 The magnitude of change in the view relates to the degree of contrast or integration likely to result from the proposed development and is influenced by the relative time over which a view is experienced and whether it is a full, partial or glimpsed view.

6.65 The criteria set out in Table 6.10 have been used to assess the magnitude of visual impacts, based on the degree of change to the view or composition.

Table 6.10 Magnitude of Visual Impacts

Category	Criteria
Major	The proposals will cause a dominant or complete change or contrast to the view, resulting from the loss or addition of substantial features in the view and will substantially alter the appreciation of the view.
Moderate	The proposals will cause a clearly noticeable change or contrast to the view, which would have some effect on the composition, resulting from the loss or addition of features in the view and will noticeably alter the appreciation of the view.
Minor	The proposals will cause a perceptible change or contrast to the view, but which would not materially affect the composition or the appreciation of the view.
Negligible	The proposals will cause a barely perceptible change or contrast to the view, which would not affect the composition or the appreciation of the view.
No change	The proposals will cause no change to the view.

Nature of Effects

6.66 In determining the scale of effect, consideration has also been given to the duration of the effect, i.e. short term (< 7 years) and medium term (8-12 years) and temporary, or long term (>12 years) and permanent. Effects may be temporary, permanent or reversible over time. For example, visual effects arising from construction activities may be limited solely to the construction period and therefore only temporary. The assessment therefore considers the practicality of effects being reversed.

6.67 The nature of the effect has been described as follows:

- Beneficial – An advantageous effect to a receptor.
- Adverse – A detrimental effect to a receptor.
- Neutral – An effect that is on balance both beneficial and adverse, or a proposal that fits with the existing character, or makes a positive contribution to by virtue of good design, even if it is in contrast to existing character.

6.68 Whether the effect is direct, indirect or secondary has also been considered. Direct effects are those that result directly from a development itself, whereas indirect effects may arise as a consequential change resulting from development.

Source of Effect

6.69 The sources of effect in relation to townscape and views include:

- Changes to the Petersfield townscape character area;
- Individual townscape receptors, including; urban grain, land use, building heights, movement and linkages, public realm and open space
- Site character.
- Views experienced by visual receptors (people) who would view the Proposed Development within the city centre and surrounding context.

Significance Criteria

6.70 This assessment has been carried out with reference to the Guidelines for Landscape & Visual Impact Assessment, 3rd Edition, 2013 (referred to hereafter as "the Guidelines"). By Planit-IE Ltd, a registered practice of the Landscape Institute with considerable experience in landscape and visual assessment. The photography and preparation of any Visually Verified Montages (VVMs) will be prepared in accordance with the Landscape Institutes Technical Guidance Notei.

6.71 A three-stage assessment process has been adopted. Firstly, the nature of receptors (sensitivity) will be assessed by combining judgements on the susceptibility of the townscape receptor to the specific type of development proposed and the value attributed to that receptor combined with professional judgement. In assessing the sensitivity of visual receptors, key factors to be considered are the type of view and the number of viewers. Sensitivity of townscape and visual receptors will be assessed on a scale of high, moderate and low.

6.72 Secondly, the magnitude of change is considered on a scale of major, moderate, minor or negligible. The magnitude of a townscape or visual effect is assessed in terms of its size or scale, the geographical extent of the area influenced by that effect, its duration and degree of reversibility and the impact these are likely to have on the baseline character of the townscape element or view. The magnitude of change in the view relates to the degree of contrast or integration likely to result from the proposed development and is influenced by the relative time over which a view is experienced and whether it is a full, partial or glimpsed view.

6.73 From this, the overall significance of the identified effects on receptors will be assessed. Significant effects will be determined through combining judgements about the sensitivity of the receptor and the magnitude of the effects, combined with professional judgment using the following matrix.

Table 6.12 Impact Significance Matrix

			Sensitivity		
Magnitude	High	High/Moderate	Moderate	Moderate/Low	Low
Major	Major Adverse/ Beneficial	Major - Moderate Adverse/ Beneficial	Moderate Adverse - Beneficial	Moderate - Minor Adverse - Beneficial	Minor Adverse -Beneficial
Moderate	Major - Moderate Adverse/ Beneficial	Moderate Adverse – Beneficial	Moderate - Minor Adverse – Beneficial	Minor Adverse/Beneficial	Minor-Negligible Adverse/ Beneficial

Minor	Moderate Adverse/ Beneficial	Moderate-Minor Adverse/ Beneficial	Minor Adverse/ Beneficial	Minor-Negligible Adverse/Beneficial	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Baseline Conditions

Townscape Character and Heritage assets

6.74 The Site lies within Manchester City Centre, as defined by Manchester Core Strategy 2012-2027. The City Centre is defined as the area inside the Inner Relief Route and extends to the south to encompass the Oxford Road Corridor and includes several distinct areas.

6.75 The Site is located adjacent to the city centre's Civic Quarter and Central Business District within the Petersfield townscape character area, as defined by the Local Plan. Petersfield is characterised by its blend of historic listed buildings, modern architecture and high quality cultural and leisure facilities. The area is home to Manchester Central – the city's premier conferencing venue, the Bridgewater Hall, the Great Northern Warehouse and some of the region's best hotels. The Great Northern Warehouse is set to be transformed with the addition of 3 new buildings up to 34 storeys in height, which will include residential and high quality office use.

6.76 The Site includes part of the Grade II listed Castlefield Railway Viaduct and there are a number of other listed buildings within the vicinity of the Site and within the Site's visual envelope.

6.77 The future baseline for the Petersfield character area, which forms the study area for this townscape assessment, includes the following developments:

- 70 Great Bridgewater Street - a reconfiguration of Great Bridgewater Street to create a new office building and 2 storey rooftop extension.
- St Michaels (on the northern edge of the Petersfield character area, overlapping with the Central Business District) - development up to 171.6AOD of residential, office, hotel, place of worship and leisure/food and drink uses, along with associated public realm and highways alterations.
- 325-327 Deansgate - 22 storey apart-hotel with commercial uses to ground floor and within railway viaduct arches, associated public realm and access works.

6.78 The future baseline development will consolidate the existing character of Petersfield by contributing additional contemporary development with some cultural and leisure uses.

Urban Grain

6.79 The wider study area presents predominantly a fairly coarse urban grain to the north reflecting the location in the city centre. The elevated Metrolink line and viaduct form a significant north-south barrier between the centre and its surroundings. The grain is punctuated by occasional green open spaces. Although partially developed with Phase 1, the Site forms a void within the urban grain which adversely impacts on townscape character at what is a key arrival point into the city centre. The Future Baseline development will create a minor positive addition to the urban grain by infilling an existing gap or by reinforcing the existing grain.

Land Use

6.80 The surrounding area is primarily commercial and retail lead with some hotel and residential functions. The Great Northern Warehouse Manchester Central Conference Centre (referred to hereafter as MCCC) are

located to the north of the Site on Great Bridgewater Street. Great Northern Warehouse is a major leisure facility containing food and retail outlets, a multi-storey car park, a cinema complex and a casino. The Great Northern is set to be redeveloped with existing leisure use to be replaced with residential and office use, with food and retail uses retained as part of the new development. The MCCC is an exhibition and conference centre converted from the former Manchester Central railway station. The two developments are commercial in character and divided by Watson Street. Both buildings are Grade II* listed. In the immediate vicinity of the Site, Viadux Phase 1 and Great Northern Tower are residential in nature, and the Beetham Tower is in residential and hotel in use. In the future baseline, a further hotel development is currently under construction at 325 Deansgate. The future baseline development will consolidate the existing land uses within Petersfield through the contribution of some additional cultural and leisure uses.

Building Heights

6.81 Building heights within the site context have increased significantly, with well-defined clusters of tall buildings defining the city skyline. The Beetham Tower is a key landmark in Manchester city centre and a defining feature of the city skyline at 47 storeys in height. It is mixed-use development occupied by the Hilton Hotel and private apartments. Deansgate Square is located to the south of Deansgate railway station and north of the Mancunian Way, bounded by Deansgate, Owen Street and the River Medlock. It includes a cluster of 4 towers, which have substantially changed the Manchester skyline since construction began in 2016. The tallest of the 4 towers stands at 67 storeys. Viadux Phase 1 stands at 40 storeys, with the nearby Axis building at the corner of Whitworth Street west and Albion Street at 28 storeys. The 28 storey Fusion building and 10 storey Plot9a are located to the south of the Site. The tall building clusters contrast with the more horizontal massing of Manchester Central, the Great Northern Warehouse and more historic buildings within the southern portions of the city centre. In the future baseline, St Michael's and 325 Deansgate are under construction within the study area, at up to 171.6AOD and 22 storeys respectively.

Movement and Linkages

6.82 The viaduct runs along the southern edge of the city on an east-west axis and functions as a primary public transport route for people travelling into and out of the city centre. Deansgate-Castlefield Metrolink Station, located immediately adjacent to the site to the south, forms a major arrival point into the city. The Site is located at a key nodal point at the convergence of key axis into and out of the city centre – Deansgate to the west, Lower Mosley Street to the east, and Whitworth Street West to the south.

6.83 The assessment predates the opening of the Phase 1 building, when pedestrian permeability and connectivity between the Site and the surrounding context was adversely affected by the barrier effect of the viaduct, and ongoing construction works to Viadux Phase 1. It is noted that the current site conditions are now more aligned with the future baseline condition and includes some of the public realm, access and landscape proposals which will form a very minor contribution to movement and linkages.

Public Realm and Public Open Space

6.84 The Site does not currently contain any public open space. The quality of the public realm is currently poor due to a lack of a defined use and ongoing construction works. Nearby, Castlefield Urban Heritage Park is located to the west and forms a green space in which to appreciate the significant history of the city. A substantial area of public realm to the north of Manchester Central forms an important meeting/gathering space. Similarly, the open amphitheatre space and Great Northern Square to the north of the Great Northern Warehouse forms an informal gathering space and flexible space for events and restaurant spill-out. Castlefield Viaduct forms a new attraction within the city and within close proximity to the Site. It aims to create a 'sky garden' and has been transformed by the National Trust. The future baseline developments include public realm, access and landscape proposals which will form a very minor contribution to movement and linkages.

Site Character

6.85 The Site is currently underutilised and detracts from what is a key nodal point and major arrival point into the city. The Site largely forms a void in the urban grain, and is disconnected from the surrounding context due to lack of clear function, major highways infrastructure, ongoing construction works and complex level changes.

Site Visibility

6.86 Views of the Site are experienced by a high number of viewers due to the city centre location, position adjacent to the Deansgate-Castlefield Metrolink Station, and close to the convergence of key routes. The Site also sits on elevated ground levels above the viaduct.

Identification and Evaluation of Likely Significant Effects

Construction Phase

6.87 The potential effects of the Proposed Development that are likely to be significant for townscape and views during the construction phase are identified in Table 6.13 below.

Table 6.13 Likely Significant Construction Phase Effects

Description	Adverse/Beneficial
Changes to existing views due to the introduction of construction activity and partially constructed built form as a result of: • Presence of the site compound(s). • Erection of site boundary fencing. • Site clearance and demolition of buildings. • Ground Works including site levelling and preparation. • Contractor parking and plant and equipment storage. • Presence of construction traffic. • Works and construction machinery, including high level cranes, associated with construction of the Proposed Development. • Night-time (security and winter) lighting.	Adverse

Townscape Impacts

6.88 During the construction stages, impacts range from negligible adverse (land use, building heights, public realm and open space and site character) to minor adverse (townscape character area, urban grain, movement and linkages) The townscape construction phase effects are not considered to be significant.

Visual Impacts

6.89 The Visual Impact Assessment (VIA) considers 28 viewpoints of the Site and the Proposed Development, considering: the existing baseline scenario (i.e. the Site as it is today); where relevant, the future baseline (including buildings that are currently under construction but not yet visible in the baseline photography); the Proposed Development; and the Proposed Development together with other cumulative developments.

6.90 The VIA is supported by one night-time view (View 4 from Lower Mosley Street) and three kinetic views. The kinetic views allow a more experiential representation of the potential impacts by indicating how moving

through a place can change the visibility of a tall building. Kinetic views can allow an appreciation of hidden revealed views which often add interest to the character of an area and can improve the appreciation of the townscape. They can also better reflect the impact on heritage assets and their settings.

6.91 During the construction phase, the VIA concludes that the Proposed Development will lead to:

- Temporary moderate adverse impacts from views 4 (Lower Mosley Street), 11, (Oxford Road/Portland Street), 13 (Princess Street / Mosley Street – St Peter's Square), 14 (Albert Square), 20 (St Ann's Square / St Mary's Gate) and 28 (Albert Square/Friends Meeting House). The construction works (including the emerging building structure, tower cranes and other construction activities) will either by prominent or, in the case of Albert Square dominant, in these views. Cumulative impacts remain temporary moderate adverse in all cases where present. These effects are considered to be significant
- Temporary minor adverse impacts from views 1, 3, 5, 6, 12, 15, 17, 21, 22, 25 and 27, where the construction works would be clearly visible from the selected viewpoint. The cumulative impact in View 6 from Deansgate/Quay Street increases to moderate adverse as a consequence of the construction of Great Northern. The cumulative impact in View 25 from Hulme Park increases to moderate adverse because of the construction of buildings across the Great Jackson Street framework in the view. All other views remain minor adverse when considered together with other committed developments.
- There is a temporary neutral or negligible impact from views 2, 7, 8, 9, 10, 16, 18, 19, 23, 24 and 26. The cumulative impact in View 10 from Medlock Street/A5103 increases to moderate adverse because of the construction of One Medlock Street, One City Road and Vision in the view. All other views remain neutral or negligible adverse when considered together with other committed developments.

Operational Phase

6.92 The potential effects of the Proposed Development likely to be significant for townscape and views during the operational phase are identified in Table 6.1 below.

Table 6.14 Likely Significant Operation Phase Effects

Description	Adverse/Beneficial
Changes to existing views as a result of: Changes to built form and urban grain. Changes to land use. Changes to building heights. Changes to movement and linkages. Changes to public realm and open space. Changes to site character.	Adverse to Beneficial
Changes to townscape due to: Change to 'sense of place' as a result of changes to townscape character. Changes to urban grain as a result of new built form. Changes to land use as a result of new built form, public realm and open space.	Beneficial

Changes to building heights as a result of new development. Changes to movement and linkages as a result of integration of a new movement hierarchy for vehicles, cyclists and pedestrians. Changes to public open space and public realm as a result of the changes to existing public realm and open spaces, and creation of new public spaces. Changes to site character as a result of new built form and landscape.	

Townscape

6.93 In the operational phase, once the Proposed Development is completed, the assessment concludes that it would have a moderate beneficial impact across all townscape criteria, as summarised below:

- It will contribute positively to townscape character with new buildings of a scale and massing to reflect the site's location on a prominent junction and major strategic route from the south. The Proposed Development would be in keeping with Petersfield, which is characterised by a blend of historic listed buildings, and modern architecture. The slender vertical form and glazing will allow the Proposed Development to form a well-defined tall building cluster to mark a key gateway within Petersfield. The materiality and contemporary styling also provides a contrast to the warmer tones of historic buildings and structures which are intrinsic to the character of the neighbouring conservation areas, helping visually define the scheme as a landmark site within the Petersfield townscape character area. This effect has been assessed as significant.
- The proposed urban grain will repair the broken grain of the area and reflect the wider character of the grain in Petersfield and of the Beetham Tower, to the west. The varied form, scale, massing and arrangement of the buildings reflects the wider context of the site and infills a currently disjointed site, which has a limited urban grain at a key gateway. This effect has been assessed as significant.
- The provision of a new mix of land-uses would respond to uses within the surrounding character area of Petersfield, and the immediately adjacent tall building cluster. The proposed mix of residential, hotel and commercial land-uses in Plots 2A and 2B, respond to the character and mix of land-uses within the Petersfield character area and support and strengthen surrounding character areas, including delivery of affordable homes in the city centre core. This effect has been assessed as significant.
- The proposed building heights range from 23 to 76 storeys, and are appropriate to the Site's existing context, in proximity to the Beetham Tower and Viadux Phase 1. The Proposed Development further strengthens this strategic site and its surroundings as a landmark and development cluster on the periphery of the city centre. The design of the three Viadux towers of different heights, with a landscaped central podium level, will result in a scheme of varied massing that achieves a good degree of separation within the scheme and with surrounding buildings. The varied massing, form, scale and arrangement, complement the height of the existing Beetham Tower and creates a stepped effect that makes for a more diverse skyline, within an emerging cluster of buildings, which includes: Axis, and Beetham Tower.. This effect has been assessed as significant.
- The Proposed Development will retain and improve the existing movement and linkages, activating the former railway arches and surrounding streets accordingly. The existing pedestrian routes through the Site will be hugely improved with a high-quality landscape setting of low-level planting and new trees. Activation primarily occurs along Great Bridgewater Street through the creation of new pedestrian linkages to the north and south. The removal of the deck to the Great Bridgewater Bridge provides an open and visual linkage between the site and the road below, enhancing the street

environment for pedestrians and cyclists (who are traveling along the National Cycle Route 6). This effect has been assessed as significant.

- With respect to public realm and open space, the Proposed Development will capitalise on the site's unique, elevated setting, expanding upon the enhanced green space at Deansgate Metrolink. The proposals will vastly improve the pedestrian environment and legibility between Deansgate Metrolink into the site. The streetscene along Albion Street will be enhanced with a new pedestrianised space that forms the entrance to the hotel and restaurant. The space include new trees and planting with a new vehicular drop off area. Material palettes will tie the landscaped pedestrian route into the adjacent Deansgate Metrolink public space, creating a high-quality large open area, and orientation point into the southern city core. Different material palettes will offer varying character to the landscape podium. A variety of uses are proposed for the landscape podium between Phase 1 and Plot 2a, which will activate the space with seating areas and terraces. This effect has been assessed as not significant.
- The Proposed Development will create an entirely new site character, transforming the Site from one of no identity to a high quality scheme that ties into its context, bridges and adjacent spaces. This character will be defined by the physical form and scale of the new buildings, the mix of uses provided within the buildings, through the re-activation of the old railway arches at street level and creation of new public realm areas around them. The development will strengthen the Beetham Tower and its environment as a landmark destination to the south of the city centre, creating a strong tall building cluster. This effect has been assessed as significant.

Visual Impact

6.94 During the operational phase once construction is complete, the VIA concludes that the Proposed Development will lead to:

- A moderate beneficial impact from view 4 from the Lower Mosley Street, in the baseline and cumulative scenarios. It would be in-keeping with the towers which form the backdrop to the view whilst, due to the height and closer proximity of Plot 2a, forming a prominent new addition to the view. The Proposed Development does not block views to any listed buildings within the view and contrasting materiality would allow the Midland Hotel and Manchester Central to retain their importance within the view. High quality design and architectural detailing would create a high-quality new landmark within the view. In the night-time view 4, the impact is assessed to be moderate neutral as the architectural detailing would be unlikely to be appreciable at night. A sensitive approach to lighting would allow the subtly illuminated Manchester Central to retain its importance within the nighttime view. This effect is considered to be significant.
- A moderate adverse impact from view 11 from Oxford Road/Portland Street. The Proposed Development would form a prominent new addition to the view, which contrasts with the scale and massing of other development within the view and would detract from the visual prominence of heritage assets within the view. In the cumulative scenario, the impact remains assessed as moderate adverse. This effect is considered to be significant.
- A moderate adverse impact from view 13 on St Peter's Square. Whilst the Proposed Development would not be out of keeping with the existing character of the view, it would form a prominent new landmark in the view that would detract from the importance of built heritage assets enclosing the Square. High quality design and a sensitive approach to materiality would reduce the overall magnitude of impact. In the cumulative scenario, the impact remains assessed as moderate adverse. This effect is considered to be significant.
- A moderate adverse impact from view 20 (St Ann's Square) as it would form a tall, slender addition that is uncharacteristic within the existing view. This is true in the baseline and cumulative context. This effect is considered to be significant.

- A moderate adverse impact from view 28 (Albert Square/Friends Meeting House) the Proposed Development would form a prominent new landmark in the view that would contrast and detract from the importance of built heritage assets in the foreground of the view. High quality design and a sensitive approach to materiality would reduce the overall magnitude of impact and create a contrast with the existing materiality of the heritage assets seen within the view. This effect is considered to be significant.
- From Albert Square, view 14 results in a moderate neutral impact in the existing and cumulative context. The Proposed development would form a new landmark within the backdrop of the view, which would be in-keeping with the existing character of the backdrop of the view, which is characterised by tall, contemporary buildings. The Proposed Development will not obscure views to listed heritage assets within Albert Square. It would form a perceptible change in the view but would not materially affect the composition or appreciation of the view. This effect is considered to be significant.
- A minor beneficial impact from views 1, 2, 5, 6, 7, 8, 9, 10, 12, 15, 17, 19, 23, 24, 25 and 26. This is principally as a result of consolidating the tall building cluster around the Beetham Tower and Viadux Phase 1 and as a result of the high-quality architectural design. When considered in the cumulative scenario, the impacts from views 6 (Deansgate), 7 (Castlefield Viaduct) and 25 (Hulme Park) are assessed as being moderate beneficial, as the other committed developments help to consolidate the clusters in the view. View 10 (Medlock Street / A5103) is also assessed to provide a moderate beneficial impact by creating a positive interface at the southern gateway into Manchester, signifying the ongoing development and regeneration of the area. The cumulative effect of development on Viewpoint 9 (Castle Street) has been assessed as 'neutral' due to the degree of 'sprawl' created by tall building development, however the perceived lower height of cumulative development, comparable to the existing roofline in the foreground prevents adverse cumulative effects. These effects are not considered to be significant.
- A minor adverse impact from views 3, 21 and 22. This impact is not changed in the cumulative scenario. These effects are not considered to be significant.
- Minor neutral or negligible impacts from views 16 and 18. These effects are not considered to be significant.
- There is 'no view' from viewpoint 27.

6.95 In summary, whilst the Proposed Development is assessed to result in instances of temporary adverse impact during the construction phase, once completed it will predominantly result in beneficial impacts upon the townscape and visual setting of the city. These largely beneficial impacts are considered to outweigh relatively isolated instances of minor or moderate adverse impact. A Tall Building Statement considering the proposals against Historic England guidance and the criteria of Policy EN2 is included in the next section of this report.

Cumulative Effects

6.96 Petersfield townscape character area containing the Site is characterised by its blend of historic listed buildings, modern architecture and high quality cultural and leisure facilities. The following schemes are located in the Petersfield character area and have the potential to result in cumulative townscape effects in conjunction with the Proposed Development:

- 10-12 Whitworth Street (111003/FO/2016/C1. Demolition and development of 35 storey residential tower.

- Great Northern (135565/FO/2022. The proposals include 3 residential towers of 16, 27 and 34 storeys in additional demolition, restoration and office and food and drink uses with enhanced public realm.
- Apex Tower (133172/FO/2022. The proposals are for a 26 storey residential tower and 7 storey commercial space with residential above.

6.97 The proposed cumulative development within Petersfield will be characterised by tall buildings with primarily residential use, which will positively consolidate the existing and emerging character of Petersfield in conjunction with the Proposed Development and future baseline.

6.98 The cumulative visual assessment is contained within Appendix 6.2 (Visual Baseline and Assessment). A total of 28 viewpoints have been considered cumulatively in the construction and operational phases. The summary conclusions of this assessment are:

- There are two views which have no cumulative visual effects, these are Views 21 and 27. There are no committed developments which are visible within these views. There are also no cumulative visual effects for views 16 and 27, as the Proposed Development is not visible. There are 22 views with no in-combination visual effects in addition to those identified for the Proposed Development. These include; views 1 - 5, 8 - 9, 12-15, 17- 24, 26, and 27.
- A total of nine viewpoints were assessed as having significant cumulative effects in both construction and operational phases - these were views 4,6,7,10,11,13,14,20 & 25. Effects were all moderately adverse in the construction phase and moderately adverse (views 11,13 & 20)/ moderately beneficial (views 4,6,7,10 &25) in the operational phase.
- There are four viewpoints where the Proposed Development has been assessed as resulting in effects that are 'not significant' during the construction phase but will result in significant adverse effects when considered cumulatively during the construction phase. These are viewpoints 6, 7, 10 and 25.
- There are four viewpoints where the Proposed Development has been assessed as resulting in 'not significant' during the operational phase but will result in significant beneficial effects when considered cumulatively during the operational phase. These are viewpoints 6, 7, 10 and 25.

Mitigation Measures

6.99 The assessment of the townscape and visual effects is set out in full within Appendices 6.1 and 6.2.

6.100 The implementation of good site management, maintenance and housekeeping would ensure that the temporary deterioration to townscape character and visual amenity will be kept to a practical minimum. Despite these better practice measures, there would still remain inevitable adverse effects during construction works.

6.101 The Proposed Development has been designed through an iterative process, which avoids, reduces or offsets potential impacts on townscape and views, minimising the need for additional mitigation. The extent of mitigation ‘designed in’ to the Proposed Development means that townscape and visual effects are likely to remain as residual effects after any supplementary mitigation has been implemented.

Construction Phase

6.102 A summary of the mitigation relevant to townscape and views embedded within the CEMP is outlined below:

- Minimised disruption to ongoing use of adjacent buildings through protection and maintenance of existing highways and footpaths. This will minimise any potential impacts on movement and linkages and visual amenity from construction vehicle movements.

- Site lighting will be carefully considered to ensure the required level of safety and security is achieved without causing excessive nuisance to neighbours. This will minimise any potential impacts on visual amenity.
- Specialist contractors will work with the design team during the design stages to find the most efficient and economical solutions in reducing waste during the construction phase. In addition, the strategy for maximising the levels of works through prefabrication off site will further reduce waste generation. This will minimise any potential impacts on movement and linkages and visual amenity from construction vehicle movements, by minimising the number of vehicle movements required to remove waste off site.
- The site will operate a strict vehicle one-way access regime, with only one vehicle being allowed into site at any time, the rest will be held off site and called in to site when the space is available. No vehicle holding will be allowed in the adjacent streets. This will minimise any potential impacts on movement and linkages and visual amenity from construction vehicle movements.
- 3rd party consultation to minimise potential disruption e.g through road closures. Co-ordination of construction activities with wider city centre developments within close proximity to avoid or reduce potential cumulative construction phase effects.
- Development of lifting strategy around a single tower crane. This will minimise any potential impacts on visual amenity.

Operational Phase

6.103 A summary of the 'designed in' embedded mitigation relevant to townscape and views is outlined below:

- Tree species and materials will be selected to continue Phase 1 design, to provide a cohesive character within the townscape character and views. In Plot 2a six trees are proposed to the streetscape. Species are selected for their aesthetic value. Planting beds are flush or below the edge of the footway so that surface runoff can drain into them, aiding the drainage strategy. Planting species will be climate resilient and selected to suit the conditions of the site.
- The edges of the buildings will be activated with seating and planting which will contribute positively to townscape character and key views.
- At the viaduct level, a redesigned service yard for the conference centre is enclosed by a new podium structure with residents' external amenity space above. There will be potential for planting to be visible and provide visual interest from the public realm at street level.
- Lighting within the Plot 2a roof gardens will be designed to be sensitive to potential light pollution.
- A new area of public realm associated with the hotel and restaurant entrances will help to define and activate the junction, creating an appropriate sense of arrival and contributing positively to townscape character and views. New tree and shrub planting will create a positive green pedestrian environment. On Albion Street, the kerb line will be pushed out to create a new vehicular drop off and more generous public realm and facilitate pedestrian movement. a challenging level change will be accommodated through the introduction of an informal series of cascading, green seating walls. This creates a sense of enclosure to the space and shelter from the busy road. Planting, is utilised for sustainable drainage management where possible.
- A section of the Great Bridgewater Street bridge will be removed to bring light into the street below and introduces the high-quality materials to create an enhanced streetscene and enhance perceptions of safety.
- On the eastern side of the Plot 2b building will be two new building entrances which will create additional edge permeability to what is currently an inactive edge.

- Introduction of wind mitigation panels within Plot 2b will function as wayfinding or artwork, which will contribute positively to defining and reinforcing townscape character.
- The public realm in Plot 2b will positively enhance movement and linkages, with inclusion of space which connects the level 1 viaduct, Deansgate-Castlefield tram stop and Great Bridgewater Street.
- Commercial uses within the arches at ground floor opening onto Great Bridgewater Street will reactivate the space.

Residual Effects

6.104 There are no additional mitigation measures proposed in relation to townscape and views in addition to embedded mitigation measures. For the purposes of this Townscape and Visual Impact Assessment, only effects deemed 'moderately significant' and 'significant' are considered to be significant in the meaning of EIA Regulations (2017).

6.105 A detailed assessment of effects is contained within Appendix 6.1 and Appendix 6.2. A verified kinetic views assessment is contained within Appendix 6.3. The kinetic views allow a more experiential representation of the potential impacts by indicating how moving through a place can change the visibility of a tall building. Kinetic views can allow an appreciation of hidden revealed views which often add interest to the character of an area and can improve the appreciation of the townscape. They can also better reflect the impact on heritage assets and their settings.

Construction Phase

6.106 Significant residual construction phase impacts are summarised in the table 6.15 below. Table 6.15 summarises only the construction phase effects that are significant residual effects. The full assessment of construction phase impacts is contained within Appendices 6.1, 6.2 and 6.3.

Table 6.15 Significant Construction Phase Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Moderate Adverse	Viewpoint 4	None	N/A	Moderate adverse effects. Temporary. Significant.
Moderate Adverse	Viewpoint 11	None	N/A	Moderate adverse effects. Temporary. Significant.
Moderate Adverse	Viewpoint 13	None	N/A	Moderate adverse effects. Temporary. Significant.
Moderate Adverse	Viewpoint 14	None	N/A	Moderate adverse effects. Temporary. Significant.
Moderate Adverse	Viewpoint 20	None	N/A	Moderate adverse effects. Temporary. Significant.
Moderate Adverse	Viewpoint 28	None	N/A	Moderate adverse effects. Temporary. Significant.

Operational Phase

6.107 Significant residual operation phase impacts are summarised in the table 6.16 below. Table 6.15 summarises only the operational phase effects that are significant residual effects. The full assessment of operational phase impacts is contained within Appendices 6.1, 6.2 and 6.3.

Table 6.16 Significant Operation Phase Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Moderate Beneficial	Townscape Character - Petersfield	None	N/A	Moderate beneficial effects. Permanent. Significant.
Moderate Beneficial	Urban Grain	None	N/A	Moderate beneficial effects. Permanent. Significant.
Moderate Beneficial	Land Use	None	N/A	Moderate beneficial effects. Permanent. Significant.
Moderate Beneficial	Building Heights	None	N/A	Moderate beneficial effects. Permanent. Significant.
Moderate Beneficial	Movement and Linkages	None	N/A	Moderate beneficial effects. Permanent. Significant.
Moderate Beneficial	Site character	None	N/A	Major beneficial effects. Permanent. Significant.
Moderate Beneficial	Viewpoint 4	None	N/A	Moderate beneficial effects. Permanent. Significant.
Moderate Neutral	Viewpoint 4 - Nighttime view	None	N/A	Moderate neutral effects. Permanent. Significant.
Moderate Adverse Viewpoint 11	None	N/A	Moderate adverse effects. Permanent. Significant.	
Moderate Adverse	Viewpoint 13	None	N/A	Moderate adverse effects. Permanent. Significant.
Moderate Neutral	Viewpoint 14	None	N/A	Moderate neutral effects. Permanent. Significant.
Moderate Adverse	Viewpoint 20	None	N/A	Moderate adverse effects. Permanent. Significant.
Moderate Adverse	Viewpoint 28	None	N/A	Moderate adverse effects. Permanent. Significant.

Monitoring

6.108 No monitoring during the operational phase of Proposed Development is recommended in relation to townscape and views.

Reference List

6.109 This ES Chapter has been prepared in reference to the following:

- Council of Europe (Florence, 2000). The European Landscape Convention.
- Landscape Institute, Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment, Third Edition.
- Landscape Institute Technical Guidance Note 06/09 (2019). Visual Representation of Development Proposals. Available at: https://www.landscapeinstitute.org/visualisation/. [Accessed: 14/12/2023].

- Manchester City Council Core Strategy 2012-2027 (2012). https://www.manchester.gov.uk/info/200074/planning/6573/core_strategy_2012-2027. [Accessed: 14/12/2023].
- Planning Practice Guidance. The National Planning Policy Framework and relevant planning practice guidance (2023). Available at: https://www.gov.uk/government/collections/planning-practice-guidance. [Accessed: 14/12/2023].
- Institute of Environmental Management and Assessment (2015). IEMA Environmental Impact Assessment Guide to Shaping Quality Development, 2015.
- Historic England (2022). Historic England Advice Note 4. Available at: https://historicengland.org.uk/images-books/publications/tall-buildings-advice-note-4/. [Accessed: 14/12/2023].

Non-Technical Summary

What is Townscape and Visual?

6.110 This Chapter of the Environmental Statement has been prepared by Planit and assesses townscape and visual impacts. Townscape and Visual Impact Assessment (TVIA) is a tool used to identify and assess the likely significance of the effects of change resulting from development both on the townscape in its own right and on People's views and visual amenity. The 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 negative effects; and the likely residual effects after these measures have been adopted.

6.111 This chapter is accompanied by the following appendices:

- Appendix 6.1: Townscape Baseline and Assessment.
- Appendix 6.2: Visual Baseline and Assessment.
- Appendix 6.3: Verified Kinetic Views Assessment.

What has been assessed?

6.112 The Site lies within Manchester City Centre, as defined by Manchester Core Strategy 2012-2017. The following townscape receptors have been considered in the assessment:

- Townscape character and heritage assets. The Site lies within Manchester City Centre, as defined by Manchester Core Strategy 2012-2017, within the Petersfield townscape character area. Petersfield is characterised by its blend of historic listed buildings, modern architecture and high quality cultural and leisure facilities. The Site includes part of the Grade II listed Castlefield Railway Viaduct and there are a number of other listed buildings within the vicinity of the Site and within the Site's visual envelope.
- Urban grain. Urban grain is a description of the pattern of development blocks. Although partially developed with Phase 1, the Site forms a void within the urban grain which adversely impacts on townscape character at what is a key arrival point into the city centre.
- Land Use.
- Building Heights.
- Movement and Linkages.
- Public Realm and Public Open Space.
- Site Character.

6.113 Visual receptors are individuals and/or defined groups of people who have the potential to be affected by a proposal. The following 28 key views represent a range of visual receptors and were considered within the assessment:

- View 1 from Deansgate/Castlefield Metrolink View from Albion St/Whitworth St
- View 2 from Great Bridgewater Street
- View 3 from Lower Mosley Street
- View 4 from Watson Street
- View 5 from Deansgate/Quay Street
- View 6 from Castlefield Viaduct
- View 7 from First Street, James Grigor Square
- View 8 from Castle Street
- View 9 from Medlock Street/A5103
- View 10 from Oxford Road/Portland Street
- View 11 from Liverpool Road
- View 12 from Princess St/Mosley St
- View 13 from Albert Square
- View 14 St. John's Gardens
- View 15 from A56/Chester Road
- View 16 from Manchester Road
- View 17 from Regent Road
- View 18 from canal at Middlewood Locks
- View 19 from St Anns Square/St Mary's Gate
- View 20 from Corporation St Metrolink
- View 21 from Corporation St Metrolink

- View 22 from Piccadilly Gardens/Market Street
- View 23 from Piccadilly Station/Fairfield Street
- View 24 from Mayfield Park
- View 25 from Hulme Park
- View 26 from Epping Walk Bridge/Hulme Arch
- View 27 from St Peter's Square -Town Hall Extension
- View 28 from Albert Square - Friends Meeting House

6.114 Although not fully complete and visible within the baseline views, all developments that are currently on-site have been considered as part of the future baseline for the purposes of this townscape and visual assessment. Together, they form part of the 'future baseline' for the city, which assumes that any development currently under construction will come forwards as consented.

6.115 As a result of the proposed phasing, it will be necessary to test a number of scenarios within the Townscape and Impact Assessment to ensure robustness. The TVIA scenarios to be assessed are:

- Scenario 1: (Existing Baseline) = The Existing Baseline is the Site as is today i.e. Phase 1 tower as built with the various amendments. The baseline visual assessment also includes a series of views which include a 'Future Baseline'. In essence, this includes consented schemes which are currently under construction. As stated in GLVIA3 guidance, "the approach taken to consented developments may vary on a case by-case basis. Where it is likely that a consented development will be constructed before the project under consideration, it may be appropriate to include it as part of the future baseline in the main assessment so that the effects of the proposed development are reported against that baseline." For the purposes of this assessment the following schemes are considered part of the 'Future Baseline' and are illustrated with a wireline where relevant within the 'Future Baseline' images presented in Appendix 6.2.
- - 70 Great Bridgewater Street 129081/FO/2021
- - Plot 11 First Street 125573/FO/2019
- - Plot 9a First Street 132600/FO/2021
- - St Michael's/Land Bounded by Jacksons row, Bootle Street, Southmill Street and 201 Deansgate 114664/FO/2016
- - 325-327 Deansgate 125804/FO/2019
- - Plot 10b First Street 136170/FO/2023
- - Deansgate South (Fusion) 129406/FO/2021
- - Plot F Great Jackson Street (Contour) 132199/FO/2021.
- Scenario 2: Existing Baseline + Viadux Plot 2a + Viadux Plot 2b.
- Scenario 2a: Existing Baseline + Viadux Plot 2a + Viadux Plot 2b + cumulative.

6.116 The cumulative visual assessment only assesses identified developments that are visible in the viewpoints. The 10 committed developments assessed are:

- Vision Tower 111003/FO/2016/C1
- Bridgewater House Great Jackson Street 134694/FO/2022
- One City Road 128002/FO/2020

- Land Bounded by Deansgate, Great Bridgewater Street, Watson Street and Peter Street (Great Northern) 135565/FO/2022.
- Land Bounded By Trumpet Street, Albion Street & Great Bridgewater Street (Apex Tower) 133172/FO/2022 & 133176/FO/2022
- 1 Commercial Street 128433/FO/2020
- One Medlock Street (Premier Inn) 135419/FO/2022
- Land Bounded by River Street to the North, Plot 10b to the East, Hulme Street to the South and Plot 9a to the West (Plot 10, First Street) 136043/FO/2023
- Part Of Plot C And Plot E Great Jackson Street (Crown Street Phase 3 'The Green')137226/FO/2023
- Plot D Great Jackson Street (The Lighthouse) 137227/FO/2023

What is the effect of the Proposed Development on Townscape and Views?

6.117 There are not predicted to be any significant adverse effects on the townscape during the construction phase. There are predicted to be temporary moderate adverse (significant) construction phase effects on views 4 (Lower Mosley Street), 11, (Oxford Road/Portland Street), 13 (Princess Street / Mosley Street – St Peter's Square), 14 (Albert Square), 20 (St Ann's Square / St Mary's Gate) and 28 (Albert Square/Friends Meeting House). The construction works (including the emerging building structure, tower cranes and other construction activities) will either by prominent or, in the case of Albert Square dominant, in these views. Cumulative impacts remain temporary moderate adverse in all cases where present. These effects are considered to be significant

6.118 During the operational phase (developed), there are predicted to be significant beneficial effects on the following townscape receptors:

- Petersfield Townscape Character Area;
- Urban Grain;
- Land Use;
- Building Heights;
- Movement and Linkages, and ;
- Site Character.

6.119 During the operational phase once construction is complete, the VIA concludes that the Proposed Development will lead to:

- A moderate beneficial impact from view 4 from the Lower Mosley Street, in the baseline and cumulative scenarios. It would be in-keeping with the towers which form the backdrop to the view whilst, due to the height and closer proximity of Plot 2a, forming a prominent new addition to the view. The Proposed Development does not block views to any listed buildings within the view and contrasting materiality would allow the Midland Hotel and Manchester Central to retain their importance within the view. High quality design and architectural detailing would create a high-quality new landmark within the view. In the night-time view 4, the impact is assessed to be moderate neutral as the architectural detailing would be unlikely to be appreciable at night. A sensitive approach to lighting would allow the subtly illuminated Manchester Central to retain its importance within the night[1]time view. This effect is considered to be significant.
- A moderate adverse impact from view 11 from Oxford Road/Portland Street. The Proposed Development would form a prominent new addition to the view, which contrasts with the scale and

massing of other development within the view and would detract from the visual prominence of heritage assets within the view. In the cumulative scenario, the impact remains assessed as moderate adverse. This effect is considered to be significant.

- A moderate adverse impact from view 13 on St Peter's Square. Whilst the Proposed Development would not be out of keeping with the existing character of the view, it would form a prominent new landmark in the view that would detract from the importance of built heritage assets enclosing the Square. High quality design and a sensitive approach to materiality would reduce the overall magnitude of impact. In the cumulative scenario, the impact remains assessed as moderate adverse. This effect is considered to be significant.
- A moderate adverse impact from view 20 (St Ann's Square) as it would form a tall, slender addition that is uncharacteristic within the existing view. This is true in the baseline and cumulative context. This effect is considered to be significant.
- A moderate adverse impact from view 28 (Albert Square/Friends Meeting House) the Proposed Development would form a prominent new landmark in the view that would contrast and detract from the importance of built heritage assets in the foreground of the view. High quality design and a sensitive approach to materiality would reduce the overall magnitude of impact and create a contrast with the existing materiality of the heritage assets seen within the view. This effect is considered to be significant.
- From Albert Square, view 14 results in a moderate neutral impact in the existing and cumulative context. The Proposed development would form a new landmark within the backdrop of the view, which would be in-keeping with the existing character of the backdrop of the view, which is characterised by tall, contemporary buildings. The Proposed Development will not obscure views to listed heritage assets within Albert Square. It would form a perceptible change in the view but would not materially affect the composition or appreciation of the view. This effect is considered to be significant.
- A minor beneficial impact from views 1, 2, 5, 6, 7, 8, 9, 10, 12, 15, 17, 19, 23, 24, 25 and 26. This is principally as a result of consolidating the tall building cluster around the Beetham Tower and Viadux Phase 1 and as a result of the high-quality architectural design. When considered in the cumulative scenario, the impacts from views 6 (Deansgate), 7 (Castlefield Viaduct) and 25 (Hulme Park) are assessed as being moderate beneficial, as the other committed developments help to consolidate the clusters in the view. View 10 (Medlock Street / A5103) is also assessed to provide a moderate beneficial impact by creating a positive interface at the southern gateway into Manchester, signifying the ongoing development and regeneration of the area. The cumulative effect of development on Viewpoint 9 (Castle Street) has been assessed as 'neutral' due to the degree of 'sprawl' created by tall building development, however the perceived lower height of cumulative development, comparable to the existing roofline in the foreground prevents adverse cumulative effects. These effects are not considered to be significant.
- A minor adverse impact from views 3, 21 and 22. This impact is not changed in the cumulative scenario. These effects are not considered to be significant.
- Minor neutral or negligible impacts from views 16 and 18. These effects are not considered to be significant.
- There is 'no view' from viewpoint 27.

6.120 In summary, whilst the Proposed Development is assessed to result in instances of temporary adverse impact during the construction phase, once completed it will predominantly result in beneficial impacts upon the townscape and visual setting of the city. These largely beneficial impacts are considered to outweigh relatively isolated instances of minor or moderate adverse impact.

[i] Landscape Institute Technical Guidance Note 06/09 (2019). Visual Representation of Development Proposals. Available at: https://www.landscapeinstitute.org/visualisation/. [Accessed: 27/09/2022].

7. Built Heritage

Introduction

7.1. This Chapter of the ES has been prepared by Stephen Levrant Heritage Architecture and asseses the likely Built Heritage impacts of the proposals 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.

7.2. This Chapter is accompanied by the following appendices:

- Heritage Significance Appraisal (Appendix 7.1)
- Heritage Impact Assessment (Appendix 7.2)

7.3. The authors of this Chapter are Sarah Stirling (BA Hons, MA) and Kirsten McKnight (BA Hons, MA, MSc, IHBC) who collectively have c.20 years' experience in producing ES Chapters on the built historic environment.

	Lead Author	**Reviewer**
Name	Sarah Stirling	Kirsten McKnight
Company	Stephen Levrant Heritage Architecture	Stephen Levrant Heritage Architecture
Qualifications/Accreditations relevant to technical area	BA (hons), MA (hons)	BA (Hons), MA, MSc, IHBC
Does the practitioner hold any IEMA qualification?	No	No
Company hold IEMA QMark?	No	No
Years technical experience (in technical area)	5	15
Number of EIA's delivered to date	15+	30+

Assumptions and Limitations

7.4. Survey of the identified heritage assets within the study area was undertaken from publicly accessible areas. As such the study is limited to assessment from ground level. An assessment of below ground archaeology does not form part of this assessment.

Relevant Legislation, Policy and Guidance

Legislation

7.5. The Heritage Statement (Appendix 7.1 and 7.2) has been prepared in accordance with or with reference to the following legislation, policy, and guidance:

7.6. Section 66 of the Planning (Listed Building and Conservation Areas) Act 1990 requires the Local Planning Authority to “have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses” when considering whether to grant planning permission.

7.7. Section 72 of the Act is also of relevance, as it embodies the “general duty as respects conservation areas in exercise of planning functions” and stipulates that “special attention shall be paid to the desirability of preserving or enhancing the character or appearance of that area”.

Policy

National Planning Policy Framework, NPPF (December, 2023)

7.8. Section 16 of the National Planning Policy Framework (NPPF, 2023) sets out the Government’s planning policies on the conservation of the historic environment.

7.9. The policies in the NPPF constitute the Government’s view of what sustainable development in England means in practice. In these terms, development proposals which fail to give due weight to the conservation of heritage assets are deemed not to be sustainable development and consequently shall not be supported. This is because one of the key dimensions of sustainability is protecting and enhancing our historic environment.

7.10. The NPPF stresses that “great weight” should be given to the conservation of designated heritage assets (paragraph 205), emphasising the need to avoid substantial harm, in terms of demolition, alteration or the compromise of its setting. The fundamental objective is to ensure that the balance of the impact on the heritage assets is demonstrably beneficial, minimising any negative impact on their significance.

7.11. The NPPF establishes a clear hierarchy of significance for heritage assets, derived from their designated status. The fundamental objective is to avoid compromising designated heritage assets, such that any potential ‘harm’ from a development must be balanced against the potential advantages of the public benefits that may outweigh any harm.

7.12. Degrees of harm are categorised within the NPPF as 'substantial' and 'less than substantial'. Para 207 states that 'Where a proposed development will lead to substantial harm to (or total loss of significance of) a designated heritage asset, local planning authorities should refuse consent, unless it can be demonstrated that the substantial harm or total loss is necessary to achieve substantial public benefits that outweigh that harm or loss'. Four subsequent tests apply to mitigate such harm.

7.13. Para 208 relates to 'less than substantial harm', stating that 'this harm should be weighed against the public benefits of the proposal including, where appropriate, securing its optimum viable use'.

7.14. The 'designated heritage asset' status of the identified Listed Buildings and Conservation Areas within and in the setting of any site requires that any potential 'harm' must be weighted and balanced against the potential advantages of the particular development. It is thus necessary to establish whether the effects of the proposals outweigh any perceived harm, in the context of the statutory duties set out above.

7.15. Local planning authorities may also identify non-designated heritage assets. These are buildings, monuments, sites, places, areas or landscapes identified as having a degree of significance meriting their consideration in planning decisions, but which are not formally designated heritage assets. As stated within para 209 of the NPPF, 'In weighing applications that directly or indirectly affect non-designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset'. For the purposes of this assessment, the LPA have not identified any non-designated heritage assets that they consider should be included within the study area of scoped in for assessment.

Local Planning Policy

7.16. Within Manchester's Local Development Framework, Extant Policies DC18.1 (Conservation Areas) and DC19.1 (Listed Buildings) of the Unitary Development Plan (UDP) and Policies CC9 (Design and Change) and EN3 (Heritage) of the Core Strategy 2012 are relevant to this assessment. These policies seek to preserve and enhance the setting of buildings and areas of architectural or historic interest.

7.17. Places for Everyone (PfE) was adopted in March 2024. PfE sets out the long-term plan of nine Greater Manchester districts for jobs, new homes and sustainable growth. The plan 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. The Proposed Development has been assessed against the policies contained within PfE, with particular focus on: Objective 4 and Policy JP-P 2.

Guidance

7.18. The Heritage Statement (Appendix 7.1 and 7.2) and ES Chapter have been prepared in accordance with the National Planning Practice Guide (PPG, July 2019) and The Heritage Statement (Appendix 7.1) has been written in accordance with Historic England Guidance. Including, Advice Note 12, 'Statements of Heritage Significance: Analysing Significance in heritage Assets' (October 2019); Good Practice Advice Note 2 'Managing Significance in Decision-Taking in the Historic Environment – March 2015' and Good Practice Advice Note 3 'The Setting of Heritage Assets – as amended December 2017'.

7.19. Assessment Methodology and Significance Criteria

Scenarios Tested

7.20. This ES Chapter (Section 7: Built Heritage) will test the following scenarios in respect of both construction and operational phases as relevant: 2, 2a, 3 and 3a, utilising Scenario 1 (Existing Baseline), summarised below:

- Scenario 1: (Existing Baseline and Future Baseline) = The Existing Baseline is the Site as is today i.e. Phase 1 tower as built, noting the office scheme which forms part of Phase 1 consent not built out and Plots 2a and 2b in their existing use. The baseline visual assessment also includes a series of views which include a 'Future Baseline' (seven in total, 1, 2, 6, 9 14, 16 and 20). In essence, this includes consented schemes which are currently under construction. As stated in GLVIA3 (third edition, updated 2024) guidance, "the approach taken to consented developments may vary on a case by-case basis. Where it is likely that a consented development will be constructed before the project under consideration, it may be appropriate to include it as part of the future baseline in the main assessment so that the effects of the proposed development are reported against that baseline." For the purposes of this assessment, St Michaels and 325 Deansgate are under construction and would be visible in the aforementioned views and therefore are considered as part of the future baseline.

- Scenario 2: Baseline (including consideration of Existing Baseline and Future Baseline, where relevant) + Viadux Phase 2 Plot a + Viadux Phase 2 Plot b;
- Scenario 2a: Baseline (including consideration of Existing Baseline and Future Baseline, where relevant) + Viadux Phase 2 Plot a + Viadux Phase 2 Plot b + cumulative;

The Study Area

7.21. The Site comprises a multi-layered plot above street level, on top of the Grade II Castlefield Viaduct, a portion of which falls within the defined site boundary. A series of brick-built piers and arches are arranged at ground level, with the 'Great Bridgewater Street Bridge' forming part of the high-level former service yard to the Manchester Central Convention Centre (Grade II*), which is situated just north of the Site boundary. A large portion of this area (west side) was developed as part of Viadux Phase 1 (recently completed). The arches at street level were also redeveloped in accordance with the consented scheme for Viadux Phase 1. A small portion of the land just east of the vacant 'slot site' (Plot 2b) is currently being developed with a new pedestrian stair, which will provide access to the Deansgate Metrolink stop.

7.22. The following ES Chapter assesses the effect of the Proposed Development on designated built heritage assets, both within the Site and within a 500m study area (Figure 7.1 and Figure 7.2). The study area was determined using professional experience and knowledge of the area and an understanding of the nature and form of the development, and its presence within the townscape. The study area provides a focus for assessment but is not intended to be prescriptive; buildings outside the boundary of the study area will be considered where relevant.

7.23. A Zone of Visual Influence (ZVI) prepared by Planit-IE has also informed the study area and has been used to identify those assets within the setting of the Site that have the potential to be indirectly affected by the Proposed Development (Figure 7.3). An initial study area of 1km was considered for the Built Heritage Assessment, this was subsequently discounted following the outcome of initial visual appraisal studies, worked up in tandem with Planit-IE. Key heritage views beyond the 500m study area have been included were necessary, including the view from St Ann's Square.

7.24. The Visual Impact Assessment (VIA), assesses 15 key viewpoints (supporting a total of 28 views as part of the wider townscape and visual impact analysis). In addition to a series of 15 static viewpoints and night-time views, two kinetic views have been produced to aid the assessment. As noted above, each view considers the Existing Baseline, Future Baseline (where relevant), Proposed, and Cumulative scenarios.

Surveys and Data Sources

7.25. The baseline assessment was undertaken using a combination of desk-based review of plans, maps, records and other documents. Principal sources of baseline information therefore included Historic England's National Heritage List for England (NHLE) and the Historic Environment Record (HER) (accessed November 2023).

7.26. Desk based research has been supplemented by on-site surveys in order to identify and assess the heritage significance of the heritage asset receptors (see Figure 7.1). It also establishes the way in which the settings and the Site contribute to the heritage significance of these assets. The relevant Conservation Area Appraisals of Manchester's designated areas have also been a primary data source (Figure 7.2).

7.27. The ZVI study has demonstrated that a number of the designated heritage assets within the study area will not be materially affected by the development and subsequently these have been scoped out of our assessment. The list of heritage assets scoped in for assessment is provided in Table 7.2.

7.28. Consideration has also been given to the historical development of the Site and the local area, building types and materials, key views to the notable historic buildings which contribute to the identification of the built form, and understanding of the special interest of the area.

Source of Effect

7.29. The assessment methodology for the historic environment is a synthesis of established guidance, best practice and professional judgement. The assessment of effects of the Proposed Development has been undertaken in accordance with an adapted form of the methodology set out in the ICOMOS Guidance on 'Heritage Impact Assessments' (January 2011), in which the value of heritage attributes is assessed in relation to statutory designations. The judgements on the significance or heritage value of assets are also informed by priorities or recommendations set out in national research agendas and ascribed values. Professional judgement is then used to determine the importance of the resource. The receptor (which for the purposes of this assessment are 'heritage assets') which has the potential to be affected by the Proposed Development is ascribed a value and subsequently the impact of the Proposed Development on them is assessed in order to determine the significance of the effect.

7.30. The following Historic England guidance has also informed the assessment undertaken in this Chapter:

- Historic England's Conservation Principles, Policies and Guidance (2008);
- Historic England's Good Practice Advice Note 3: The Setting of Heritage Assets (2017);
- Historic England's Advice Note 4: Tall Building Guidance (2022); and
- Historic England's Understanding Place: Conservation Area Designation, Appraisal and Management (2019).

The aims of this assessment have been:

- To establish the baseline environment regarding designated heritage assets related to the historic built environment, i.e. Listed Buildings and Conservation Areas.

- Assessment of the significance of the asset.
- Evaluation of the magnitude of impacts on the identified asset.
- Identification of mitigation in the form of further surveys, investigation and recording to be undertaken in light of the identified impacts.

Significance Criteria

7.31. Criteria has been established to appraise a heritage asset's significance. Statutory criteria, as set out in the 'Principles of Selection for Listing Buildings', DCMS (2018), provides a list of principles of assessing significance based on architectural and historic interest, age and rarity, aesthetic merits, selectivity and national interest. Historic England's criteria outlined in 'Conservation Principles, Policies and Guidance' (2008), are also considered in this assessment.

7.32. Evaluation of significance has been informed primarily by the designation of the assets at an international, national, regional or local level as well as their ability to contribute to an understanding of the past. This value rating has also been applied when considering sensitivity of views containing heritage assets. Indicative definitions for each of these ratings are outlined in Table 7.1 below:

Table 7.1 Significance Criteria for determining the value of heritage assets

Significance / Sensitivity	Definition of receptor
Very High	• Grade I listed buildings / Grade I registered parks and gardens • World Heritage Sites
High	• Grade I and Grade II* listed buildings. • Other buildings that can be shown to have exceptional qualities in their fabric or historical associations not adequately reflected in the listing grade. • Conservation Areas containing very important buildings.
Medium	• Grade II listed buildings. • Historic buildings that can be shown to have exceptional qualities in their fabric or historical associations. • Conservation areas containing buildings that contribute significantly to its historic character.
Low	• Locally listed buildings. • Historic buildings of modest quality in their fabric or historical association.
Negligible	• Recorded on the HER in record form or as 'Find Sites' • buildings, structures, or designed landscape features, which detract from the architectural design, historic, communal, or townscape interest of the principal heritage asset.
Unknown / none	• Buildings/sites where the potential importance interest requires determination • Or sites determined to be of no heritage interest

Baseline Conditions

Brief History and Development

7.33. A detailed historical development of the Site and the surrounding area is provided in the Heritage Significance Appraisal (Part 1) reproduced at Appendix 7.1 to this Chapter. We provide a summary description of the Site's historic development below.

7.34. During the 16th and 17th Centuries, the land to the south of Deansgate comprised a large ancient wood known as Aldport Park, which belonged to the Lords of Manchester and was documented as early as 1322. The early street pattern in the immediate area grew up around the ancient hamlet of Alport Town, containing many narrow courtyards, slum dwellings and alleyways. By the early to mid-Victorian period, the area was already infamous for having a large number of slum dwellings and for being an area of ill repute.

7.35. The construction of the new Manchester Central Railway Station in 1876-9 for the Midland Railway Company saw a large swathe of slum dwellings and small industrial buildings being cleared for the new station building and infrastructure, including the cast iron viaduct which was constructed over Great Bridgewater Street (the Site), and the large expanse of brick, vaulted undercroft arches to the south, which linked at high level the already extant Castlefield viaduct, to the new Central Station (now known as GMEX - Grade II*). This area on the outskirts of Manchester remained relatively undeveloped until the compulsory purchase of the Site by the Great Northern Railway Company in 1896. The purchase of the Site reflected one example of the intensification and industrialisation of the area in the second part of the 19th century and the contemporaneous development of the area with poor quality terraced housing, historically identified as an area of slums with a reputation of ill repute.

7.36. By the late 1890s, the need for a large new, city centre goods station saw the construction of the Great Northern Warehouse (Grade II*) and Deansgate Goods Station (Grade II) complex being constructed along the eastern side of Deansgate. This new multi-purpose and large-scale station saw further cast-iron viaducts being erected over the western end of Great Bridgewater Street. These were removed as part of the construction of the Beetham Tower (Hilton Hotel), and the conversion of the Great Northern Warehouse into a leisure complex, both in the late 1990s.

7.37. Along with the Metrolink tram system, which opened in 1992, other large cultural developments were constructed in the immediate environs around the site, such as the Bridgewater Hall in (1990-1996), the International Convention Centre, adjacent to Manchester Central, and the conversion of the former Great Northern Goods Depot, for leisure use (both opening in 2000). These large public venues invited further interaction with the formation of new public realms to the north front of Manchester Central, forming Manchester Central Piazza, the construction of the Bridgewater Hall on Lower Mosley Street, allowing the creation of Barbirolli Square and the restoration of the former Manchester and Salford Junction Canal and Bridgewater Canal basin, and the creation of the Great Northern Square to the north of the Great Northern Warehouse and Cinema complex.

Baseline Assessment

7.38. The heritage assets identified for assessment are valued and the impact of the Proposed Development on each is determined and the impact ascribed a significance of effect.

7.39. In order to predict the magnitude and significance of effect of the potential visual impact of the Proposed Development, the following criteria is considered:

- The sensitivity and proximity of receptors (i.e. heritage assets);
- The nature of the existing views;
- The degree of change to existing views and the visibility of the Proposed Development; and
- The availability and amenity of alternative views.

7.40. The assessment has identified 104 listed buildings (Figure 7.1) and ten Conservation Areas (Figure 7.3) in the 500m study area. The scoping exercise has determined that a number of these heritage assets have the potential to be impacted by the Proposed Development.

7.41. For the purposes of this assessment, the LPA have not identified any non-designated heritage assets that they consider should be included within the study area of scoped in for assessment.

7.42. Table 7.2 below sets out the heritage assets scoped in for assessment within this Chapter and their ascribed heritage value.

Table 7.2: Significance of Heritage Assets scoped in for assessment

Ref number	Heritage asset	Grade / Designation	Relative Significance / Value
1	Royal London House, Deansgate (west side) Nos.188 to 202.	Grade II	Medium
2	Rylands Library, Deansgate (west side)	Grade I	Very High
3	Sawyers Arms Public House, Deansgate (west side) No.138	Grade II	Medium
4	Deansgate, Nos.184 and 186	Grade II	Medium
5	Onward Buildings	Grade II	Medium
6	Elliot House	Grade II	Medium
7	Former entrance to Deansgate Station Nos.223 to 233	Grade II	Medium

8	Opera House Theatre, Quay Street	Grade II	Medium
9	Sunlight House, Quay Street (north side)	Grade II	Medium
10	Albert Memorial Hall, No.27	Grade II	Medium
11	Harvester House, Peter Street (north side), No.37.	Grade II	Medium
12	Lancashire House, Peter Street.	Grade II	Medium
13	Free Trade Hall, Peter Street	Grade II*	High
14	Former Theatre Royal (now listed as Royale Club) Peter Street.	Grade II	Medium
15	Peter Street (south side), No.56 to 58. Former Young Men's Christian Association .	Grade II	Medium
16	Peter Street (south side), Midland Hotel.	Grade II*	High
17	Mount Street, Friends' Meeting House.	Grade II	Medium
18	Albert Chambers, 16-18 Albert Square.	Grade II	Medium
19	Carlton House, Albert Square	Grade II	Medium
20	St Andrew's Chambers, Albert Square	Grade II	Medium
21	Manchester Town Hall Grade I	Grade I	Very High
22	Frasers Statue	Grade II	Medium
23	Brights Statue	Grade II	Medium

24	Heywood's Statue	Grade II	Medium
25	Gladstone's statue Fountain (Jubilee)	Grade II	Medium
26	Albert Square, Albert Memorial.	Grade I	Very High
27	Mulberry Street Roman Catholic Church of St. Mary.	Grade II	Medium
28	G-MEX. (Formerly listed as former Central Station.)	Grade II*	High-medium
29	Lawrence Buildings, Central Street, No.7	Grade II*	High
30	Central Public Library St Peter's Square	Grade II*	High
31	Albert Square, No.1. Abbey National	Grade II	Medium
32	Manchester Town Hall Extension	Grade II*	High
33	St. John Street Numbers 25 To 31 And Attached Former Chapel	Grade II	High-medium
34	St John Street No.8-8a	Grade II	High-medium
35	St John Street No.10	Grade II	High-medium
36	St John Street No.12-16	Grade II	High-medium
37	St John Street No.18-20	Grade II	High-medium
38	St John Street No.22	Grade II	High-medium
39	St John Street No.24	Grade II	High-medium
40	St John Street No.24a-26	Grade II	High-medium
41	St John Street No.28	Grade II	High-medium
42	St John Street No.21-25	Grade II	High-medium
43	St John St. No.19	Grade II	High-medium
44	St John Street No.11-17	Grade II	High-medium

45	Byrom Street - No.15.	Grade II	High-medium
46	St Johns College (Great John Street Hotel)	Grade II	Medium
47	Deansgate Goods Station and Attached Carriage Ramp.	Grade II*	High
48	Lloyds House.	Grade II	Medium
49	1-5 Central Street (North Side).	Grade II	Medium
50	Church of St Matthew	Grade II	Medium
51	Eagle House, Cross Street.	Grade II	Medium
52	Prudential Assurance Office.	Grade II	Medium
53	Northern Assurance Building, 9-21 Princess Street	Grade II	Medium
54	City Art Gallery, Mosley Street (East Side).	Grade I	Very High
55	The Athenaeum, 81 Princess Street (North East Side).	Grade II*	High
56	Memorial Cross, St Peter's Square	Grade II	Medium
57	Cenotaph, St Peter's Square	Grade II*	High
58	Castlefield Viaduct, GMex to Dawson Street	Grade II	Medium
59	Britons Protection, 50 Great Bridgwater Street	Grade II	Medium
60	13-17 Albion Street	Grade II	Medium
61	Lock 90 east of Albion Bridge	Grade II	Medium
62	Lock 91 west of Gaythorn Tunnel	Grade II	Medium
63	Rochdale Canal Lock Keepers Cottage at Lock 91	Grade II	Medium
64	Manchester Junction & Altrincham Railway Viaduct	Grade II	Medium
65	Chepstow House	Grade II	Medium

66	Canada House	Grade II	Medium
67	Peveril on the Peak	Grade II	Medium
68	Manchester and Salford Junction Canal Tunnel	Grade II	Medium
69	235-291, Deansgate	Grade II	Medium
70	Castlefield Information Centre	Grade II	Medium
71	Former Market Hall (Liverpool Road)	Grade II	Medium
72	21-41 Liverpool Road	Grade II	Medium
73	Museum Of Science and Industry, Air and Space Museum	Grade II	Medium
74	Power Hall Of Museum of Science and Industry	Grade II	Medium
75	Manchester Museum of Science and Industry, Former Lower Byrom Street Warehouse	Grade II	Medium
76	Old Warehouse to North of Former Liverpool Road Railway Station	Grade I	Very High
77	Liverpool Road Railway Station Masters House	Grade I	Very High
78	Former Commercial Hotel	Grade II	Medium
79	123 Liverpool Road	Grade II	Medium
80	St Ann's Church	Grade I	Very High
81	Former Congregational Chapel	Grade II	Medium
82	Merchants Warehouse	Grade II	Medium
83	Middle Warehouse at Former Castle Field Goods Yard	Grade II	Medium
84	Bridgewater House	Grade II	Medium
85	Remains of eastern wall of the Roman fort,	Scheduled Monument	Very high
86	Tootal, Lee and Broadhurst	Grade II*	High

87	George Street, 63	Grade II	Medium
88	Boundary Stone on Knott Mill Bridge	Grade II	Medium
89	Lee House	Grade II	Medium
90	Princes Building	Grade II	Medium
91	32 Dickinson Street	Grade II	Medium
92	110-114 Portland Street	Grade II	Medium
93	116-118 Portland Street	Grade II	Medium
94	127-133 Portland Street	Grade II	Medium
95	61 Oxford Street	Grade II	Medium
96	St James Building	Grade II	Medium
97	The Palace Theatre	Grade II	Medium
98	Manchester Oxford Road Station	Grade II	Medium
99	Former Refuge Assurance Company Offices	Grade II*	High
100	Chorlton New Mill and Attached Chimney	Grade II	Medium
101	Mill chimney stack on west side of junction with Cambridge Street	Grade II	Medium
102	Former Cotton Mill On West Side Of Junction With Cambridge Street	Grade II	Medium
103	Chorlton Old Mill	Grade II	Medium
104	Mill On Northeast Corner Of Junction With Chester Street	Grade II	Medium
A	St Peters Square Conservation Area	CA	High
B	Albert Square Conservation Area	CA	Very High
C	St Ann's Conservation Area	CA	High-medium

D	Deansgate / Peter Street Conservation Area	CA	High-medium
E	St Marys Parsonage Conservation Area	CA	Medium
F	St John Street Conservation Area	CA	High-medium
G	Castlefield Conservation Area	CA	Medium
H	Upper King Street	CA	High
I	Whitworth Street Conservation Area	CA	High
J	George Street Conservation Area	CA	Medium

Value/Importance of Heritage Assets

7.43. The relative 'value' and importance attributed to the identified heritage assets largely coincides with their national status. In line with ICOMOS terminology, generally, Grade I buildings are considered to be of very high significance; Grade II* of high significance; and Grade II of medium heritage significance. As indicated in Table 7.2 above, this tabulated approach is not intended to be prescriptive, but rather a guide to assessing significance. For instance, some Grade II listed buildings are identified as 'high-medium' due to the completeness / sensitivity of their setting and some Grade II* listed buildings are also identified as 'high-medium' due to their degree of alteration / greater capacity for change within their setting. The value of Conservation Areas is informed by the quality and significance of the built form within them and may be influenced by the status of listed and locally listed buildings which make up the designated area. The Heritage Statement (Heritage Significance Appraisal: Appendix 7.1 and Heritage Impact Assessment: 7.2) has been written within this overarching framework.

Identification and Evaluation of Likely Significant Effects

7.44. Built heritage impacts may be beneficial, adverse or neutral. If the Proposed Development will enhance heritage values or the ability to appreciate them, then the impact on heritage significance will be deemed to be beneficial. However, if the Proposed Development fails to sustain the heritage values of an asset or impairs an appreciation of their value then the impact will be deemed to be adverse. A neutral impact does not change how the significance of the heritage asset is appreciated or experienced.

Determining Magnitude of Impact and Significance of Effect

7.45. Table 7.3 below summarises the factors to be taken into consideration when assessing the magnitude of impact of the Proposed Development. The criteria are not intended to be prescriptive and the weighting to be accorded to each requires professional judgement.

Table 7.3 Significance Criteria for determining the value of heritage assets (adopted from ICOMOS Guidance)

Magnitude of Impact	Criteria for Assessing impact
Major beneficial	The development considerably enhances the heritage values of the heritage assets, or the ability to appreciate those values.
Moderate beneficial	The development enhances to a clearly discernible extent the heritage values of the heritage assets, or the ability to appreciate those values.
Minor beneficial	The development enhances to a minor extent the heritage values of the heritage assets, or the ability to appreciate those values.
Negligible beneficial	The resultant difference will be imperceptible but have a positive impact on the understanding or appreciation of the heritage asset.
Neutral	This does not necessarily mean that there will be no physical or visual change, rather that the resultant difference will be imperceptible or appropriately balanced
Negligible adverse	The development would not diminish the value of the heritage assets' significant physical fabric, their settings or significance to any appreciable degree.
Minor adverse	The development erodes to a minor extent the heritage values of the heritage assets, or the ability to appreciate those values.
Moderate adverse	The development erodes to a clearly discernible extent the heritage values of the heritage assets, or the ability to appreciate those values.
Major adverse	The development severely erodes the heritage values of the heritage assets, or the ability to appreciate those values.

7.46. Derived by combining the significant rating of each heritage asset with the magnitude of impact of the Proposed Development on each, Table 7.4 provides the overall assessment of the significance of the effect.

7.47. The magnitude of impact or 'significance of effect' is a product of the extent of change which is likely to result from the Proposed Development on the setting of a heritage asset (indirect) or the fabric and character of a heritage asset (direct).

7.48. Where the proposed changes are considered to enhance the setting or appreciation of a heritage asset, the impact on its significance will be deemed to be beneficial. Conversely, where the Proposed Development is considered to compromise its positive heritage values the impact on the significance will be deemed adverse. The effect may also be identified as 'neutral', this does not equate to 'no change', but rather, no material impact on the significance of the baseline receptor.

Table 7.4: Significance of Effect Matrix

Magnitude	Sensitivity		
	Very High / High	Medium	Low
Major	Major Adverse/Beneficial	Major-Moderate Adverse-Beneficial	Moderate –Minor Adverse-Beneficial
Moderate	Major –Moderate Adverse/Beneficial	Moderate –Minor Adverse-Beneficial	Minor Adverse/Beneficial
Minor	Moderate – Minor Adverse/Beneficial	Minor Adverse/Beneficial	Minor- Negligible Adverse/Beneficial
Negligible	Negligible Adverse/Beneficial	Negligible Adverse/Beneficial	Negligible Adverse/Beneficial
Neutral	Neutral	Neutral	Neutral

Baseline conditions (Scenario 1)

7.49. The Site comprises of a multi-layered plot above street level, on top of the Grade II Castlefield Viaduct, a portion of which falls within the defined site boundary. A series of brick-built piers and arches are arranged at ground level, with the 'Great Bridgewater Street Bridge' forming part of the high-level former service yard to the Manchester Central Convention Centre (Grade II*), which is situated just north of the site boundary. A large portion of this area (west side) is currently being developed with Viadux Phase 1 (recently completed). The arches at street level are also currently being redeveloped in accordance with the consented scheme for Viadux Phase 1. A small portion of the land just east of the vacant 'slot site' (Plot 2b) is currently being developed with a new pedestrian stair which will provide access to the Deansgate Metrolink stop.

7.50. In October 2024, an additional Site survey was undertaken. This confirmed the understanding of the baseline conditions, from which it is evident that Viadux Phase 1 is now complete. The consented office development, which formed part of the 2017 consent although implemented has not been delivered. Plot 2b remains vacant (Scenario 1).

7.51. For the purposes of this ES Chapter and for the avoidance of doubt, the existing baseline includes the Phase 1 residential tower.. It excludes both approved and implemented but undelivered office building, on Plots 2a and Plot 2b. respectively. This baseline is considered as 'Scenario 1' throughout subsequent discussion in relation to construction and operational impact.

7.52. Where visible in views and relevant to the assessment, the Future Baseline including St Michaels and 325 Deansgate, which are currently under construction, and are also assessed.

Construction Phase

7.53. During the demolition and construction phase, works related to the Proposed Development will trigger various construction impacts which in turn will temporarily directly and indirectly impact the heritage assets within the Site and indirectly impact those in its setting.

7.54. The assessment methodology and approach to the relative impact on heritage assets during the construction phase is based on evidence-based assumptions in relation to common issues such as demolition, dust, noise, site hoarding and scaffolding.

7.55. The proposals seek to remove sections of the Grade II listed Castlefield Viaduct in order to facilitate Viadux Plot 2a. The direct heritage impact (i.e. the physical works, alterations and change of use) will include removal of two linear sections of brick piers to form a central core and altering existing openings to Great Bridgwater Street to facilitate new openings within the arches along the street. The 76 storey tower above will be supported by concrete columns which in turn, will directly impact isolated sections of the listed arch. It will be evident the strategy for this aspect of the proposals will accord with the previous strategy for Phase 1.

7.56. With regard to Scenario 2: Baseline + Viadux Phase 2 Plot a + Viadux Phase 2 Plot b, it will be evident this will give rise to a minor adverse impact (direct – permanent) on the Grade II listed Castlefield Viaduct, due to loss of historic fabric. It will be clear the degree of fabric loss is marginally less than the 2017 submission.

7.57. The construction phase will also result in some disruption to the streetscape around these listed buildings and in turn, some temporary adverse impact upon their setting. It is therefore considered that Scenario 2 will give rise to temporary moderate adverse impacts on the settings of nearby heritage assets during the construction phase, principally those closest and contained within the site, including: Castlefield Viaduct (indirect – temporary), Briton's Protection (Grade II), 13-17 Albion Street (Grade II) and the G-MEX (Grade II). The effect on designated heritage assets, such as St Peters Square Conservation Area and the listed buildings contained within it is also identified as being moderate adverse (indirect – temporary).

7.58. A summary of the assessed effect upon individual heritage assets is provided at Table 7.5 below.

Operational Phase

7.59. The assessment methodology and approach to the relative impact on heritage assets during the completed / operational phase has been assessed utilising the suite of application plans and drawings and high-level images of the Proposed Development and professional judgement.

7.60. The potential physical and visual effects of the Proposed Development are considered in full within the Heritage Impact Assessment (Appendix 7.2) and the assessed effect on individual assets summarised in Tables 7.5, 7.6, 7.7 and 7.8 below.

<u>Direct (physical) impacts</u>

7.61. With regards to direct impact, the Heritage Impact Assessment (Appendix 7.2) has identified the impact upon the Castlefield Viaduct to be minor adverse. The current proposals offer a measurable improvement on the consented 2017 scheme (115871/FO/2017) as they have been designed to: avoid the loss of a significant section of the existing masonry abutments that stabilise the arches; and limit removal to the brickwork only, so springing stones are maintained and respect existing load-paths within the existing structure, minimising the risk of movement and damage. The Proposed Development also retains a large section of original cast iron girders which were previously consented to be removed as part of the 2017 application. The retention of these girders offers a greater degree of fabric retention and visual benefit at street level through the ability to read the historic significance of the structure.

7.62. With regard to Scenario 2: Baseline + Plot 2a + Plot 2b, it will be evident this will result in permanent loss of historic fabric, incurring a direct minor adverse impact. This impact is mitigated in part through the positive reactivation of the viaduct at street level, particularly with the new activation at street level, enhanced further through the retention of the cast iron girders along Great Bridgewater Street, resulting in some counterbalancing (minor beneficial) indirect impact on the Castlefield Viaduct. The hotel use has necessitated a change to the location of the main entrance, which is now proposed to be accessed via Albion Street, forming an open and striking new arrival point. Further benefit derives from the reactivation of the arches with new commercial uses (including a new bar) along Great Bridgewater Street, which will enable members of the public to experience and enjoy the viaduct structure, as opposed to this area being solely residential use.

7.63. As with the previously consented scheme, the direct heritage impact will remain minor adverse. It is however, considered that these interventions are appropriately balanced by the long term benefits the revised structural approach will provide alongside the public benefits of the wider scheme, paired with the added enhancement of retaining the cast iron girders to Great Bridgewater Street as part of the proposals

7.64. Whilst the Heritage Impact Assessment (Appendix 7.2) has demonstrated that the loss of historic fabric will result in localised instances of minor direct adverse impact (less than substantial harm). It will be clear that the main mitigation for the loss of historic fabric is to enable the creation of high-quality public realm, accessibility, and permeability throughout the spaces as well as the long-term viable use of the arches.

Visual impacts

Summary assessment of impacts

The potential visual effects of the Proposed Development are considered in full within Table 2. The Visual Impact Assessment (VIA), which assesses 15 key viewpoints (supporting a total of 28 views as part of the wider townscape and visual impact analysis), demonstrates that the Proposed Development will result in:

- 3 instances of minor beneficial impact,
- 1 instance of negligible-minor beneficial impact,
- 12 instances of negligible beneficial impact,
- 48 instances of neutral impact,
- 6 instances of negligible adverse impact,
- 4 instances of negligible-minor adverse impact,
- 23 instances of minor adverse impact,
- 11 instances of minor-moderate adverse impact, and
- 6 instances of moderate adverse impact.

Discussion

7.65. The development is experienced from several points within the immediate and wider townscape, with adverse impacts ranging from moderate adverse to negligible adverse. When considered on a collective basis, the level of harm is identified as 'less than substantial', albeit on the higher end of this scale. This harm would be both individually to

the designated heritage assets as well as their collective significance as a coherent group, in the case of the assets contained in St. Peters Square.

7.66. The Visual Impact Assessment (VIA) concludes that the Proposed Development will lead, in the worst-case scenario, to:

- Less than substantial harm, at the high or higher end of the scale of harm, from viewpoints: 4 – Lower Moseley Street (static and kinetic); 6 – Deansgate / Quay Street; 13 – Princess Street / Moseley Street (static and kinetic); 14 – Albert Square; 15 – St John's Gardens; 20 – St Ann's Square (static and kinetic); 28 – St Peter's Square, west side. These views consider variously the setting of: Midland Hotel (Grade II*); Central Library (Grade II*); Town Hall Extension (Grade II*); Town Hall (Grade I); Albert Square Memorial (Grade I); Deansgate Terrace (Grade II*); Great Northern Warehouse (Grade II*); St Johns Street (Nos.11-17, No.19, Nos.21-25 and 25-31 with attached former chapel); Church of St Ann (Grade I); St Peter's Square Conservation Area, Albert Square Conservation Area; and St Johns Conservation Area.

- Less than substantial harm at the mid-high end of the scale in viewpoint 3 from Great Bridgewater Street. This view considers the impact upon the setting of Chepstow House (Grade II), Peveril on the Peak (Grade II), and Canada House (Grade II).

- Less than substantial harm at the lower or lowest end of the scale from viewpoints: 1 – Deansgate / Castlefield Metrolink; 2 – Albion Street / Whitworth Street; 4 – Lower Mosley Street (night view). These views consider variously the impact upon heritage assets including: Manchester Central (Grade II*); Castlefield Viaduct (Grade II) Briton's Protection (Grade II, minor beneficial impact identified); and 13-15 Albion Street (Grade II, minor beneficial impact identified).

- Beneficial impact from viewpoints: 5 – Watson Street (minor beneficial impact on setting of Manchester Central); 9 – Castle Street (minor beneficial impact on setting of the Castlefield Conservation Area and Castlefield Viaduct, and negligible beneficial impact on the lock keepers cottage (Grade II); and 12 – Liverpool Road (negligible beneficial impacts on the Grade I and II listed assets on Liverpool Road).

- Neutral impact (i.e. no harm) from viewpoints 22 and 27.

Scenario 2

7.67. The Visual Impact Assessment has demonstrated that in Scenario 2, the Proposed Development will be highly visible from St. Peters Square, in south facing views towards the Midland Hotel (Grade II*), this is well represented in static Views 4, 13 and 28 and further demonstrated by the Kinetic view across St. Peters Square / Lower Mosley Street. Whilst experienced with an existing backdrop of tall buildings across the southern edge of the city centre, the height of Plot 2a combined with its more central location will undoubtably incur a much greater degree of change and, in turn, a much greater impact on the setting of the heritage assets contained within St. Peters Square.

7.68. Whilst the new tower will not be as dominant in views from Albert Square (as illustrated in Viewpoint 14), in comparison to views from St. Peters Square, given the significance of Manchester Town Hall (Grade I), the Albert Memorial (Grade I) and the eclectic mix of

Listed Buildings along the southern aspect of the square, the presence of Plot 2a will still give rise to minor adverse impacts (minor-moderate significance of effect), when considered in isolation. This impact is considered to be heightened by the presence of the St. Michaels development (under construction, forming part of the future baseline) – resulting in an overall moderate adverse significance of effect.

7.69. The significance of St. Ann's Square is best understood and appreciated in south facing views towards the Grade I listed Church of St Ann. This listed building is further complimented by the domestic and subservient scale and form of buildings which frame the square, many of which date to the Victorian and Edwardian period. As demonstrated in Viewpoint 20, the Proposed Development will give rise to minor adverse impact and a minor-moderate adverse significance of effect upon the setting of the Church, through creating a distracting new element in the distance. This impact is considered to be less intrusive than the St. Michaels scheme, which is under construction, and assessed as 'future baseline' in View 20. However, the presence of both of these new build towers will affect the experience of St Anns Church within its historic-scaled setting, incurring an overall moderate adverse significance of effect.

7.70. It will be evident therefore that the presence of the Proposed Development (Plot 2a) will result in some considerable distraction in south facing views across Albert Square, St Ann's Square and St. Peters Square, collectively incurring moderate adverse impacts on the setting of these designated areas. The degree of harm is considered to be high but contained within the less than substantial category of harm, triggering para.208 of the NPPF (2023).

7.71. With regards to wider townscape impacts, the Visual impact Assessment has demonstrated the Proposed Development will incur some minor and negligible adverse impacts, but also a number of neutral effects (refer to Table 7.6 for full breakdown).

7.72. The collection of high Grade listed buildings such as the Grade II* Free Trade Hall and Former Theatre Royal are experienced primarily on Peter Street, which channels views along the throughfare with the collection of robust, mid-scale buildings which line either side of the street. This is well illustrated in View 27, which demonstrates the Proposed Development will not necessarily be highly visible from all locations within the immediate and wider townscape. It will be evident, therefore, that despite their relative proximity to the Proposed Development site, their settings remain largely unaffected by the new tower. The exception to this being select views from the junction of Quay Street and Deansgate, from which the tall building will be highly visible, projecting above the roofline of the Grade II* listed Great Northern Warehouse, for which a minor-moderate adverse impact was identified.

7.73. Much like Peter Street, the buildings along Deansgate benefit from being experienced as part of a channelled vista, with minimal interruption from surrounding development. The eclectic array of built from which characterises the street scene, combined with the varied rooflines allow for some modest capacity for change. It is thus determined that, the impact of the proposals upon key listed assets along Deansgate is minor to negligible.

7.74. Viewpoint 15 provides an indication of the visual impact of the Proposed Development upon the St John Street Conservation Area. The significance of the Georgian buildings contained within the designated area is particularly high and thus, their setting is more sensitive to change. Therefore, despite the quality of Plot 2a, the relative impact of

further height, mass and scale in the backdrop of the view has been identified to cause some harm (minor-moderate adverse effects, permanent).

7.75. As noted above, there are some views which demonstrate a positive impact upon the settings of designated heritage assets, with particular reference to View 9 and 12, both of which are taken from sperate points within the Castlefield Conservation Area.

7.76. Further beneficial impacts derive from the enhancement to the immediate environs around the street scene of Albion Street and Great Bridgewater Street, with the proposed entrance along Albion Street creating a nodal point of significant activation around a currently underutilised area. This would give rise to two instances of minor beneficial indirect impact upon the settings of the Britons Protection Public House (Grade II) and 13-15 Albion Street.

7.77. From these view, the Proposed Development will be read as a new centralised cluster, with Viadux Phase 1 and the Beetham tower. The quality and dynamic nature of the elevational treatment of Viadux Plot 2a, paired with the stepping effect of Plot 2b will create a successful tall building cluster in key views from within the Castlefield Conservation Area.

Cumulative Effects

7.78. In assessing the likely significant effects of the Proposed Development, due consideration has been paid to the other committed developments (i.e. those that have already commenced construction, referred to as 'future baseline' or those that have not commenced but have a valid planning permission or those that are reasonably foreseeable, i.e. as part of an approved Masterplan), where there are likely to be significant effects. Additional committed developments are set out in the Committed Developments List (Deloitte).

Construction

7.79. With regards to Scenario 2a (Baseline* + Viadux Phase 2 Plot a + Viadux Phase 2 Plot b + cumulative), it will be evident the temporary disruption instigated by the Proposed Development will be further compounded by additional construction impacts from nearby committed developments, including the Apex Tower (133172/FO/2022 & 133176/FO/2022) and the Great Northern Development (135565/FO/2022). It is clear Scenario 2a is likely to give rise to temporary moderate adverse impacts upon the settings of listed buildings closest to the site, including: Briton's Protection (Grade II), 13-17 Albion Street (Grade II) and the G-MEX (Grade II). The impact on the setting of the Grade II listed Castlefield Viaduct is also identified as being moderate adverse (temporary). A further minor adverse impact (direct – permanent) is identified on the Grade II listed Castlefield Viaduct, due to loss of historic fabric.

Operation

7.80. With regards to Scenario 2a (Baseline + Viadux Phase 2 Plot a + Viadux Phase 2 Plot b + cumulative), the Heritage Impact Assessment has assessed the collective impact of committed development alongside the Proposed Development, inclusive of Plot a and Plot b.

7.81. The Heritage Impact Assessment has identified two instances in which the impact upon the settings of heritage assets will be greater than the 'proposed' situation (Scenario 2). For instance, the cumulative impact of the Proposed Development when read alongside the Great Northern Scheme will give rise to a greater adverse effect on the settings of the Great Northern Warehouse (Grade II*) and Deansgate Terrace (Grade II), with the overall significance of effect deemed as moderate adverse for the warehouse and minor-moderate for Deansgate Terrace (heightened from minor-moderate and minor in the proposed scenarios). Please refer to Table 7.7 for detail.

7.82. The final cumulative effect which is considered to result in material change to the conclusions relates to the Grade II Victorian former lockkeeper's cottage. When viewed in isolation, the Proposed Development is considered to create a successful cluster with Viadux Phase 1 and the Beetham Tower, resulting in some negligible beneficial impact. However, when seen alongside committed development, this cluster is hindered, and the satisfying visual effect is undermined by the sprawl of cumulative schemes. The HIA has therefore identified an additional negligible-minor adverse effect on the setting of this listed building in the cumulative assessment.

7.83. A summary of material changes to the assessed cumulative effects on heritage assets arising in the operational stage provided at Table 7.8 below.

Mitigation Measures

7.84. Mitigation measures are embedded into the design of the Proposed Development.

Construction Phase

7.85. Prior to any demolition, a method statement by a suitably trained contractor should be submitted to the council. This should include relevant protection measures to avoid unnecessary dust, noise and debris impacts upon the surrounding built environment.

7.86. Recommended measures, to be included within a Construction Environmental Management Plan include:

- Use of high quality hoardings;
- Dust management;
- Vibration monitoring;
- Regular cleaning of roads and the public realm surrounding the site;
- Edge protection to be affixed whilst concreting operations are in place;
- Implementation of a traffic management plan; and
- Vibration monitoring.

Operational Phase

7.87. As stipulated within Historic England's Tall Building Guidance (March 2022) 'good design can ensure that tall buildings respond positively to the character of the surrounding area and the historic environment and can be used creatively to achieve sustainable outcomes'.

7.88. Viadux Plot 2a will be read alongside the Beetham Tower and Viadux Phase 1, forming the pinnacle element to the existing, high-rise buildings around this part of the city. The quality and dynamic nature of the elevational treatment of Viadux Plot 2a, paired with

the successful stepping effect when viewed in conjunction with the existing towers, ensures a successful tall building cluster in key views from within the Castlefield Conservation Area and around Watson Street.

7.89. The enhancements around Great Bridgewater Street and Albion Street will reactivate the currently underutilised street scene, and promote activation around the Grade II listed viaduct. This activation will bring about some material benefits to the setting of the viaduct (long term – permanent).

Residual Effects

Construction Phase

7.90. Table 7.5 below considers the potential impact of the Proposed Development (both physical and visual) on designated heritage assets during the construction phase. These impacts will therefore generally be identified as 'temporary', with any 'permanent' effects identified when a loss of historic fabric is proposed.

7.91. The impacts outlined in Table 7.5 below is also applicable to Scenario 2 using Scenario 1 as the baseline.

Operational Phase

7.92. Overall, this assessment has identified that the completed and operational phase of the Proposed Development will result in varying degrees of beneficial and adverse impacts on the built historic environment within the identified study area.

The potential direct and indirect effects for individual heritage assets are presented in Table 7.5 below. The impacts outlined are applicable to Scenario 2a, using Scenario 1 as the baseline.

Table 7.5: Impact on Heritage Assets – Construction and Operational Phase

Receptor(s)	Significance / Sensitivity value	Scale of Impact	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Demolition and Construction Phase			
Castlefield Viaduct (direct impact)	Medium	Minor adverse	Minor adverse – Permanent
Castlefield Viaduct (indirect impact)	Medium	Minor adverse	Minor adverse -Temporary
Manchester Central (G-MEX)	High-medium	Moderate adverse	Moderate Adverse – Temporary
Britons Protection	Medium	Moderate adverse	Moderate Adverse – Temporary
13-17 Albion Street	Medium	Moderate adverse	Moderate Adverse – Temporary
Operational Phase			
Royal London House, Deansgate (west side) Nos.188 to 202.	Medium	Negligible-minor adverse	Negligible-minor adverse
Rylands Library, Deansgate (west side)	Very High	Negligible adverse	Negligible adverse

Sawyers Arms Public House, Deansgate (west side) No.138	Medium	Neutral	Neutral
Deansgate, Nos.184 and 186	Medium	Neutral	Neutral
Onward Buildings	Medium	Neutral	Neutral
Elliot House	Medium	Neutral	Neutral
Former entrance to Deansgate Station Nos.223 to 233	Medium	Minor adverse	Minor adverse
Opera House Theatre, Quay Street	Medium	Neutral	Neutral
Sunlight House, Quay Street (north side)	Medium	Negligible adverse	Negligible adverse
Albert Memorial Hall, No.27	Medium	Minor adverse	Minor adverse
Harvester House, Peter Street (north side), No.37.	Medium	Negligible-minor adverse	Negligible-minor adverse
Lancashire House, Peter Street.	Medium	Negligible-minor adverse	Negligible-minor adverse
Free Trade Hall, Peter Street.	High	Minor adverse	Minor adverse
Former Theatre Royal (now listed as Royale Club) Peter Street.	Medium	Minor adverse	Minor adverse
Peter Street (south side), No.56 to 58. Former Young Men's Christian Association .	Medium	Minor adverse	Minor adverse
Midland Hotel	High	Moderate adverse	Moderate adverse
Mount Street, Friends' Meeting House.	Medium	Neutral	Neutral
Albert Chambers, 16-18 Albert Square.	Medium	Minor adverse	Minor adverse
Carlton House, Albert Square	Medium	Minor adverse	Minor adverse
St Andrew's Chambers, Albert Square	Medium	Minor adverse	Minor adverse
Manchester Town Hall	Very High	Minor adverse	Moderate adverse
Frasers Statue	Medium	Neutral	Neutral
Brights Statue	Medium	Neutral	Neutral
Heywood’s Statue	Medium	Neutral	Neutral

Gladstone's statue Fountain (Jubilee)	Medium	Neutral	Neutral
Albert Memorial	Very High	Minor adverse	Moderate adverse
Mulberry Street Roman Catholic Church of St. Mary.	Medium	Neutral	Neutral
G-MEX. (Formerly listed as former Central Station.)	High-medium	Minor adverse	Minor adverse
Lawrence Buildings, Central Street, No.7	High	Minor adverse	Minor adverse
Central Public Library St Peter's Square	High	Moderate adverse	Moderate adverse
Albert Square, No.1. Abbey National	Medium	Negligible adverse	Negligible adverse
Manchester Town Hall Extension	High	Moderate adverse	Moderate adverse
St. John Street Numbers 25 To 31 And Attached Former Chapel	High-medium	Minor-moderate adverse	Minor-moderate adverse
St John Street No.8-8a	High-medium	Minor adverse	Minor adverse
St John Street No.10	High-medium	Minor adverse	Minor adverse
St John Street No.12-16	High-medium	Minor adverse	Minor adverse
St John Street No.18-20	High-medium	Minor adverse	Minor adverse
St John Street No.22	High-medium	Minor adverse	Minor adverse
St John Street No.24	High-medium	Minor adverse	Minor adverse
St John Street No.24a-26	High-medium	Minor adverse	Minor adverse
St John Street No.28	High-medium	Minor adverse	Minor adverse
St John Street No.21-25	High-medium	Minor-moderate adverse	Minor-moderate adverse
St John St. No.19	High-medium	Minor-moderate adverse	Minor-moderate adverse
St John Street No.11-17	High-medium	Minor-moderate adverse	Minor-moderate adverse
Byrom Street - No.15	High-medium	Minor adverse	Minor adverse
St Johns College (Great John Street Hotel)	Medium	Neutral	Neutral
Deansgate Goods Station and Attached Carriage Ramp.	High	Minor-moderate adverse	Minor-moderate adverse
Lloyds House.	Medium	Negligible-minor adverse	Negligible-minor adverse
1-5 Central Street (North Side).	Medium	Neutral	Neutral
Church of St Matthew	Medium	Neutral	Neutral
Eagle House, Cross Street.	Medium	Neutral	Neutral

Prudential Assurance Office.	Medium	Neutral	Neutral
Northern Assurance Building, 9-21 Princess Street	Medium	Neutral	Neutral
City Art Gallery, Mosley Street (East Side).	Very High	Negligible adverse	Negligible adverse
The Athenaeum, 81 Princess Street (North East Side).	High	Neutral	Neutral
Memorial Cross, St Peter's Square	Medium	Negligible adverse	Negligible adverse
Cenotaph, St Peter's Square	High	Minor adverse	Minor adverse
Castlefield Viaduct, GMex to Dawson Street	Medium	Minor beneficial	Minor beneficial
Britons Protection, 50 Great Bridgwater Street	Medium	Minor beneficial	Minor beneficial
13-17 Albion Street	Medium	Minor beneficial	Minor beneficial
Lock 90 east of Albion Bridge	Medium	Neutral	Neutral
Lock 91 west of Gaythorn Tunnel	Medium	Neutral	Neutral
Rochdale Canal Lock Keepers Cottage at Lock 91	Medium	Negligible beneficial	Negligible beneficial
Manchester Junction & Altrincham Railway Viaduct	Medium	Neutral	Neutral
Chepstow House	Medium	Minor-moderate adverse	Minor-moderate adverse
Canada House	Medium	Minor adverse	Minor adverse
Peveril on the Peak	Medium	Minor-moderate adverse	Minor-moderate adverse
Manchester and Salford Junction Canal Tunnel	Medium	Neutral	Neutral
235-291, Deansgate	Medium	Minor adverse	Minor adverse
Castlefield Information Centre	Medium	Negligible (neutral)	Negligible (neutral)
Former Market Hall (Liverpool Road)	Medium	Negligible beneficial	Negligible beneficial
21-41 Liverpool Road	Medium	Negligible beneficial	Negligible beneficial
Museum Of Science and Industry, Air and Space Museum	Medium	Negligible beneficial	Negligible beneficial
Power Hall Of Museum of Science and Industry	Medium	Negligible beneficial	Negligible beneficial
Manchester Museum of Science and Industry, Former Lower Byrom Street Warehouse	Medium	Negligible beneficial	Negligible beneficial
Old Warehouse to North of Former Liverpool Road Railway Station	Very High	Negligible beneficial	Negligible beneficial

Liverpool Road Railway Station Masters House	Very High	Negligible beneficial	Negligible beneficial
Former Commercial Hotel	Medium	Negligible beneficial	Negligible beneficial
123 Liverpool Road	Medium	Negligible beneficial	Negligible beneficial
St Ann's Church	Very High	Minor adverse	Moderate adverse
Former Congregational Chapel	Medium	Neutral	Neutral
Merchants Warehouse	Medium	Negligible beneficial	Negligible beneficial
Middle Warehouse at Former Castle Field Goods Yard	Medium	Negligible beneficial	Negligible beneficial
Bridgewater House	Medium	Neutral	Neutral
Remains of eastern wall of the Roman fort,	Very high	Neutral	Neutral
Tootal, Lee and Broadhurst	High	Neutral	Neutral
George Street, 63	Medium	Neutral	Neutral
Boundary Stone on Knott Mill Bridge	Medium	Neutral	Neutral
Lee House	Medium	Negligible adverse	Negligible adverse
Princes Building	Medium	Neutral	Neutral
32 Dickinson Street	Medium	Neutral	Neutral
110-114 Portland Street	Medium	Neutral	Neutral
116-118 Portland Street	Medium	Neutral	Neutral
127-133 Portland Street	Medium	Neutral	Neutral
61 Oxford Street	Medium	Neutral	Neutral
St James Building	Medium	Neutral	Neutral
The Palace Theatre	Medium	Neutral	Neutral
Manchester Oxford Road Station	Medium	Neutral	Neutral
Former Refuge Assurance Company Offices	High	Neutral	Neutral
Chorlton New Mill and Attached Chimney	Medium	Neutral	Neutral
Mill chimney stack on west side of junction with Cambridge Street	Medium	Neutral	Neutral
Former Cotton Mill On West Side Of Junction With Cambridge Street	Medium	Neutral	Neutral
Chorlton Old Mill	Medium	Neutral	Neutral
Mill On Northeast Corner Of Junction With Chester Street	Medium	Neutral	Neutral
St Peters Square Conservation Area	High	Moderate adverse	Moderate adverse
Albert Square Conservation Area	Very High	Moderate adverse	Moderate adverse

St Ann's Conservation Area	High-medium	Minor adverse	Minor-moderate adverse
Deansgate / Peter Street Conservation Area	High-medium	Minor adverse	Minor adverse
St Mary's Parsonage Conservation Area	Medium	Neutral	Neutral
St Johns Gardens Conservation Area	High-medium	Minor-moderate adverse	Minor-moderate adverse
Castlefield Conservation Area	Medium	Negligible-minor beneficial	Negligible-minor beneficial
Upper King Street	High	Neutral	Neutral
Whitworth Street Conservation Area	High	Neutral	Neutral
George Street Conservation Area	Medium	Neutral	Neutral

Cumulative Effects

7.93. The potential direct and indirect effects for individual heritage assets are presented in Table 7.6 below. The impacts outlined are applicable to Scenario 2b using Scenario 1 as the baseline. Scenario 2b presents the Proposed Development alongside the baseline and cumulative development.

7.94. The following Table (7.6) only includes heritage assets where a ***material change from Scenario 2a has been identified.*** These impacts are considered applicable for both the Construction and Operational phases.

Table 7.6: Impact on Heritage Assets - Cumulative Assessment (Construction and Operational Phase)

Receptor(s)	Significance / Sensitivity value	Scale of Impact	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Demolition and Construction Phase			
Former entrance to Deansgate Station Nos.223 to 233	Medium	Negligible adverse	Negligible adverse (Temporary)
Deansgate Goods Station and Attached Carriage Ramp	High	Negligible adverse	Negligible adverse (Temporary)
Rochdale Canal Lock Keepers Cottage at Lock 91	Medium	Negligible adverse	Negligible adverse (Temporary)
Operational Phase			
Former entrance to Deansgate Station Nos.223 to 233	Medium	Minor-moderate adverse	Minor-moderate adverse (Permanent)

Deansgate Goods Station and Attached Carriage Ramp	High	Moderate adverse	Moderate adverse (Permanent)
Rochdale Canal Lock Keepers Cottage at Lock 91	Medium	Negligible-minor adverse	Negligible-minor adverse (Permanent)

Monitoring

7.95. As stated above, a suitable CEMP should be produced in order to ensure appropriate monitoring during the construction stage.

Reference List

7.96. This ES Chapter has been prepared in reference to the following:

- DCMS's Principles of Selection for Listing Buildings (2018);
- Historic England's Conservation Principles, Policies and Guidance (2008);
- Historic England's Good Practice Advice Note 2: Managing Significance in Decision-Taking in the Historic Environment (March 2015);
- Historic England's Good Practice Advice Note 3: The Setting of Heritage Assets (2017);
- Historic England's Good Practice Advice Note 4: Tall Buildings (2022); and
- Historic England's Understanding Place: Conservation Area Designation, Appraisal and Management (2019).

8. Air Quality

Introduction

8.1 This Chapter of the ES has been prepared by Hydrock and asseses air quality.

8.2 This Chapter is accompanied by the following appendices:

- Technical Appendix 8.1 - Air Quality Technical Assessment (28401-HYD-XX-ZZ-RP-Y-2002-P02)

8.3 Following initial consultation with Manchester City Council (MCC) Environmental Health, operational phase impacts did not require detailed assessment and are not considered further within this ES Chapter. An operational phase screening and exposure assessment has been undertaken in line with relevant guidance, which can be found in Technical Appendix 8.1. Therefore, impacts associated with operational phase road traffic emissions are not considered further within this Chapter.

8.4 It is noted that this initial consultation was undertaken when the Proposed Development was for residential use only. The scheme now includes for hotel use. However, trips have not altered significantly and would not lead to a change in scope and the outcome of the assessment. It is therefore considered that MCCs original consultation remains valid.

8.5 In addition to the above, combustion source related plant emissions have also been screened out of the Chapter. The proposed energy strategy is 100% electric and no combustion sources will be introduced as part of the proposals. Reference should be made to Technical Appendix 8.1 for further details. Therefore, impacts associated with operational phase combustion emissions are not considered further within this Chapter.

8.6 The authors of this Chapter are Lauren Massingham and Mark Nichols who have the following experience:

	Lead Author	Reviewer
Name	Lauren Massingham	Mark Nichols
Company	Hydrock	Hydrock
Qualifications/Accreditations relevant to technical area	CEnv Full Member of the Institute of Air Quality Management and Institute of Environmental Science	Full Member of the Institute of Air Quality Management and Institute of Environmental Science
Does the practitioner hold any IEMA qualification?	No	No
Company hold IEMA QMark?	No	

Years technical experience (in technical area)	10	7
Number of EIA's delivered to date	10+	10+

Assumptions and Limitations

8.7 In undertaking this air quality assessment, the following assumptions and limitations are noted:

- The Construction Phase Assessment has been undertaken using information provided by the client in December 2023. Where information was not available, worst case robust assumptions have been made in line with IAQM guidance.

Relevant Legislation, Policy and Guidance

Legislation

8.8 There are two sets of air quality legislation which include ambient air quality thresholds for the protection of public health that apply in England, these include legally binding limit values originally set by the European Union (EU) Directive 2008/50/EC [1] on ambient air quality and cleaner air for Europe; and regulations implementing national air quality objectives as set out in the 2023 Air Quality Strategy for England (AQS)[2] which local authorities are required to work towards achieving.

8.9 The 2023 AQS sets out the government's policies and framework for improving air quality in England with the aim of meeting the requirements of above legislation The AQS also outlines the Limit Values, Target Values, Standards, Objectives, Critical Levels and Exposure Reduction Targets for the protection of human health and the environment (collectively termed AQALs throughout this report). The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 [3] also brought forward a new target level for PM2.5. Those relevant to this assessment is provided below.

8.10 With reference to the Annual Mean Concentration Target (AMCT) for PM2.5, it should be noted that that the date for compliance is 2040. The applicable PM2.5 AQAL for the purposes of this assessment is therefore the current AQAL of 20µg/m3.

Table 8.1 – National AQALs

Pollutant	Averaging Period	AQALs	
NO_2	1 Hour Mean	200µg/m^3	Not to be exceeded more than 18 times in a year.
	Annual Mean	40µg/m^3	
PM_{10}	24 Hour Mean	50µg/m^3	Not to be exceeded more than 35 times in a year.
	Annual Mean	40µg/m^3	
$PM_{2.5}$	Annual Mean	20µg/m^3	

Pollutant	Averaging Period	AQALs	
	AMCT	10µg/m^3	To be met across England by 2040
	-	Population Exposure Reduction Target ('exposure target')	35% reduction in population exposure by 2040 (compared to a base year of 2018).

8.11 Defra's Local Air Quality Management Technical Guidance 2022 (LAQM.TG(22))[4] provides guidance on where the above AQAL's should apply. These are detailed in the Air Quality Technical Appendix. For the purposes of this chapter, the long term-term AQALs apply at the Site when considering the potential for exposure to poor air quality, and annual mean and short-term AQALs apply at high-sensitivity receptors in the wider study area.

Policy

National Planning Policy Framework

8.12 The National Planning Policy Framework (NPPF) [5] sets out the Government's planning policy for England. It requires planning decisions for any new development to prevent new and existing development from contributing to, or being put at risk from, unacceptable levels of air pollution (paragraph 174). It also states that planning decisions should sustain and contribute towards compliance with relevant limit values or national objectives for air pollutants, taking into account the presence of Air Quality management Areas (AQMAs) and Clean Air Zones (CAZ)s (paragraph 186), and the cumulative impacts from other sites (paragraph 185).

8.13 Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. Furthermore, planning decisions should ensure that any new development in AQMAs and CAZs is consistent with the local air quality action plan.

8.14 Also, to help reduce congestion and emissions, to improve air quality and public health, significant development should be focused on locations which are / can be made sustainable through limiting the need to travel (paragraph 105).

Planning Practice Guidance

8.15 Reference ID 32 (Air Quality) of the National Planning Practice Guidance (NPPG), which was updated in November 2023, provides guiding principles on how planning can take account of the impact of new development on air quality. The NPPG summarises the importance of air quality in planning and the key legislation relating to it.

Local Planning Policy

8.16 The Manchester Local Plan guides development within Manchester. The Core Strategy [6] was adopted on 11th July 2012 and is the key document in the Manchester Local Plan. It sets out the long-term strategic policies for future development in Manchester. Within the Core Strategy Policy EN16 relates to air quality as follows:

"The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along

Manchester's principal traffic routes and at Manchester Airport. Developers will be expected to take measures to minimise and mitigate the local impact of emissions from traffic generated by the development, as well as emissions created by the use of the development itself, including from Combined Heat and Power and biomass plant.

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

8.17 The Core Strategy goes further in stating that:

"Whilst this policy seeks to improve air quality within Manchester's AQMA it also applies across the District in order to assist air quality across Manchester remaining at acceptable levels. It should be noted that other policies within the Core Strategy will guide the location of development in order to reduce the need for private transport and encourage the use of decentralised and renewable energy and green infrastructure to reduce both emissions and their impact still further."

8.18 Policy DM 1 'Development Management' also includes a reference to air quality, stating that:

"all development should have regard to effects on amenity, including air quality".

Guidance

8.19 The following guidance has been used to undertake this air quality chapter:

- Defra's LAQM.TG(22)[4];
- Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) Land-use Planning & Development Control: Planning for Air Quality [7]; and,
- The IAQM's guidance on assessing impacts from construction [8]; and
- MCC's Air Quality & Planning Technical Guidance [9].

Assessment Methodology and Significance Criteria

Scenarios Tested

8.20 The following scenarios have been considered as part of the air quality Chapter.

- 2019 (pre-covid) baseline;
- Scenario 1: (Existing Baseline) = Site as is today i.e. Phase 1 tower as built with the various amendments, noting the office scheme which forms part of Phase 1 consent not built out;
- Scenario 2: Baseline + Viadux Phase 2a, 2b; and
- Scenario 2a: Scenario 2 + Cumulative.

8.21 The transport consultants for the Proposed Development, have provided trips generated by Phase 2a and2b. Following consultation with MCC Environmental Health (Technical Appendix 8.1

(Appendix A)), it is considered that trips will disperse below the relevant threshold (Technical Appendix 8.1, Table 3) and detailed modelling is not required to determine potential air quality impacts. As such, the scenarios above have not been considered further. Reference should be made to Technical Appendix 8.1 for the operational phase screening and exposure assessment.

8.22 The construction phase assessment utilises Scenario 2 as the completed development scenario.

The Study Area

8.23 Various factors have determined the spatial extent of the air quality study area, as outlined below:

- In line with IAQM guidance [8], for the demolition and construction stage, a 250m buffer has been defined around the application site in addition to a construction vehicle trackout route up to 500m from the site entrance with a 50m buffer has been used.

8.24 Reference should be made to Figure 8.1 and Technical Appendix 8.1 (Figure 4) for the construction phase study area.

Source of Effect

Construction Phase Assessment

8.25 The construction phase assessment of the Proposed Development has been assessed using the methodology described in the latest guidance by IAQM [8].

8.26 Activities on construction sites with the potential to generate dust and emissions can be categorised into four types of activities:

- Demolition – any activities associated with the removal of existing structures on site;
- Earthworks – includes the processes of soil-stripping, ground-levelling, excavation and landscaping;
- Construction – any activities relating to the provision of new structures on site; and
- Trackout – the transport of dust and dirt from the construction site onto the public road network where it may be deposited and re-suspended by traffic using the network.

8.27 The three impacts are:

- Annoyance due to dust soiling;
- The risk of health effects due to a significant increase in PM_{10} exposure; and
- Harm to ecological receptors (there are no ecological designations within the development locale and therefore ecological impacts are not required for this assessment).

8.28 There are five steps in the assessment process described in the IAQM guidance, summarised in in the following paragraphs.

STEP 1: NEED FOR ASSESSMENT

8.29 The first step is the initial screening of the need for a detailed assessment. According to the IAQM guidance, an assessment is required where there are sensitive receptors within the study area (as defined in Table 8.4).

STEP 2: ASSESS THE RISK OF DUST IMPACTS

8.30 This step is split into three sections as follows:

- 2A. Define the potential dust emission magnitude;
- 2B. Define the sensitivity of the area; and
- 2C. Define the risk of impacts.

8.31 Each of the dust-generating activities is given a dust emission magnitude depending on the scale and nature of the works (step 2A) based on the criteria presented in Table 8.3.

8.32 The sensitivity of the surrounding area is then determined (step 2B) for the dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM_{10} background concentrations and any other site-specific factors. The criteria for defining the sensitivity of the area to different dust effects are shown in Table 8.2.

8.33 The overall risk of the impacts for each activity is then determined (step 2C) prior to the application of any mitigation measures and an overall risk for the site derived.

STEP 3: DETERMINE THE SITE-SPECIFIC MITIGATION

8.34 Once each of the activities is assigned a risk rating, appropriate mitigation measures are identified. Where the risk is negligible, no mitigation measures beyond those required by legislation are necessary.

STEP 4: DETERMINE ANY SIGNIFICANT RESIDUAL EFFECTS

8.35 Once the risk of dust impacts has been determined and the appropriate dust mitigation measures identified, the final step is to determine whether there are any residual significant effects. The IAQM guidance notes that it is anticipated that with the implementation of effective site-specific mitigation measures, the environmental effect will not be significant in most cases.

Significance Criteria

Receptor Sensitivity Criteria

8.36 There are different scales of receptor sensitivity applicable to the air quality assessment, depending on the receptor type and stage of the proposed development. However, indicative examples of receptors and their sensitivity are provided in Table 8.2.

Table 8.2 Scale of Sensitivities

Receptor Sensitivity	Receptors sensitive to dust soiling	Human Health Receptors	Ecological Receptors
High	Receptors where users can reasonably expect enjoyment of a high level of amenity or the appearance, aesthetics or value of their property would be diminished by soiling such as:	All locations where members of the public might be regularly exposed. Building façades of residential properties,	European Designated sites with features sensitive to changes in air pollution (e.g., RAMSAR, SAC)

Receptor Sensitivity	Receptors sensitive to dust soiling	Human Health Receptors	Ecological Receptors
	Residential buildings, schools and education premises, hospitals, clinics and care homes; Museums and other culturally important collections; Some commercial operations e.g., car showrooms, electronics manufacturing and horticultural operations, long term car parks; and International, European, or nationally designated nature conservation sites which have designated features sensitive to dust deposition	schools, hospitals, care homes.	
Medium	Locations where users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or The appearance, aesthetics or value of their property could be diminished by soiling; or The 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. Indicative examples include parks and places of work.	Places of work, hotels, gardens of residential properties, pavements of busy shopping streets, parks, open-air bus stations.	Nationally Designated sites, (e.g., SSSI, National Nature Reserves) with features sensitive to changes in air pollution
Low	Locations where the enjoyment of amenity would not reasonably be expected; or Property would not reasonably be expected to be diminished in	Locations of short-term exposure	Locally Designated Sites (e.g., Local Nature Reserves, Local Wildlife Sites, Ancient Woodland) with

Receptor Sensitivity	Receptors sensitive to dust soiling	Human Health Receptors	Ecological Receptors
	appearance, aesthetics or value by soiling; or There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.		features sensitive to changes in air pollution

Construction Phase (Area Sensitivity)

8.37 Table 8.3 and Table 8.4 below show the scale of sensitivity applied in each stage of the construction phase dust assessment. This determines the sensitivity if the area to adverse impacts.

Table 8.3 – Scale of sensitivity used in the construction phase assessment – Nuisance Dust

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
High	10 – 100	High	Medium	Low	Low
High	1 – 10	Medium	Low	Low	Low
Medium	<1	Medium	Low	Low	Low
Low	<1	Low	Low	Low	Low

Table 8.4 - Scale of sensitivity used in the construction phase assessment – Human Health

Receptor Sensitivity	Annual Mean PM_{10} Concentrations ($\mu g/m^3$)	Number of Receptors	Distance from Source (m)			
			<20	<50	<100	<250
High	32	>100	High	High	High	Medium

Receptor Sensitivity	Annual Mean PM_{10} Concentrations ($\mu g/m^3$)	Number of Receptors	Distance from Source (m)			
			<20	<50	<100	<250
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
High	28 – 32	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
High	24 – 28	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
High	<24	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
Medium	28 – 32	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	24 – 28	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	<24	>10	Low	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} Concentrations ($\mu g/m^3$)	Number of Receptors	Distance from Source (m)			
			<20	<50	<100	<250
		1-10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

8.38 Within distances of 20m of the Site boundary there is a high risk of dust impacts. Up to 100m from the construction site, there may still be a high risk, particularly if the receptor is downwind of the prevailing wind direction in relation to the dust source. Table 8.3 and Table 8.4 detail the determination of receptor sensitivity.

8.39 It is considered that for receptors more than 250m from the Site boundary, the risk is negligible. Figure 8.1 and Technical Appendix 8.1 (Figure 4) shows the sensitive human receptors identified within 350m of the Site. No designated ecological sites were identified within the construction stage study area, as defined by IAQM guidance [8].

Magnitude of Impact Criteria

Demolition and Construction Phase Dust Emission Magnitude

8.40 The potential dust emission magnitude for each of the four activities (demolition, earthworks, construction and trackout) outlined above is determined on the scale and magnitude of the works and are classified as small, medium or large depending on the criteria outlined in Table 8.5.

Table 8.5 – Scale of Impact Magnitude

Activity	Potential Dust Emission Magnitude		
	Small	Medium	Large
Demolition	Total building volume <12,000m^3, construction material with a low potential for dust release, demolition activities <6m above ground, demolition during wetter months	Total building volume 12,000m^3 – 75,000m^3, potentially dusty construction material, demolition activities 6-12 m above ground level	Total building volume >75,000 m^3, potentially dusty construction material, on-site crushing and screening, demolition activities >12 m above ground level
Earthworks	Total site area <18,000m^2, soil type with large grain size, <5 heavy earth moving vehicles active at any one time, formation of bunds>3m in height	Total site area18,000m^2 – 110,000 m^2, moderately dusty soil type, 5-10 heavy earth moving vehicles, formation of bunds 3m - 6m in height	Total site area >110,000 m^2, potentially dusty soil type >10 heavy earth moving vehicles, formation of bunds >8 6

Construction	Total building volume <212000 m^3, construction material with low potential for dust release	Total building volume 12,000m^3 – 750,000m^3, on site concrete batching	Total building volume >750, 000m^3, on site concrete batching, sandblasting;
Trackout	<20HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m	20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material, unpaved road length 50 m – 100 m	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material, unpaved road length >100 m

Scale of Effect Criteria

Construction Phase

8.41 The risks of impacts and the significance of each stage of the demolition and construction stage is classified as Negligible, Low, Medium or High Risk, determined against the matrices shown below**Error! Reference source not found.**, which combine t he potential dust emission magnitude of each stage with the sensitivity of the area.

8.42 The overall risk of impacts during the construction assessment represents the highest risk category for each stage. This risk level is then used to determine mitigation requirements.

8.43 It should be noted that IAQM guidance [8] recommends that significance is only assigned to the effect **after** considering the construction activity with mitigation. Accordingly, significance is not determined against the risk of impacts. In most instances, mitigation will bring the risk of impacts to Negligible, which is not significant.

Table 8.6 – Risk of Impact

Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
		Demolition	
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
		Earthworks	
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
		Construction	
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
		Trackout	
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Baseline Conditions

Existing Baseline

8.44 Baseline air quality conditions in the study area have been established through compilation and review of appropriately sourced monitoring and modelling data. Scenario 1 has been used as the Existing Baseline and it depicts the Site as is today.

8.45 The following sources have been utilised:

- Data from the National Atmospheric Emissions Inventory (NAEI) [10], Environment Agency (EA) [11] and Defra's Pollutant Release and Transfer Register (PRTR) data [12];
- Defra's modelled background concentrations of AQS pollutants (UK-AIR) [13]. These estimates are produced using detailed modelling tools and are available as concentrations at central 1km^2 National Grid square locations across the UK. Mapped background concentrations have been obtained based upon the 2018 base year Defra update (August 2020 publication);
- Defra's predicted roadside concentrations of NO_2 produced from their pollution climate mapping (PCM) [14] model;
- Multi Agency Geographic Information for the Countryside (MAGIC) [15], which incorporates Natural England's interactive maps and;
- MCC's latest available air quality monitoring data, derived from the latest available air quality annual status report published in 2023 [16] and Clean Air Data Hub [17]

Local Air Quality Management

8.46 The Greater Manchester AQMA has been declared by the GMCA of which MCC is one of the included Local Authorities. The Greater Manchester AQMA has been declared for exceedances of the annual mean NO_2 AQAL and covers *"An Area covering the 10 districts of Greater Manchester, including arterial routes, district centres, and airport."* The Proposed Development is located within the AMQA.

8.47 The GMCA have an AQAP [18] to help reduce pollutants within this designated area. Actions include, promoting sustainable transport including buses, cycling and increased Electric Vehicle charging provision. In additional to providing resources to help raise awareness and educate.

Clean Air Zone

8.48 The Proposed Development is located within the proposed Greater Manchester CAZ which is currently 'in review'. The Greater Manchester Air Quality Administration Committee are currently deciding whether to approve the Mayor of Greater Manchester proposals for an investment-led Clean Air Plan.

8.49 In relation to the GM Air Quality Plan, there are 'at-risk' and 'over the legal limit' road links in the vicinity of the Site, therefore the Proposed Development should ensure that compliance is not delayed as a result of emissions from additional traffic flows.

Local Emission Sources

8.50 The main source of air pollution in the surrounding Site locale is considered to be emissions from vehicles using the local road network, predominantly Great Bridgewater Street to the north, Whitworth Street West to the south, Albion Street to the east and Deansgate to the west.

8.51 There are a number of railway lines in proximity to the Site, which have been screened against Defra's LAQM.TG(22) [4] for potential air quality impacts. The Manchester Piccadilly to Manchester Deansgate line is listed in Defra's table of 'Rail Lines with a Heavy Traffic of Diesel Passenger Trains'. However, the closest point of the track to the Site is approximately 80m south, which is well beyond the 30m screening distance. In addition, lines closer to the track are understood to be associated with the Manchester Metrolink, which is electrified. Therefore, railway emissions are not considered to be a significant source of local pollution and do not require further assessment.

8.52 A review of the NAEI [10], EA [11] and Defra's PRTR [12] data indicates that there are no major industrial pollution sources in the immediate vicinity of the Site that will influence local air quality.

UK-AIR Background Concentrations

8.53 Mapped background concentrations of NO_2, PM_{10} and $PM_{2.5}$ for the 1 km grid square containing the Site, for 2019 (the base year) and 2023 (the assessment year) are displayed in Technical Appendix 8.1, Section 4.24. The pollutant concentrations for all years are below the relevant AQALs.

Defra Roadside Modelled Concentrations (Pollution Climate Mapping)

8.54 Defra have modelled roadside concentrations of AQS pollutants, including NO_2 (pollution climate mapping (PCM)) [14], which was previously used in the annual reporting regarding compliance with EU limit values. The closest road (Deansgate and Albion Street) for which data is available, is shown in Technical Appendix 8.1 (Figure 2).

8.55 The figure shows 2019 modelled annual roadside NO_2 concentrations of between 26.6 – 33.0 µg/m^3 along Deansgate and 30.0 µg/m^3 along Albion Street. These predicted roadside concentrations are below the AQAL; however, it is recognized that there are

uncertainties associated with these modelled concentrations; therefore, further analysis of local air quality monitoring is also provided below.

Air Quality Monitoring Data

Automatic Air Quality Monitoring

8.56 Three of MCC's automatic monitoring stations are considered representative of the Proposed Development.

8.57 Automatic Monitor 'MAN09' Bridge Street, Manchester (x383556, y398292) is situated approximately 650m north-west of the Site. However, this monitoring location only began monitoring on 25th September 2022 and therefore there is insufficient data to present and this monitoring location has not been considered further.

8.58 The automatic monitors MAN1 (x384233, y397287) and MAN3 (x384310, y398337) are shown in **Technical Appendix 8.1 (Figure 3)** and recent results are shown below, with exceedances in bold.

Table 8.7 – Automatic Air Quality Monitoring

Monitor	Pollutant	AQAL		Concentration (µg/m^3)					
				2018	2019	2020	2021	2022	2023
MAN1 Manchester Oxford Road (Kerbside)	NO_2	Annual Mean	40	**62**	**59**	36	**44**	**43**	**45.7**
		1-hour Mean	200 (A)	2	1	0	0	3	0
	PM_{10}	Annual Mean	40	30	26	18	18	18	16.4
		24-Hour Mean	50 (B)	15	18	5	2	8	4
MAN3 Manchester Piccadilly (Urban Centre/Background)	NO_2	Annual Mean	40	35	36	27	30	29	26.8
		1-hour Mean	200 (A)	0	0	0	0	0	0
	PM_{10}	Annual Mean	40	21	20	15	15	17	15.1
		24-Hour Mean	50 (B)	2	7	1	2	4	1

Monitor	Pollutant	AQAL		Concentration (µg/m³)					
				2018	2019	2020	2021	2022	2023
	$PM_{2.5}$	Annual Mean	20	11	12	8	9	10	8.5

Notes:
(A) 200µg/m³ not to be exceeded more than 18 times/year
(B) 50µg/m³ not to be exceeded more than 35 times/year

8.59 The data above shows there have been exceedances of the NO_2 annual mean AQAL at automatic monitor MAN1, located on Manchester Oxford Road. Exceedances have occurred each year, with the exception of 2020, likely due to the COVID-19 pandemic. The highest recorded concentration of NO_2 was 62µg/m³ in 2018. However, the monitor is located at a 'kerbside' location along one of the busiest roads in Manchester and therefore concentrations are expected to be higher.

8.60 There have been no exceedances of the NO_2 annual mean AQAL at automatic monitor MAN3, located at an 'urban centre' location. However, concentrations are higher than the UK-AIR urban background concentrations, which suggests some influence of road traffic at this location.

8.61 There was one recorded exceedance of an annual mean greater than 60µg/m³at MAN1, which indicates that an exceedance of the 1-hour mean objective is potentially likely. However, there is a general downward trend in concentrations between 2018 – 2022 and no other exceedances of 60µg/m³ have been measured.

8.62 There are no exceedances of the annual mean PM_{10} or $PM_{2.5}$ AQAL. Since 2020 concentrations monitored have been fairly consistent.

8.63 2020 and 2021 data should be treated with caution due to the impacts of the COVID-19 pandemic and 'lockdowns' on local traffic flows.

Passive Air Quality Monitoring

8.64 Passive NO_2 diffusion tube monitoring is currently undertaken by MCC at 40 locations throughout the Council's area as part of their commitment to LAQM. Monitoring locations within close proximity to the Site are shown in **Technical Appendix 8.1 (Figure 3)** and the data presented below.

8.65 Additional monitoring is being undertaken as part of the Clean Air Plan (CAP). Recent monitoring data for locations closest to the Site are presented in the table below.

8.66 All tubes are classified as 'roadside' apart from MA77NO which is classified as 'urban background' and MA24NO which is classified as 'kerbside'.

8.67

Table 8.8 – Passive Air Quality Monitoring

Site ID	X (m)	Y (m)	Distance from Site (km)	Annual Mean NO_2 Concentration (µg/m^3)					
				2018	2019	2020	2021	2022	2023
MA77NO – Hewitt Street	383576	397489	0.1	**41.0**	**43.7**	26.9	30.8	33.1	31.6
MA29ANO – Oxford Street	384119	397503	0.5	**58.8**	**55.4**	39.0	**44.8**	**49.8**	**49.6**
MA24NO – Princess Street	383968	398070	0.5	**40.3**	**40.8**	26.8	31.8	32.4	29.8
MA84NO – Oxford Road	384239	397276	0.7	**54.0**	**52.0**	33.9	**40.7**	**42.6**	**41.4**
MA97BNO – Chester Road	382886	397215	0.8	-	32.3	23.4	28.4	27.8	27.4
CAP_MANC_073 – Lingfield Terrace	383737	397617	0 E	-	**43.6**	25.8	29.3	34.8	32.9
CAP_MANC_152 – Great Bridgewater Street	383499	397678	0 W	-	-	-	-	39.4	32.5
CAP_MANC_074 – Oakleigh Avenue	383508	397687	0 W		**49.4**	28.1	32.3	40.0	31.3
CAP_MANC_155 - A5103 Medlock St	383603	397442	0.1 S	-	-	-	-	33.5	-

Site ID	X (m)	Y (m)	Distance from Site (km)	Annual Mean NO_2 Concentration (µg/m^3)					
				2018	2019	2020	2021	2022	2023
CAP_MANC_156 - A5103 Medlock St	383627	397472	0.1 S	-	-	-	-	35.7	-
CAP_MANC_042 – Mancunian Way	383637	397097	0.4 S	**41.3**	**40.1**	34.0	39.2	38.8	36.7
CAP_MANC_045 – Mancunian Way	383357	397166	0.5 S	**70.5**	**64.1**	**50.0**	**56.4**	**64.7** (A)	**50.4**
CAP_MANC_041 – Mancunian Way	383370	397133	0.5 S	**49.6**	**45.3**	36.2	**41.1**	**40.4**	39.3
CAP_MANC_044 – Mancunian Way	383273	397147	0.5 S	**62.8**	-	**43.7**	**52.2**	33.6 (A)	-
CAP_MANC_183 – Wakefield Street	384140	397465	0.5 E	-	-	-	-	**54.4**	**54.1**
CAP_MANC_185 – Wakefield Street	384119	397499	0.5 E	-	-	-	-	**49.7** (A)	**48.5**
CAP_MANC_186 – Wakefield Street	384124	397533	0.5 E	-	-	-	-	**42.4**	**43.0**

Site ID	X (m)	Y (m)	Distance from Site (km)	Annual Mean NO_2 Concentration (µg/m^3)					
				2018	2019	2020	2021	2022	2023
CAP_MANC_184 – Wakefield Street	384157	397474	0.5 E	-	-	-	-	**41.1**	39.5
CAP_MANC_043 – Mancunian Way	383855	397070	0.5 S	**48.0**	**43.8**	31.2	33.2	35.7	-
CAP_MANC_019 – A34 (Oxford Road)	384234	397287	0.6 SE	-	-	-	-	**44.4**	**41.3**

8.68 Locations CAP_MANC_073, 074 and 152 are considered most representative of the Site due to their location adjacent to the Site. Concentrations are below the annual mean in 2023. However, location 074 did monitor 40 µg/m^3 during 2022 which is 100% of the AQAL for annual mean NO_2.

8.69 Location MA77NO is the closest LAQM monitoring location to the Site however, this is classified as 'urban background'. Pre-pandemic concentrations show exceedances of the relevant annual mean AQAL at this location however, results have declined since 2019. MAN77NO is located within 45m of the A5013 and within close proximity to the railway line between Manchester Piccadilly and Manchester Deansgate. This section of railway is listed within LAQM.TG(22) as a 'Rail Lines with a Heavy Traffic of Diesel Passenger Trains'. As such, it is considered that NO_2 concentrations would be influenced by this section of railway.

8.70 The data above shows there have been exceedances of the NO_2 annual mean AQAL at monitoring sites close to the Site during all recent years. The highest recorded concentration of NO_2 was 70.5µg/m^3 at CAP_MANC_045 in 2018. This location is located along Mancunian Way, within the AQMA and on one of the busiest A-roads in Manchester, therefore exceedances are to be expected.

8.71 There were no recorded exceedances of an annual mean greater than 60µg/m^3, in 2023 (the base year), which indicates that an exceedance of the 1-hour mean objective is unlikely at these sites. One exceedance occurred in 2022 at CAP_MANC_045, which is adjacent to Mancunian Way, over 500m south of the Site.

8.72 All locations have shown a general downward trend since 2018.

8.73 2020 and 2021 concentrations should be treated with caution as they would have been impacted by the COVID-19 pandemic and the associated decrease in traffic levels during lockdown periods in the UK.

Future Baseline

8.74 The Future Baseline would be represented within Scenario 3.

8.75 Based on the trip generation provided, detailed modelling has not been required and therefore future baseline concentrations have not been quantified. The qualitative change to the Existing Baseline as a result of the Proposed Development is discussed further within **Technical Appendix 8.1**.

Committed Developments

8.76 With regards to the construction phase, the committed developments detailed within **Technical Appendix 8.1 (Appendix D)** are all located within 250m of the Proposed Development and share receptors with the Site that's are within 200m of the Site and cumulative schemes.

Identification and Evaluation of Likely Significant Effects

Construction Phase

Potential Dust Emission Magnitude

8.77 The potential dust emission magnitude for demolition, earthworks, construction and trackout activities is summarised in **Table 8.9**. Further details are provided in **Technical Appendix 8.1**.

Table 8.9: Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude	Justification
Demolition	Small	A small section of the Viaduct is required to be demolished prior to earthworks and construction. This volume to be demolished is within the IAQM 'small category (<12,000m^3)..
Earthworks	Large	The total area of the Site (including all areas inside the red-line boundary) is greater than 110,000m^2 and therefore within the 'large' IAQM category. The underlying soil texture is loamy and clayey soils.
Construction	Large	Plot 2a construction is due to start Q1 2026 and Plot 2b construction is due to start Q3 2028. Both plots will be complete by Q1 2032. The proposals comprise the erection of two phases of development. An estimation of the total volume of buildings to be constructed is considered to be >750,000m^3. It is not envisaged that concrete batching and sandblasting would be undertaken onsite.
Trackout	Medium	It is expected that there would be between 20-50 HDVs outwards movements from the Site each day. No unpaved surfaces over 50m would be utilised as site traffic would be routed along the existing road network.

Area Sensitivity to Dust Impacts

8.78 The Manchester Airport wind rose (**Technical Appendix 8.1 (Appendix B)**) shows that the prevailing winds are from the south. As such, receptors downwind (i.e., north) of the Site are more at risk of exposure to dust impacts during construction.

8.79 Figure 8.1 and Technical Appendix 8,1 (Figure 4) shows the IAQM buffer zones around the Site, as well as the location of sensitive receptors identified within 250m of the Site boundary. It also shows that greater than 100 high sensitivity receptors are located within 20m of the Site boundary. On this basis, the overall sensitivity of the surrounding area to nuisance dust soiling effects is defined as 'High' for demolition, earthworks and construction.

8.80 With regard to Trackout, the sensitivity for Large size sites is assessed where receptors are located within 50m from Trackout routes up to 500m from the Site. As there are more than10 high-sensitivity receptors within 20m of potential Trackout routes from the Site, the sensitivity to dust soiling impacts from Trackout is defined as 'High'.

8.81 Defra mapped background predictions (Technical Appendix 8.1, Section 4.24) show that annual mean concentrations of PM_{10} are not likely to exceed 24µg/m^3 in the vicinity of the Site based on 2019 estimates. However, 2019 monitored concentrations at the MAN1 automatic monitor were 26µg/m^3 and LAQM.TG(22) does states that concentrations should take into account local sources. As such, there is potential for the annual mean PM_{10} concentrations to be greater than 24µg/m^3. According to IAQM guidance, where PM_{10} concentrations are 24-28µg/m^3 and there are more than 100 high sensitivity receptors within 20m of construction works, the overall sensitivity of the surrounding area to human health impacts is defined as 'High' for Earthworks, Construction and Trackout.

8.82 A summary of the area sensitivity is presented below in Table 8.10.

Table 8.10: Sensitivity of the Local Area

Potential Impact	Sensitivity of Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	High	High	High	High

Risk of Impacts

8.83 Using the methodology prescribed in the IAQM guidance [8], the overall risk of impacts can be defined by combining the sensitivity of the area with the potential dust emission magnitude of each stage of the construction phase as described above. Table 8.11 provides a summary of the construction dust risk assessment.

Table 8.11: Risk of Adverse Impacts during Demolition and Construction

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	High	High	Medium
Human Health	Medium	High	High	Medium

8.84 Overall, the construction phase of Proposed Development is considered to be High Risk for nuisance dust soiling effects and High Risk for PM_{10} health effects, in the absence of mitigation. As stated previously, the IAQM guidance [8] recommends that significance is only assigned to the effect after considering the construction activity with mitigation.

Cumulative Effects

Construction Phase

8.85 The IAQM guidance does not provide a detailed approach to the assessment of potential cumulative construction phase effects. The IAQM guidance [8] states the following:

"The potential for significant cumulative effects should also be considered. These are more likely to occur where the dust generating activities from separate developments projects are in close proximity and likely to occur at the same time. Ideally reference should be made to a dust assessment prepared by third parties for other relevant developments or it may be necessary to use professional judgement if such assessments are not publicly available. For example:

- ***multiple construction sites contributing to the risk of track out onto the same section of a public highway or;***
- ***receptors located within 250m of multiple development sites."***

8.86 The committed developments detailed within Technical Appendix 8.1 (Appendix D) are all located within 250m of the Proposed Development and share receptors with the Site that's are within 200m of the Site and cumulative schemes. As such, there is the potential for cumulative construction phase effects. However, all Sites should adhere to the IAQM mitigation measures in order to reduce potential impacts to negligible / not significant.

Mitigation Measures

Construction Phase

8.87 There are no relevant embedded mitigation measures associated with the construction of the Proposed Development.

8.88 The IAQM's [8] highly recommended mitigation measures, which are proportionate to the level of risk identified above, should be incorporated into the Construction Environmental Management Plan (CEMP). Full details of the measures are presented in Technical Appendix 8.1 (Appendix C). The mitigation measures contained in the CEMP would reduce the risk of impacts to No Change / Small which would result in reversible Negligible effects in the short-term on a local level (Not Significant) in accordance with IAQM guidance.

Operational Phase

8.89 While a detailed assessment of operational phase impacts has been scoped out of this ES, in line with the MCC Air Quality Planning guidance [9], a Damage Cost Calculation is recommended, otherwise known as an Emissions Mitigation Assessment.

8.90 Based on the calculation undertaken (Technical Appendix 8.1 (Section 7)) the total emissions 'damage costs' (sum of NOx and $PM_{2.5}$) = £12,557, which is the indicative value of a package of air quality mitigation measures to offset the real-world impact of emissions from the Proposed Development.

8.91 Additionally, measures included within the associated Travel Plan would also aid improvement in air quality.

Residual Effects

Construction Phase

8.92 The table below shows a summary of the Construction Phase residual effects.

Table 8.12: Residual Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Construction Phase - Dust Soiling	High	The mitigation measures identified in Section 8.84 and detailed in Technical Appendix 8.1 (Appendix C) would ensure that the residual effects of nuisance dust soiling and PM_{10} health effects from all activities within the construction stage would have a negligible effect.	Measures implemented during construction phase via best practice measures	Negligible (Not significant) Temporary and Short-Term
Construction Phase - Human Health	High			Negligible (Not significant) Temporary and Short-Term

Monitoring

8.93 Reference should be made to the Construction Management Chapter of the ES (Chapter 5) which confirms the recommendations for construction phase air quality monitoring.

Reference List

8.94 This ES Chapter has been prepared in reference to the following:

- [1] - Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe Available at: https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32008L0050
- [2] - Defra. "The Air Quality Strategy for England, Scotland, Wales and Northern Ireland". Available at: https://www.gov.uk/government/publications/the-air-quality-strategy-for-england
- [3] - The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 https://www.legislation.gov.uk/uksi/2023/96/contents/made
- [4] - Defra. Local Air Quality Management Technical Guidance (LAQM.TG(22)). (Department for Food, Environment and Rural Affairs (Defra), August 2022), https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf

- [5] - Department for Levelling Up, Communities and Housing, “National Planning Policy Framework,” December 2023, https://www.gov.uk/guidance/national-planning-policy-framework
- [6] - Manchester City Council, “Manchester’s Local Development Framework, Core Strategy Development Plan Document, July 2012, Core Strategy | Manchester City Council
- [7]- EPUK & IAQM, “Land-Use Planning & Development Control: Planning for Air Quality” (Institute for Air Quality Management (IAQM), January 2017), http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf.
- [8] - IAQM, “Guidance on the Assessment of Dust from Demolition and Construction” (Institute of Air Quality Management (IAQM)), January 2024 version 2.2), https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf.
[9] - Manchester City Council, Air Quality & Planning Technical Guidance, August 2022, https://www.manchester.gov.uk/downloads/download/5199/information_for_developers.
- [10] - National Atmospheric Emissions Inventory, UK Emissions Interactive Map (beis.gov.uk).
- [11] - https://data.gov.uk/dataset/cfd94301-a2f2-48a2-9915-e477ca6d8b7e/pollution-inventory
- [12] - UK Pollutant Release and Transfer Register (PRTR) https://prtr.defra.gov.uk/map-search
- [13] - UK-AIR, “Background Mapping Data for Local Authorities - 2018,” n.d., https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018.
- [14] -https://uk-air.defra.gov.uk/data/gis-mapping/
- [15] - https://magic.defra.gov.uk/MagicMap.aspx
- [16] - Greater Manchester Combined Authority, 2023 Air Quality Annual Status Report (ASR), In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, June 2023.
- [17] https://cleanairgm.com/data-hub/
- [18] - GREATER MANCHESTER AIR QUALITY ACTION PLAN 2016–2021, https://www.bing.com/search?q=GMCA+air+quality+action+plan&FORM=AWRE

Figure 8.1



Construction Phase Buffer Zones and Sensitive Receptors

To Scale	Date: December 2023

9. Noise and Vibration

Introduction

This Chapter of the ES has been prepared by Jameson Acoustics Limited and assesses likely significant 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 negative effects; and the likely residual effects after these measures have been adopted.

9.1.

This Chapter is accompanied by the following appendices:

- Appendix 9.1: Acoustic Terminology
- Appendix 9.2: Relevant Legislation, Policy & Guidance
- Appendix 9.3: Noise Survey Details & Summary Results
- Appendix 9.4: Vibration Survey Details & Summary Results
- Appendix 9.5: Construction Noise Calculation Sheets

9.2.

The authors of this Chapter have the following qualifications / experiences:

9.3.

	Lead Author	**Reviewer**
Name	Andrew Jameson	
Company	Jameson Acoustics	
Qualifications/Accreditations relevant to technical area	BSc(Hons), MIOA, MIET	
Does the practitioner hold any IEMA qualification?	No	
Company hold IEMA QMark?	No	
Years technical experience (in technical area)	21	
Number of EIA's delivered to date	15+	

9.4.

Assumptions and Limitations

Our assessment considers the following assumptions and limitations:

1. The precise methods and plant used for construction are not known and, therefore, our assessment shall draw upon source noise/vibration data from BS 5228. For vibration, the dispersion of vibration varies significantly from site-to-site due to variations in ground/soil make ups and therefore calculation procedures are limited in accuracy. Published data in BS

5228-2 or by manufacturers that are most relevant to this site shall be considered and used to evaluate risks.

2. The noise modelling software used industry recognized standards for calculating the radiation of noise sources, including DMRB, CRTN, CRN, BS 5228 and ISO 9613. However, the software cannot accurately account for variations in noise levels due to changes in meteorological conditions. As is standard for all noise mapping software used for this purpose, the model shall consider 'neutral' meteorological conditions.

Relevant Legislation, Policy and Guidance

Legislation

The assessment has been undertaken with regard to the following legislation:

1. Control of Pollution Act, 1974 (CPA);
2. Planning and Compulsory Purchase Act, 2004;

9.5.

3. Environmental Protection Act, 1990;
4. Licensing Act, 2003; and,
5. Building Regulations, 2010.

Policy

The assessment has been undertaken with regard to the following national and local planning policy:

9.6.

1. Noise Policy Statement for England, 2010 (NPSE);
2. National Planning Policy Framework, 2023 (NPPF);
3. Planning Practice Guidance - Noise, 2019 (PPG-N);
4. Manchester City Council's (MCC) Core Strategy, 2012;
5. MCC Planning & Noise Technical Guidance, 2022; and,
6. MCC Manchester Residential Quality Guidance, 2017.

9.7. Guidance

The assessment has been undertaken with regard to the following standards and good practice design guides:

1. ProPG: Planning & Noise: Professional Practice Guidance on Planning & Noise, 2017;
2. World Health Organisation (WHO), European noise guidelines, 2018;
3. ANC/IOA: Acoustics, Ventilation & Overheating Residential Design Guide, 2020;
4. British Standard (BS) 7445-1: 2003 Description and Measurement of Environmental Noise;
5. Environmental Advisory Leaflet (ADL) 72: Noise Control on Building Sites, 1996;
6. BS 5228-1: 2009+A1: 2014 Code of practice for noise and vibration control on construction and open sites – Noise;
7. BS 5228-2: 2009+A1: 2014 Code of practice for noise and vibration control on construction and open sites – Vibration;
8. BS 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings: Vibration sources other than blasting;
9. BS 7385-2: 1993 Evaluation and measurement of vibration in buildings;
10. BS 8233: 2014 Sound insulation and noise reduction for buildings;
11. BS 4142: 2014+A1: 2019 Methods for rating and assessing industrial & commercial sound; and,

12. The Highways Agency, Design Manual for Roads & Bridges (DMRB) Volume 11 Part 3 Section 7, 2011.

A full description of the above legislation, policy and guidance is provided in Appendix 9.2.

Assessment Methodology and Significance Criteria

Scenarios Tested

9.8. The noise and vibration assessments will consider Scenario 2 (Plots 2a + 2b) and Scenario 2a (Plots 2a, 2b + cumulative) against Scenario 1 (the existing baseline). The assessment considers noise and vibration impacts associated with the construction phase and operational phase of the Proposed Development.

The Study Area

9.9. For the construction phase, the assessment considers noise and vibration effects the Proposed Development may cause on nearby sensitive receptors in accordance with BS 5228. This is in the interest of the comfort of residents/occupants of nearby buildings during construction and, for vibration, the structural/cosmetic integrity of neighbouring buildings.

9.10. For the operational phase, the assessment considers noise effects the Proposed Development may cause on nearby sensitive receptors as well as noise and vibration effects the surrounding environmental and entertainment sources may cause onto the Proposed Development. This is in the interest of surrounding amenities and the comfort of future residents within new homes within the Proposed Development respectively.

Source of Effect

9.11. The assessment considers the source of effects to both existing and proposed sensitive receptors as set out in Table 9.1.

9.12.

Table 9.1: Source of effects & relevant sensitive receptors

Phase	Source of Effect	Assessed Receptors
Construction	Noise from construction works: Plot 2a : Q1 2026 to Q1 2032 Plot 2b : Q3 2028 to Q1 2032	A, B, D
	Vibration from construction works	A, B, D
Operational	Existing environmental noise affecting proposed residential dwellings	F, G (façade design, outdoor living)
	Existing entertainment noise affecting proposed residential dwellings	F, G (façade design)
	Tram-induced vibration affecting proposed development	F, G
	Building services noise	A, B, C, D, E, F, G
	Change in road traffic noise	A, B, D, E, F, G
	Commercial (retail) noise from Plot 2b	B, C, D, F

The referenced sensitive receptors (A to G) are listed below and shown on Figure 9.6. All receptors are 'High' sensitivity.

Table 9.2: Sensitive receptors

Receptor Reference	Status (Type)	Description
A	Existing (Residential)	Axis Tower
B	Existing (Residential)	Beetham Tower (hotel to Level 22, home from Level 24)
C (assumed from Q1 2032)	Proposed (Residential)	Great Northern (consented scheme)
D	Existing (Residential)	Viadux Phase 1
E (from Q1 2032)	Proposed (Residential)	Phase 2a 76-storey tower
F (from Q4 2031)	Proposed (Residential)	Phase 2b 23-storey building

9.13.

Significance Criteria

Construction Noise

9.14. Annex E of BS 5228-1: 2009+A1:2014 'Code of Practice for noise and vibration control on construction and open sites' provides guidance on significance criteria for construction noise.

9.15. Example Method 1 within Annex E, termed the 'ABC Method' is for residential receptors only, and allows the setting of threshold noise levels above which a potential significant effect could be generated. For the appropriate period (night, evening/weekends or day), the ambient noise level is determined and rounded to the nearest 5 dB. This noise level is then compared with the noise level at the receptor in question due solely to site operations. If the noise level originating from the Site exceeds the appropriate category value, then a potential significant effect is indicated. Other project-specific factors, such as the number of receptors affected and the duration and character of the impact then need to be taken into consideration to determine if there is a significant effect. Table 9.3 gives the threshold values and explains how the method is applied.

Table 9.3: Example threshold of potential significant effect at dwellings

Assessment category and threshold value period	Threshold value, dB LAeq,T		
	Category A (Note A)	Category B (Note B)	Category C (Note C)
Night-time (23:00-07:00)	45	50	55
Evening & weekends (Note D)	55	60	65
Daytime (07:00-19:00)	65	70	75
Note 1:A potential significant effect is indicated if the LAeq,T noise level arising from the Site exceeds the threshold level for the category appropriate to the ambient noise level.			
Note 2: If the ambient noise level exceeds the category C threshold values, the a potential significant effect is indicated if the total LAeq,T noise level for the period increases by more than 3 dB due to site noise.			
Note A: threshold values to use when ambient noise levels (rounded to the nearest 5 dB) are less than these values.			
Note B: threshold values to use when ambient noise levels (rounded to the nearest 5 dB) are the same as category A values.			
Note C: threshold values to use when ambient noise levels (rounded to the nearest 5 dB) are higher than category A values.			

Note D: 19:00-23:00 weekday, 13:00-23:00 Saturdays, 07:00-23:00 Sundays

Example Method 2 within Annex E states that noise generated by construction activities of duration of one month or more is deemed to be potentially significant if the total noise (pre-construction ambient noise plus construction noise) exceeds the pre-construction ambient noise level by 5 dB or more, subject to lower cut-off values during daytime, evening and night of 65 dB, 55 dB and 45 dB LAeq respectively. This approach is generally applicable to residential, hotel and community buildings, amongst others.

9.16. For office and residential buildings, BS5228-1: 2009+A1:2014 refers to the 1976 revision of Advisory Leaflet 72 'Noise control on building sites', published by the Department of the Environment, which states:

9.17. *"Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut…..Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the Site boundary should not exceed:*

1. *70 dBA in rural, suburban and urban areas away from main road traffic (and industrial noise);*
2. *75 dBA in urban areas near main roads (and in heavy industrial areas)."*

9.18. In line with the above discussions, Table 9.4 summarises the significance criteria adopted for construction noise affecting sensitive receptors around the Site.

Table 9.4: Construction noise impact criteria

Noise Level	Adverse Significance
Less than or equal to threshold value	Negligible
Less than 5 dB above threshold value	Minor
5-10 dB above threshold value	Moderate
> 10 dB above threshold value	Major

9.19.

Construction Vibration

9.20. From BS 6472, it can be derived that the peak particle velocity (PPV) level of around 0.56mm/s for a single event for repeated impulsive vibration (such as that due to pneumatic breaking) is the lowest level normally perceptible by humans in buildings. A doubling of this level to 1.12mm/s is generally considered to be an appropriate level in relation to perceptible vibration. Accordingly, below this level, vibration disturbance to occupants of buildings would not be expected.

Similarly, BS 5228 provides guidance on the effects of vibration levels on humans in buildings as presented in Table 9.5.

Table 9.5: Human response to vibration levels

Vibration Level (PPV)	Effect
0.14 mm/s	Vibration might just be perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.30 mm/s	Vibration might just be perceptible in residential environments.

1.00 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10.00 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

Whilst both BS 6472 and BS 5228 provide guidance on the human response to vibration, often building damage is the more pertinent consideration when assessing construction induced vibration. BS 5228 provides guide limits for cosmetic (not structural) damage to buildings during periods of transient vibration as presented in Table 9.6.

9.21. **Table 9.6: Transient vibration guide values for cosmetic damage**

Vibration Level	Peak component particle velocity in frequency range of predominant pulse (PPV)	
	4 Hz - 15 Hz	15 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
Unreinforced or light-framed structures Residential or light commercial buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
Note: Values referred to are at the base of the building. In unreinforced/light framed structures, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded by 4 Hz.		

9.22. Based on BS 5228 and BS 6472, Table 9.7 presents the significance criteria for vibration effects on people and equipment within nearby sensitive receptors during construction.

Table 9.7: Construction vibration impact criteria

Vibration Level (PPV)	Adverse Significance
Up to 1.0 mm/s	Negligible
1.1 mm/s to 3.0 mm/s	Minor
5.1 mm/s to 8.0 mm/s	Moderate
> 8.0 mm/s	Major

9.23.

Environmental Noise Affecting Proposed Residential Dwellings

9.24. Internal noise levels within the proposed apartments must be appropriate for the intended use. BS8233: 2014 'Guidance on sound insulation and noise reduction for buildings' provides appropriate criteria for acceptable levels of noise ingress within dwellings, which are referenced in MCC's Planning & Noise Technical Guidelines.

BS8233: 2014 advises that, in general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values presented in Table 9.8.

Table 9.8: BS 8233: 2014 Indoor ambient noise levels for dwellings

Location	Indoor ambient noise level	
	Daytime (07:00-23:00	Night-time (23:00-07:00)
Living room	35 dB LAeq,16hr	-
Dining room/area	40 dB LAeq,16hr	-

Bedroom	35 dB LAeq,16hr	30 dB LAeq,8hr

BS 8233 states that: 'Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed up to 5 dB and reasonable internal conditions still achieved'.

With regard to maximum night-time noise levels within bedrooms, BS8233: 2014 states "regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or LAmax,f depending on the character and number of events per night. Sporadic noise events could require separate values."

9.25.

In the absence of a specific performance criterion within BS8233 for short-term noise maxima, reference can be made to guidance published by the WHO, from the guidance given in BS8233: 2014 is itself derived. WHO states that "for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB LAmax more than ten to fifteen times per night", which correlates with MCC's Technical Guidance.

9.26.

9.27.

With regard to external noise levels in designated outdoor living spaces (e.g. shared gardens), BS 8233 states 'For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB LAeq,T, with an upper guideline value of 55 dB LAeq,T which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable and a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.'. The upper guideline value of 55 dB LAeq,T correlates with MCC's Technical Guidance.

9.28.

9.29. With reference to BS 8233, WHO and MCC's Technical Guidance, the environmental noise criteria presented in Table 9.9 shall apply for the residential sectors of the scheme.

Table 9.9: Residential noise criteria (environmental sources)

Location	**Indoor ambient noise level (upper limit)**	
	Daytime (07:00-23:00	Night-time (23:00-07:00)
Living room	35 dB LAeq,16hr	-
Bedroom	35 dB LAeq,16hr	30 dB LAeq,8hr 45 dB LAmax (exceeded not more than 10 times per night by individual noise events)
Outdoor Living Spaces	55 dB LAeq,16hr	-

9.30.

9.31.

The above criteria apply under 'normal' ventilation conditions, i.e. when background ventilation rates are being provided in accordance with Building Regulations Approved Document F: 2010 (Part F).

9.32.

MCC's Technical Guidance states: 'The indoor noise level criteria for bedrooms and living rooms do not need to be achieved when windows are opened to achieve Part F purge ventilation requirements.'.

In relation to overheating conditions, where the design strategy can often rely in some part on windows being opened, MCC's Technical Guidance makes reference to the requirements of Building Regulations Approved Document O (Part O) and the guidance set out in the ANC/IOA's Acoustics, Ventilation & Overheating Residential Design Guide, 2020 (AVO).

Part O took effect on 15 June 2022 and does not apply to work subject to a building notice, full plans application or initial notice submitted before that date, provided the building work is started before 15 June 2023. It requires noise to be considered as part of the development's overheating strategy in locations where external noise may be an issue. It states that the overheating strategy should take account of the likelihood that windows will be closed during sleeping hours if noise within bedrooms exceeds the following limits.

9.33.

1. 40 dB LAeq,T, averaged over 8 hours (between 11pm and 7am).
2. 55 dB LAFmax, more than 10 times a night (between 11pm and 7am).

AVO recommends a two-level approach to assess the potential impact of noise ingress through windows that have been opened to mitigate overheating. The Level 1 assessment relates to incident environmental noise levels and defines "risk categories". The specific category determines whether a Level assessment is recommended, optional or not required.

9.34. The approach to the Level 2 assessment shall be to ensure the reliance on openable windows does not cause the 16-hour daytime (or 8-hour night-time) internal noise levels to exceed levels that the AVO defines as the Significant Observed Adverse Effect Level (SOAEL). The maximum number of

9.35. hours per day/night permitted to ensure noise levels do not exceed the SOAEL shall be advised. It would then be for the services consultants to carry out the necessary overheating assessment (e.g. TM59) incorporating these restrictions.

Entertainment Noise Affecting Proposed Residential Dwellings

9.36. MCC's Technical Guidance sets out noise criteria in relation to entertainment venues (e.g. noise from recorded music, live bands, or karaoke). The Guidance states "When considering the potential impact of a proposal for an entertainment venue, consultants should consider the overall noise level (LAeq) and the 63 Hz and 125 Hz octave band noise levels (Leq). Music noise in the 63 Hz and 125 Hz octave bands, often described as 'bass noise', is particularly difficult to contain and the impulsive and non-steady character of low frequency music noise is particularly disturbing for local residents exposed to it".

9.37. MCC make reference to research publications to support their proposed criteria for achieving the condition of inaudible or virtually inaudible within new residential development. MCC advise that

9.38. ''Music noise levels in the 63Hz and 125Hz octave centre frequency bands (Leq) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (Leq,5min), respectively".

With reference to this requirement, the entertainment noise criteria presented in Table 9.10 shall apply for the residential sectors of the scheme.

Table 9.10: Residential noise criteria (entertainment sources)

Location	Indoor ambient noise level (upper limit)	
	63 Hz	125 Hz
9.39. Habitable Room	47 dB Leq,5min	41 dB Leq,5min

9.40. **Building Services Noise**

For noise of an industrial nature such as fixed building services plant, an assessment of the likely effects on people inside or outside residential buildings due to noise can be carried out using BS4142: 2014+A1: 2019 'Methods for rating and assessing industrial and commercial sound'.

The following acoustic parameters are described within BS4142: 2014:

1. Specific Noise Level – the equivalent continuous A-weighted sound pressure level measured over a specified time period, Tr, at the assessment position with the specific noise source contribution, LAeq, Tr (i.e. the noise level due to the new noise source).
2. Rating Level – the Specific Noise Level plus an adjustment for any characteristic noise features, LAr,Tr.

3. Residual Noise Level – the equivalent continuous A-weighted sound pressure level measured when the specific noise does not contribute to the ambient noise.
4. Background Noise level – measured for a specific duration, T, in the absence of the specific noise source, LA90,T.

To complete a BS4142 assessment of potential noise effects upon residential properties, it is necessary to obtain the Rating Level due to the sound source in question. The Rating Level is derived by adding corrections to the measured Specific Noise Level, if the noise source:

1. is tonal (correction of 0dB to +6dB, depending on severity).
2. contains distinct impulses (correction of 0dB to +9dB, depending on severity).
3. is intermittent (correction of +3dB if applicable).
4. is otherwise distinctive against the residual acoustic environment (correction of +3dB).

9.41.

The Rating Level can then be used in order to ascertain the likelihood of complaints due to industrial noise disturbance by subtracting the measured background noise level. The greater the positive difference, the greater the likelihood of complaints. BS4142 defines the following evaluation method.

9.42.

1. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact;
2. A difference of around +5 dB is of marginal significance; and,
3. where the rating level does not exceed the background, this is an indication of the specific sound source having a low impact.

9.43. MCC's Technical Guidance advises on a suitable noise rating versus background noise level to be achieved and states: 'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location'.

Commercial Operational Noise

9.44. Noise egress from the proposed commercial retail units in Plot 2b at the Proposed Development must be controlled to an appropriate level so as to avoid noise nuisance to sensitive receptors. With regard to commercial operation noise, MCC's Technical Guidance advises: 'The development should be designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location'.

9.45. **Tram-Induced Vibration Affecting Proposed Residential Dwellings**

9.46. BS6472-1: 2008 'Guide to evaluation of human exposure to vibration in buildings - part 1: Vibration sources other than blasting' provides guidance on typically acceptable limits for vibration within residential buildings during the day and night.

Table 9.11 gives the applicable criteria from BS6472-1: 2008. The applicable assessment criterion is the 'Vibration Dose Value' (VDV). Values of VDV within certain ranges indicate the likelihood or otherwise of adverse comment from occupants of the building.

Table 9.11: BS6472 VDV ranges for probability of adverse comment within residential buildings

9.47.

Place and time	Low probability of adverse comment (m/s1.75)	Adverse comment possible (m/s1.75)	Adverse comment probable (m/s1.75)
Residential building 16-hour day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential building 8-hour night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

Based on the above, the design limits for a low probability of adverse comment shall be:

1. < 0.4 m/s1.75, daytime (07:00-23:00)
2. < 0.2 m/s1.75, night-time (23:00-07:00)

There is currently no UK or International Standard which proposes acceptable levels of structure-borne noise (SBN) from railways, but the main US and UK guidance documents on this subject are summarized below.

In general, structure-borne (or re-radiated) noise is of greatest concern when it is the dominant noise, and also when the source cannot be seen, as in the case of trains in a tunnel or overground trains running on the opposite side of the building. Criteria for re-radiated noise are therefore generally intended to apply to sources that are not seen.

9.48.

Whilst there is no widely accepted method of evaluation of ground-borne noise, there is some consensus that for levels at and above 50dBA Lmax,slow during daytime, there is likely to be significant adverse reaction.

9.49.

The American Public Transit Association (APTA) document provides guidelines for recommended maximum SBN levels which take account of the building type, the proposed usage of property, whether residential, commercial or other, and also takes account of the prevailing ambient noise levels. Suggested levels are in the range of 30 to 35 dB LAmax for low to medium density residential, to 40 to 45 dB LAmax for high density residential and commercial properties, though the time weighting is not reported, i.e. 'fast' or 'slow'.

9.50.

9.51.

This and other experience in general identifies that there starts to be some impact on people in properties when the level exceeds 35 dB LAmax. Consequently, in the UK, design aims for railways have been set at 40 dB LAmax,slow within residential (e.g. rail schemes such as Channel Tunnel Rail Link, Docklands Light Railway, Bank Line Extension, Woolwich Line Extension, Jubilee Line Extension, and Thameslink 2000).

9.52.

Based on the above, for the purposes of this assessment 40 dB LAmax,slow is the recommended criterion in the proposed residential dwellings.

9.53.

Change in Road Traffic Noise

9.54.

The Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 7 gives advice on the assessment of noise effects due to changes in road traffic. The DMRB indicates that a 1 dB short term change in noise level is 'just' perceptible. However, change in traffic noise of less than 2dBA is generally not noticeable to the human ear whilst a change of 3dBA is generally considered to be just perceptible. Changes in noise levels of 3 to 5 dBA would however be noticeable and, depending on the final noise level, there may be a slight or moderate noise impact. Changes in noise level in excess of 6dBA would be clearly noticeable, and depending on the final noise level, the impact may be moderate or major. However, a significant change in traffic volumes or traffic category i.e. increase in the use of a road by HGVs, would be required to result in such increases.

9.55.

On this basis, Table 9.12 details the subjective human response relating to the change in the level of road traffic noise and the significance criteria applied to the road traffic noise assessment.

Table 9.12: Impact criteria for change in road traffic noise

Change in Noise Level	Subjective Reaction	Adverse Significance
< 3 dB	Imperceptible	Negligible
3 dB to 5 dB	Perceptible	Minor
6 dB to 10 dB	Up to a doubling in loudness	Moderate
> 10 dB	Over a doubling in loudness	Major

Baseline Conditions

Noise

A series of detailed noise surveys has been carried out by Jameson Acoustics. The surveys and associated measurement positions and measurement durations were selected to establish a detailed description of the prevailing environmental and entertainment noise climate around the Proposed Development.

The full methodology and summary results of the noise surveys are presented in Appendix 9.3. Measurement positions are shown in Figure 9.1.

9.56.

The general noise environment at and around the Site is principally determined by road traffic on Albion Street and Great Bridgewater Street and by tram movements on the Metrolink line that passes through and to the south/east of the Site. Ambient noise levels on top of the Viadux (east side) were also influenced by occasional service vehicle movements associated with the Manchester Central Convention Complex. Typical maximum noise levels to the south and east of the Site are generated by tram movements and from service vehicles associated with the Manchester Central Convention Complex. Typical maximum noise levels at the northwest of the Site are generated by vehicle movements along Great Bridgewater Street. Music noise egress from the rear elevation of bars at 'Deansgate Locks' contributes to the night-time noise climate to the south of the Site. Music noise egress during a Christmas party event within the Manchester Central Convention Complex (MCCC) was surveyed at three positions up the façade of the Viadux 1 tower (at Levels 10, 20 and 30).

9.57.

9.58.

Due to time limitations and the current schedule of music noise events, it was not possible to carry out noise studies of several different events held at MCCC. With only one event captured, it is not possible to carry out statistical analysis of music event noise impacting onto the development site. It is proposed that further noise surveys be carried out as the project design progresses. However, in lieu of sufficient measurement data at this stage, the assessment shall make reference to studies carried out by Fisher Acoustics in 2016-17. Fisher Acoustics conducted, in conjunction with Manchester Central, a controlled study of 'worst-case' PA music noise egress from MCCC's Central Hall 1, which lies at the southern edge of the Central Hall.

9.59.

9.60.

The methodology and results of this study are summarised in the original Site planning application chapter. It states that external noise levels were measured at locations representative of the closest façade of the proposed residential building to Manchester Central. These measurements were conducted at heights of 1.5 metres, 30 metres and 40 metres above the service yard. The elevated positions were used to represent the upper levels of the proposed building that will have a direct line of sight to the roof of Manchester Central.

9.61.

Based on the results of the Fisher Acoustics music noise egress study, the potential music noise levels at the upper levels of the proposed Viadux 1 residential building during an amplified music event within Central Hall 1 are presented in Table 9.13.

Table 9.13: Fisher Acoustics external noise levels due to music event at MCCC Central Hall 1

9.62.

Location	Sound Pressure Level, dB Leq,5min at Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Incident onto Viadux 1 façade	75	70	66	60	55	54	38

The above levels shall be used to calibrate a 3D software noise model of the Site in order to determine the corresponding incident MCCC music event noise levels onto the Proposed Development's residential facades.

9.63. The 3D noise model shall also be used to assess the spread of environmental noise levels across the Proposed Development (Scenario 2), calibrated using the Jameson Acoustics environmental noise survey results.

Vibration

9.64. A series of detailed vibration surveys has been carried out by Jameson Acoustics. The surveys and associated measurement positions and measurement durations were selected to determine the potential for vibration generated by tram movements to cause adverse comment within the residential buildings of the Proposed Development.

9.65. The full methodology and summary results of the vibrations surveys are presented in Appendix 9.4. Measurement positions are shown in Figure 9.2.

Identification and Evaluation of Likely Significant Effects

Construction Phase

Construction Noise

9.66. The anticipated key dates for construction works are as follows:

1. Plot 2a: Q1 2026 to Q1 2032
2. Plot 2b: Q3 2028 to Q1 2032

9.67. The anticipated construction times were originally provided in December 2023, however, as noted in Chapter 5 it is likely that construction activities for Plot 2b will commence after Plot 2a with both plots due to be operational at a similar time. The change in construction timings do not materially impact the conclusions of this Chapter or appendices. A worst case scenario is tested with both schemes still being constructed at the same time, albeit earlier in the overall construction programme, furthermore a worst case scenario is tested with noise impacts associated with Plot 2a being tested on Plot 2b.

9.68. Based on these dates, the only relevant sensitive receptors to consider would be:

1. A: Axis Tower (residential)
2. B: Beetham Tower (residential/hotel)
3. D: Viadux Phase 1 (residential)

9.69. Whilst there are other receptors around the Site, these other receptors are at greater distances from the Site than the receptors identified above and with similar exposure to the existing noise sources in the areas. Therefore, the achievement of acceptable noise levels at the assessed receptors would lead to acceptable noise level at receptors at a further distance from the Site.

9.70. Given the location of the Site within central Manchester, a limit of 75dB LAeq,10hr (or 5hr on Saturday mornings) would be considered appropriate in accordance with AL72. Furthermore, an assessment of baseline 10-hour (or 5-hour on Saturday mornings) noise levels against the BS 5228 'ABC method' would result in the same limit (75 dB LAeq,T), with total noise level (rather than construction noise alone) being assessed. NB The mean ambient LAeq,10hr noise level on roadsides at the lower levels of each of the above sensitive receptors, when rounded to the nearest 5 dB, would fall within BS 5228 Category C.

9.71. In accordance with BS 5228, a noise limit of 65 dB LAeq,T would apply for construction works undertaken on evenings or weekends (19:00-23:00 weekday, 13:00-23:00 Saturdays, 07:00-23:00 Sundays).

9.72. The Construction Methodology Chapter proposes the following Site operating hours.

1. Monday - Friday 07:30-18:00hrs
2. Saturday 08:00-14:00hrs
3. Sunday/Bank Holidays No works permitted

9.73. The construction noise threshold values shall therefore be:

1. Monday - Friday 07:30-18:00hrs: 75 dB LAeq,T
2. Saturday 08:00-13:00hrs: 75 dB LAeq,T
3. Saturday 13:00-14:00hrs: 65 dB LAeq,T

9.74. There is the potential for environmental noise effects at the above receptors from the following during the construction phase of the project:

- Temporary addition to traffic flows on local roads due to construction traffic (NB: All delivery access to the Site will be made via Albion Street and Great Bridgewater Street);
- Breaking out of existing structures; and,
- Construction of Proposed Development.

9.75. In order to estimate the likely levels of noise from construction activities at the Site, calculations have been carried out using the methodologies and data given in BS5228 and by applying corrections for quantity of plant (i.e. number of each item of plant, machinery), anticipated on-times (i.e. how long over the course of a working day each plant would operate), distance attenuation (i.e. by how much noise reduces with increasing distance from the plant) and screening loss (i.e. attenuation of noise due to intervening buildings, including buildings under construction where applicable, or the viaduct structure itself for works occurring inside the viaducts).

9.76. The assessment has been carried out for designated 'Timeslices' of the construction project in order to calculate the worst-case (pre-mitigation) noise level (LAeq,T) at each receptor over the course of a working day/period. These Timeslices are defined in Table 9.14 below.

Table 9.14: Designated 'Timeslices' for construction activities

Timeslice	Works (Site)
1	Enabling works (2a)
2	Piling (2a)
3	Substructure (2b)
4	Substructure (2a), Enabling (2b)
5	Superstructure (2a), Piling (2b)
6	Superstructure (2a), Superstructure (2b)
7	Cladding (2a), Superstructure (2b)
8	Cladding (2a), Cladding (2b)
9	Cladding (2a), ISF (2b)
10	ISF (2a), ISF (2b)

9.77. The full pre-mitigation construction noise calculation sheets are presented in Appendix 9.5.

9.78. Table 9.15 presents the calculated noise levels at the receptors identified above due to worst-case cumulative noise from construction works at the Site during the various construction 'Timeslices'.

Table 9.15: Calculated 'worst-case' noise levels at sensitive receptors during construction 'Timeslices'

Timeslice	Noise Level at Receptor, dB LAeq,T		
	A - Axis Tower	B - Beetham Tower	C - Viadux 1
1	78	59	82
2	76	57	80
3	77	58	81

4	77	86	85
5	77	84	84
6	77	85	84
7	73	85	83
8	73	81	80
9	73	78	79
10	71	78	78

The above values and commentary below represent 'worst-case' cumulative noise levels without mitigation. The results show noise levels would vary greatly according to the Timeslice and the location of the sensitive receptor.

9.79. For receptor A (Axis Tower), noise levels risk causing Minor adverse effects throughout the construction programme.

9.80. For receptor B (Beetham Tower), noise levels risk causing Negligible adverse impacts during Plot 2a early works, increasing to Moderate to Major adverse impacts when the construction of Plot 2b commences.

9.81. For receptor D (Viadux 1), noise levels risk causing Moderate to Major adverse impacts, dropping to Minor adverse impacts during the cladding and ISF works to Plot 2a & 2b.

9.82.

Construction Traffic Noise

9.83. The construction information provided by the Applicant provides a description of the construction traffic route which suggests vehicles approaching/entering the Plot 2a Site via Albion Street and the Plot 2b Site using Great Bridgewater Street. Delivery vehicles will utilise the M60 as far as reasonably practical to reduce the impact on traffic within the city centre. The vehicle data suggests that, at its peak, two-way traffic flows could reach 69 construction-related vehicles per day on Great Bridgewater Street, Albion Street and Deansgate, and 12 construction-related vehicles per day on Trafford Street.

9.84.

Although construction vehicles would have the potential to generate noise, this estimated number of vehicles would represent a very small proportion of the day-to-day road traffic movements. Based on anticipated construction traffic data and 2022 AAWT 18-hour traffic counts provided by SLR, the construction traffic would, for the worst-case road - Great Bridgewater Street (West of Albion St), produce a 0.2% increase in HGV movements and a 1.1% increase in traffic flow. At such minor rates of increase, the assessment indicates the change in noise level on any of the surrounding roads would be less than 1 dB LAeq,16hr. Therefore, the potential effects upon surrounding receptors would be Negligible.

9.85.

Construction Vibration

9.86. As discussed in BS5228, it is fully expected that the construction vibration levels would not be sufficient to cause structural damage to buildings around the Site. Similarly, as stated in BS5228-2: 2014, 'the levels of vibration associated with sectional flight auger injected piling are minimal, as the processes do not involve rapid acceleration or deceleration of tools in contact with the ground but rely to a large extent on steady motions'.

9.87.

BS 5228 indicates that construction activities (particularly piling) generally only cause vibration impacts when they are located less than 20 m from sensitive locations. The magnitude of impact depends on the type of piling, ground conditions and receptor distance.

It is not possible to accurately estimate the levels of vibration with any certainty from the likely construction works (it is dependent on the specific type of piling (such as sectional flight auger), ground conditions and the distance to the receptor). In lieu of available assessment methods, we would refer to case histories of vibration measured during piling operations presented in Annex C

and D of BS 5228-2. Data from works carried out in East London indicate that peak particle velocities of between 0.05 to 0.23 mm/s at 20 m from a site have been recorded during auger boring of 1.05 m diameter piles, with soil conditions described as 'fill / dense ballast / clay'. BS 5228 data for flight auger piling into soft ground over rock measured at 5m shows a recorded PPV level of 0.54 mm/s.

This historical data suggests that general levels of vibration from flight auger piling works are unlikely to exceed 1.0 mm/s PPV at any of the sensitive receptor buildings around the Site. From experience, occasional intermittent peaks in vibration can be experienced when the auger rig 'snags', or during the removal of pile casings. However, vibration levels recorded near such events (circa 10 m) did not exceed 3.0 mm/s PPV.

9.88. The impact of construction vibration on existing sensitive receptors is generally expected to be of a Negligible adverse significance for all receptors, occasionally increasing to a Minor adverse significance for receptor B (Beetham Tower) and receptor D (Viadux Phase 1).

9.89. Notwithstanding the potential or otherwise for vibration impacts at sensitive receptors, it is expected that specialist advice and appropriate methods to prevent structural damage to the listed structure at the Site will be implemented as part of the proposed works. Furthermore, it is

9.90. proposed that limits are placed on the closest vibration sensitive receptors as part of the CMP together with a scheme of vibration monitoring during key phases of construction works (e.g. piling and viaduct structural opening-up works).

Operational Phase

Commercial Operational Noise

9.91. The Proposed Development includes two commercial retail units in Plot 2b that will have the potential to generate noise from its operations. In accordance with MCC's Technical Guidance, this noise shall be controlled so as not to exceed a level of 5 dB below the prevailing background (LA90) noise level at the nearest sensitive receptors (due to location, this would be receptors B, C, D and E).

9.92. Based on the baseline survey data, this would equate to a noise limit of 50 dB LAeq at 1 m from residential facades of receptor B, C, D and E during anticipated opening hours (daytime, 07:00-

9.93. 23:00).

There will be apartments directly above (structurally connected) to these retail units. The party floor construction shall be capable of achieving Building Regulations ADE minimum airborne sound

9.94. insulation requirement of 45 dB DnT,w + Ctr. Noise transfer (Leq,5min) should be controlled to a level 5 dB below the anticipated background (L90) noise level in apartments at each octave band.

Noise from external servicing, i.e. deliveries and loading/unloading activities, would be dominated by the arrival/departure of service vehicles, which is captured in the next Section. Loading/unloading would occur at the front of the building (on the podium), although this is only likely to compromise crates/boxes of produce hand delivered to each unit. Historic measurements

9.95. of hand loading of goods to the store (including door slams) indicates a typical highest source noise level of up to 50 dB LAeq,15min at a normalised distance of 5 m. When extrapolated back to the nearest residential facades of receptors (which are further away that 5 metres), the resultant noise level would be significantly below the 50 dB LAeq noise limit.

For internal operations, an internal operational noise limit has been determined with consideration for a typical retail façade construction comprising conventional double glazing (28 dB Rw + Ctr) and an opened door on the frontage (onto the podium), as well as noise transfer through the floor slab based on a 225mm concrete slab (achieving Building Regulations ADE). Receptor E (residential windows directly above the retail units) would be the closest, most exposed receptor for noise breakout. This same receptor would be subject to internal noise transfer. Calculations indicate noise levels within the commercial unit could reach circa 75 dB LAeq,5min per octave band before the operational noise criteria is reached. Typical operational noise levels within cafes and restaurants are typically 65-70 dB Leq per octave band, thus falling below the upper limit of 75 dB Leq.

A suitable form of words should be included within all tenancy agreements to outline their responsibilities to prevent causing adverse noise impacts on the locality and structurally connected dwellings, in line with the above MCC noise requirements. The clause shall ensure that any tenants wishing to generate internal noise levels greater than 75 dB Leq per octave band are made responsible for introducing additional noise control measures (e.g. lobbied doors, mass-barrier ceilings) to suit.

9.96. Noise impacts associated with the operation of the commercial unit are therefore expected to be Negligible.

Changes in Road Traffic Noise

9.97. The Proposed Development would lead to changes in the traffic volumes on the roads surrounding the Site. Changes in traffic flows can lead to changes in the prevailing noise levels around the roads in question.

9.98. The expected changes in traffic flows and % HGVs in 2032 due to the operation of the Proposed Development as provided by SLR (transport consultant) are summarised in Table 9.16. This data includes delivery vehicles serving the Proposed Development, including the commercial unit, Plot 2c.

9.99.

Table 9.16: Summary of road traffic weekday flow changes due to Proposed Development

Location	2032 % Changes due to Proposed Development	
	AADT 18hr	% HGVs
Great Bridgewater Street (West of Albion St)	1.1%	0.0%
Albion Street	0.7%	0.0%
Deansgate	0.5%	0.0%
Great Bridgewater Street (East of Albion St)	0.9%	0.0%
Trafford Street	2.5%	0.1%

9.100.

9.101. The changes in traffic flows are minor and would lead to an increase in traffic noise due solely to traffic on the roads in question of less than 1.0 dB.

9.102. The potential changes in noise levels due to traffic flow changes would be classed as Negligible.

Building Services Plant

9.103. At this design stage, the specific total building services requirements for the various aspects of the Proposed Development are not known. However, noise limits for any and all building services plant can be established using published guidance.

9.104. In line with the assessment methodology detailed in BS4142 and the requirements presented in MCC's Technical Guidance, in order to avoid potential noise nuisance at existing and proposed sensitive receptors the non-emergency building services plant at the Proposed Development should be selected and suitably attenuated so as to achieve noise rating levels not more than 5 dB below the 'representative' background noise levels ('representative' as defined in BS4142, determined through statistical analysis).

It should be noted that the noise rating limits in Table 9.17 relate to the simultaneous operation of all plant serving the Development when assessed in accordance with BS4142.

Table 9.17: Cumulative non-emergency plant noise emission limits

Location (incident onto residential façade of…)	Plant Noise Rating Level, LAr,Tr (dB)	
	Day (07:00-23:00)	Night (23:00-07:00)
A - Axis Tower	50	43

B - Beetham Tower	48	42
C - Great Northern (consented scheme)	48	42
D - Viadux Phase 1	48	42
E - Proposed Plot 2a	50	43
F - Proposed Plot 2b	48	42

9.105. It is expected that any emergency plant items required at the Proposed Development, such as smoke extract fans and standby generators, would only operate during emergencies and during periodical test runs (e.g. short test runs every two weeks in sociable daytime hours). On this basis, it is not considered appropriate to require emergency plant to comply with the noise limits that would apply to continuously-operating non-emergency plant. It is therefore suggested that the noise level from any emergency plant is no more than 10 dB greater than the ambient noise level (measured as an LAeq noise level) at any proposed or existing residential receptor.

It is therefore recommended that the noise level at any residential façade during operation of any emergency plant does not exceed the daytime noise levels given in Table 9.18.

9.106. **Table 9.18: Cumulative emergency plant noise emission limits**

Location (incident onto residential façade of…)	Noise Level, dB LAeq Daytime (08:00-18:00 hr)
A - Axis Tower	75
B - Beetham Tower	67
C - Great Northern (consented scheme)	73
D - Viadux Phase 1	67
E - Proposed Plot 2a	67
F - Proposed Plot 2b	67

9.107.

9.108. Compliance with the criteria given in Table 9.17 and 9.18 would result in Negligible impact.

Environmental & Entertainment Noise Affecting Residential Dwellings

9.109. The sensitive areas of the Proposed Development that could be affected by existing environmental and entertainment noise levels are the proposed living room and bedrooms of the proposed apartments within Plot 2a and 2b.

9.110. The principal determinant of the internal noise level within the proposed apartments will be the sound reduction index of the curtain walling system, which is to include vision panels, opaque glazing and spandrel sections (the latter two items all being concealed internally behind plasterboard linings). Opening vision panels will be provided to each habitable room for purge ventilation.

9.111.

9.112. It is proposed that all apartments will be provided with continuously running supply and extract ventilation in order to achieve the background ventilation requirements of Approved Document F of the Building Regulations. Therefore, no passive trickle ventilation openings are required to the external facades of the habitable rooms. This is acoustically beneficial.

By taking into account the levels of noise measured at the Site, the areas of façade elements and the likely acoustic characteristics of the noise sensitive receiving space, the sound reduction required to be provided by the curtain wall elements can be determined.

Incident environmental and entertainment noise levels across all facades of the Plot 2a and 2b buildings have been established by use of advanced noise modelling software.

The results of the modelling have been used to determine a range of acoustic specifications for the complete curtain walling system to the proposed habitable rooms to achieve the internal noise criteria, in relation to both environmental (tram and road traffic) and entertainment noise (Manchester Central, Deansgate Locks and other surrounding identified sources). For Manchester Central, worst-case survey data measured by Fisher Acoustics, as presented in Table 9.13, have been adopted.

9.113. Figure 9.7 and 9.8 identifies façade acoustic specification zones for living rooms and bedrooms across both the Plot 2a and 2b buildings respectively.

Table 9.19 identifies the provisional minimum recommended Sound Reduction Index of the complete curtain walling specifications for each zone referred to in Figure 9.7 and 9.8.

9.114. **Table 9.19: Minimum sound reduction performance of complete curtain walling systems**

9.115

Acoustic Zone	Minimum Sound Reduction Index, R (dB) at Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
A – Red	31	33	40	42	44	47	47
B – Orange	29	31	38	40	42	45	45
C – Yellow	26	27	34	37	39	40	40
D - Green	23	25	31	34	36	36	36

9.116. It is proposed to carry out further noise surveys of Manchester Central music events, subject to scheduling, through the course of the detailed design process. The above performance figures may therefore be subject to development based on the results of further survey work.

9.117. To achieve the above performance requirements, the complete system will require:

1. appropriate high-performance double/triple glazed windows (e.g. 12.8-16-10.8mm [laminate] glass for zones A and B, reducing to 10.8-16-8.8mm [laminate] for zone C and 10-16-6.8mm [laminate] for zone D);
2. acoustically enhanced spandrel panels (including dense mineral wool insulation, sheet steel panels with layers of mass-boarding to zones A - C, e.g. Fermacell);
3. Frames would require acoustic cavity in-fills, such as those supplied by Siderise (e.g. MI5); and,
4. All non-vision panels/zones would need to be internally lined with 2 layers of 15 mm dense

9.118. plasterboard (e.g. SoundBloc) on independent lining system, providing a minimum void depth of 250 mm and containing a 100 mm (minimum) deep quilt of mineral wool (10-30 kg/m3).

9.119. The prospective complete curtain walling system shall be subject to off-site sound reduction testing at a suitably accredited acoustic laboratory to demonstrate the sound reduction performance requirements stipulated in Table 9.19 will be achieved prior to site install.

9.120. The performance requirements in zone A are particularly onerous and provisions shall be made to introduce secondary glazing to habitable rooms in this zone, should the prospective curtain walling system fail to meet the stipulated performance. The specification of the secondary glazing would be dependent on the results of the curtain walling laboratory testing. Historic test data for

9.121. equivalent curtain walling systems demonstrate that the performance targets for zones B to D are achievable without secondary glazing.

Based on the requirements of Building Regulations Approved Document O, the overheating strategy shall assume bedroom windows will be closed throughout the night (23:00-07:00) for all residential (apartment) units.

During the daytime (07:00-23:00), the following table sets out the maximum number of hours windows to habitable rooms (in apartments) can be opened before internal noise levels would exceed the Significant Observed Adverse Effect Level (SOAEL) when averaged over the 16-hour daytime period (to account for embedded overheating mitigation, i.e. MVHR on boost, solar-rated

glass, etc.). These limits have been determined in general accordance with the IOA/ANC Acoustics, Ventilation & Overheating Design Guide.

Table 9.20: Overheating strategy - maximum number of hours windows can be open during the day (07:00-23:00)

Location	Maximum number of hours windows can be open as part of the overheating strategy over a 16-hour day Daytime (07:00-23:00)
Plot 2a south & east elevations	6 hours
Plot 2a north elevation	5 hours
Plot 2a west elevation	7 hours
Plot 2b north & east elevations	5 hours
Plot 2b south & west elevations	7 hours

Note that LAeq incident environmental noise levels do not change significantly with height up the buildings (higher level apartments become more exposure to wider city traffic noise sources). The above limits therefore apply to all residential floors.

9.122.

For the lower level hotel, all guestrooms shall be air conditioned which removes any reliance on openable windows for overheating control (day or night).

9.123.

Provisions will exist within the overheating strategy to ensure apartment residents can close their windows during finite periods of 'entertainment' events at Manchester Central and Deansgate Locks (typically late evening/night-time periods on weekends) through the appropriate specification/sizing of mechanical ventilation heat recovery (MVHR) units with programmed boost rate functions.

9.124.

Tram-Induced Vibration Affecting Residential Dwellings

9.125.

The levels of vibration and associated structure-borne (re-radiated) noise have been predicted within the lower floors of residential buildings, Plot 2a and 2b, based on the results of the vibration survey, detailed in Appendix 9.4, and the following building structural information:

1. Piled foundations - independent of tram overpass footings and viaduct.
2. In-situ concrete frame building with residential accommodation from Level 5 (Plot 2a) and Level 2 (Plot 2b).
3. 200 mm+ PT concrete slabs with anticipated natural frequencies ranging from 4-15 Hz.

9.126.

The building development superstructure will modify the surveyed vibration levels, superstructures often amplifying foundation vibration levels. Our analysis considers the following:

1. Empirically researched floor amplification factors as given within “A Prediction for Rail Transportation Ground-borne Noise and Vibration” James Turner Nelson and High Saurenman Transportation Research Record 1143. [Ref 1]
2. Empirically researched floor amplification factors as given within “Handbook for Urban Noise and Vibration Control” Saurenman, Nelson, Wilson US Department of Commerce National Technical Information Services – February 1982. [Ref 2]

9.127.

The majority of the vibration energy from trains/trams is due to a combination of physical mechanisms such as wheel rail head interaction, wheel and rolling stock out-of-balance forces and suspension system resonances. All of this energy is transmitted via the track support system into the underlying ground or elevated platform structure. Any irregularities in the wheel/rail interface (eg wheel flat spots, railhead corrugation, rail joints, points etc.) can significantly increase the energy transmitted.

The main proportion of vibration energy transmitted by a train passby is found in the frequency range of 8 Hz to 250 Hz. It is usual to see some minor-to-moderate peaks in the frequency spectra at 10 to 20 Hz, due to the vehicle suspension system, although the majority of energy is contained at higher frequencies, typically between 30-125 Hz, where the rail-wheel mechanism becomes the dominant source.

9.128. Table 9.21 presents the estimated total number of tram passes through Deansgate-Castlefield for daytime (07:00-23:00 hr) and night-time (23:00-07:00 hr) periods. These estimations are based TfGM scheduling which states that a tram passes every 12 minutes on each line between 06:00-00:00 hr daily (excl. Sunday) and every 24 minutes on each line between 00:00-01:00 hr on Friday / Saturday nights.

9.129. **Table 9.21: Estimated number of tram passbys through Deansgate-Castlefield station**

Period	Number of tram passbys
Daytime (07:00-23:00)	1120
Night-time (23:00-07:00)	112

9.130. Each tram typically has 2 carriages. Trams traverse the section through the station and past the site at relatively low speed owing to a signal box to the north-east (road crossing) and the station approach.

9.131. Table 9.22 presented the estimated VDV levels within the proposed development at the first residential floor levels based on the typical maximum recorded vibration levels measured in the vertical Z-axis (worst-case), the estimated tram movement frequency detailed in Table 9.21 and medium amplification factors based on the proposed building structure. A comparison against the BS 6472 limits for a 'low probability of adverse comment' is provided.

Table 9.22: Estimated VDV levels within Plot 2a and 2b apartments from tram passbys

Location	Period	Estimated VDV (m/s1.75)	Proposed Limit (m/s1.75)	Probability of Adverse Comment
Plot 2a, Level 5 Apartments	Day (07:00-23:00)	<0.2	0.4	Low
	Night (23:00-07:00)	<0.1	0.2	Low
Plot 2b, Level 2 Apartments	Day (07:00-23:00)	<0.1	0.4	Low
	Night (23:00-07:00)	<0.1	0.2	Low

9.132.

9.133. The estimated VDV vibration levels fall below the threshold at which there would be a 'low probability of adverse comment' in accordance with BS 6472 and should therefore be considered acceptable.

Based on the highest recorded vibration levels from tram passbys, calculations have been carried out to estimate the resultant structure-borne noise (SBN) levels within the habitable rooms of proposed lower floor apartments in Plot 2a and 2b. The calculations consider medium amplification factors based on the proposed building structure. The results of the calculations are summarised in Table 9.23. A comparison against the proposed noise limits is provided.

Table 9.23: Calculated structure-borne noise levels within Plot 2a and 2b apartments from tram passbys

Location	Apartment position in building	Estimated SBN level, LAmax,s (dB)	Proposed SBN limit, LAmax,s (dB)	Compliance
	South side	33-37	40	Yes

Plot 2a, Level 11 Hotel Guestrooms	North side	31-35	40	Yes
Plot 2b, Level 2 Apartments	All	32-35	40	Yes

The results demonstrate structure-borne noise levels are predicted to fall below the proposed limit in all areas. Note, that for apartments on upper floors, noise levels can be expected to decay with height up the building, with a reasonable average estimate of circa -1 dB per floor.

9.134. Hotel guestrooms in the lower levels of Plot 2a are expected to experience structure-borne noise levels within 3 dB of the proposed limit, with the worst affected apartments being those to the south of the tower. These rooms will benefit from line-of-sight views of the tram lines, noting that noise is subjectively of greater concern when the source cannot be seen. These rooms will also

9.135. experience airborne tram noise intrusion, which will help to mask the significance of the structure-borne component.

Cumulative Effects

Construction Phase

9.136. The cumulative effects of noise from construction works associated with the Proposed Development and those of 'other' permitted development sites that may occur simultaneously have been considered. The two 'other' permitted development sites considered are listed below. All other potential sites are a significant distance from the Proposed Development and associated sensitive receptors and cumulative effects are not, therefore, anticipated.

1. 325-327 Deansgate (residential scheme) - Appl. Ref. 125804/FO/2019
2. Great Northern (residential element of scheme at land bounded by Deansgate, Great Bridgewater Street, Watson Street & Peter Street) - Appl. Ref. 135565/FO/2022

9.137. Given the locations of the above two Sites, the cumulative effects may be most significant onto receptor B (Beetham Tower). Provided all schemes incorporate suitable noise mitigation (best practice means), secured through appropriate CMPs, construction noise levels from all Sites should not exceed 75 dB LAeq,T at receptor B and, in isolation, be deemed to cause a Negligible impact. In combination, the Proposed Development site construction noise and the 325-327 Deansgate construction noise would have the potential, on certain days, to cause a +3 dB increase in total

9.138. construction noise at the south façade elevation of this receptor. This may result in an increase from Negligible to a Minor adverse impact.

9.139. The same scenario would occur on the north face of this elevation due to the combined construction noise output from the Proposed Development and the Great Northern, if construction programme coincide. The resultant impact on the north face of the receptor would also have the potential, on certain days, to increase from Negligible to a Minor adverse impact.

9.140. ### Operational Phase

9.141. Operational noise due to the Proposed Development and the committed developments in the surrounding area would include building services noise and changes in road traffic noise levels due to changes in traffic flows.

As detailed herein, the cumulative impact of noise due to changes in road traffic flows is expected to be negligible or minor. This result takes into account the predicted changes in traffic flow relating to the committed developments in the surrounding area.

Operational noise limits due to mechanical services at the Proposed Development have been derived using the methodology and assessment criteria given in BS4142. Operational noise limits for any mechanical services systems at the buildings of the committed developments in the surrounding area would also be derived using the methodology and assessment criteria given in BS4142. The Planning Conditions for the committed developments in the surrounding area include a requirement for the building and any externally mounted ancillary equipment to be acoustically

insulated in accordance with a scheme submitted to and approved in writing by the City Council in order to secure a reduction in the level of noise emanating from the equipment. The applicable noise limits will tend to be governed by the need to minimise noise levels at the buildings within the development, as these are the closest sensitive receptors in the majority of cases. Therefore, given the relative distances of the sensitive receptors applicable to each development, cumulative impact of building services noise will be Negligible.

Mitigation Measures

Construction Phase

In accordance with modern working practices, the principles of 'best practicable means' (BPM), as defined in the Control of Pollution Act, would be used to reduce noise emissions throughout the demolition and construction works to a reasonable and practicable level, as presented in Chapter 5 (Construction Management Chapter) and Appendix 5.1 of this Environmental Statement.

9.142. The control of noise and vibration from demolition and construction would be incorporate into a site-specific Construction Environmental Management Plan (CMP). The CMP would be agreed in consultation with MCC and should include and/or specify the following routine noise and vibration management controls:

9.143.

1. Noisy plant should be located so as to maximise the distances between the plant and the sensitive receptors;
2. Detailed programming of works to make maximum use of existing barriers to noise;
3. With the exception of generators, pumps and electric plant, all plant and equipment that can be shut down when not in use should be;
4. Retention of the outer walls of structures for as long as possible before demolition is necessary;
5. Careful selection of demolition/construction methods and plant to be used;
6. Switching off of plant and vehicle engines when not in use;
7. Restriction of drop heights onto lorries;
8. Regular maintenance and servicing of vehicles, equipment and plant;
9. Appropriate handling and storage of materials;
10. Appropriate operational hours;
11. Enforcement of restricted working hours for excessively noisy activities;
12. Implementation of an appropriate traffic management strategy;
13. Use of temporary acoustic barriers where appropriate and other noise containment measures such as screens, sheeting and acoustic hoardings at the construction site boundary to minimise noise breakout and reduce noise levels at the potentially affected receptors; and,
14. Breaking out of concrete structures to be undertaken, where possible, using low noise effect methods including bursting and splitting rather than percussive breaking.

9.144.

The CMP shall include a scheme for monitoring noise and vibration levels during key phases of construction works. If early noise and vibration surveys indicate levels exceed (or are at risk of exceeding) the limits set out in the CMP, continuous noise and vibration monitoring shall be

9.145. carried out. The equipment used for this monitoring shall include facilities to have trigger levels to alert site operatives (by email/SMS) when noise and/or vibration levels are approaching the limits. Upon receipt of alerts, the site operatives shall carry out investigate works to mitigate or suppress the cause, as outlined in the CMP.

9.146. In addition to the above, reasonable steps would be taken to keep the local community informed of proposed demolition and construction operations. Measures for community liaison would be dealt with by a dedicated Community Liaison Officer to co-ordinate the dissemination of information (for example, by means of a regular newsletter) and to program those operations at times that would minimise the potential for disturbance.

In terms of vibration control, impacts during piling will be minimal due to the use of continuous/sectional flight auger piling which is best suited to construction sites lying in close proximity to sensitive receptors. This technique is appropriate as it involves the use of steady motion to drive the piles instead of impacts or rapid acceleration and deceleration of machinery

against the ground. Therefore, the impact of perceptible piling vibration on neighbouring receptors and the risk of damage to adjacent buildings will be Negligible.

The above range of environmental management controls represent measures that are regularly and successfully applied to large-scale construction projects in order to minimise noise effects on local communities. The application of similar control measures during the construction would likewise ensure that the works proceed with the minimum disturbance to local residents, commercial properties, and pedestrians.

Operational Phase

9.147.

Commercial Operational Noise

The operational noise limit for the proposed commercial retail units in Plot 2b have been established to ensure compliance with published guidelines. To achieve compliance with the criteria, a shell (no ceiling) construction and conventional façade constructions will suffice, but prospective tenants will need to adhere ensure operational noise levels internally do not exceed a

9.148. level of 75 dB Leq per octave band. This level should, however, be comfortably achievable by most cafes, coffee shops and restaurant tenants. A suitable form of words should be included within tenancy agreements to outline their responsibilities to prevent causing adverse noise impacts on the locality, and introducing additional noise control measures (for 'noisier' tenants) as necessary.

Building Services Noise

Overall building services noise limits have been established to achieve compliance with published guidelines. To ensure compliance with the criteria, individual items of building services plant and

9.149. any associated noise control hardware will need to be selected such that the cumulative noise levels from all plant items do not exceed the overall building services noise limits.

Environmental & Entertainment Noise Affecting Proposed Dwellings

9.150. Internal noise criteria that must be achieved within the proposed accommodation due to external noise sources have been established. To ensure compliance with the criteria, the individual façade elements of the proposed buildings must achieve recommended minimum sound insulation performance criteria, as established herein.

Residual Effects

9.151.

Construction Phase

9.152. The implementation of noise mitigation measures as outlined above would assist in the reduction of adverse noise effects generated by construction activities.

9.153. Table 9.15 presents the calculated post-mitigation noise levels at the receptors identified above due to cumulative noise from construction works at the Site during the various construction 'Timeslices' identified in Table 9.14.

The full pre-mitigation construction noise calculation sheets are presented in Appendix 9.5.

Table 9.24: Calculated post-mitigation' noise levels at sensitive receptors during construction 'Timeslices'

Timeslice	Noise Level at Receptor, dB LAeq,T		
	A - Axis Tower	B - Beetham Tower	C - Viadux 1
1	69	51	68
2	69	51	68
3	68	49	67
4	69	75	74
5	69	75	75

6	69	74	73
7	67	75	73
8	67	73	72
9	67	69	70
10	63	69	69

The calculations demonstrate impact risks from construction works can be mitigated to be Negligible.

It is expected that vibration levels at sensitive receptors during the construction works would also be Negligible.

9.154. A range of mitigation measures to minimise disturbance due to the construction works has been recommended, including the maintenance of communication between the Contractor, MCC and local residents.

9.155. The noise impact of construction traffic on roads local to the Proposed Development during the construction phase of the development is expected to be Negligible.

9.156. Table 9.25 summarises the construction phase noise and vibration impact assessment.

9.157. **Table 9.25: Summary of construction phase noise and vibration impacts**

9.158.

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Construction noise	Existing local residents	Solid screening around the site. Communication with MCC and local residents. Application of 'Best Practicable Means' and noise control guidance from BS5228 and AL72. (Reference Paragraph 9.138-9.140) Implementation of a scheme of noise monitoring. (Reference Paragraph 9.140)	Noise limits and best practicable means defined in CMP. Scheme of noise monitoring defined in CMP.	Negligible to Minor (Temporary)
Construction traffic noise on local roads	Existing local residents	-	-	Negligible (Temporary)

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Construction vibration	Existing local residents	Communication with MCC and local residents. Application of 'Best Practicable Means' and noise control guidance from BS5228 and AL72. (Reference Paragraph 9.138-9.140) Adopt low-vibration methods for piling. (Reference Paragraph 9.142) Implementation of a scheme of vibration monitoring. (Reference Paragraph 9.140)	Vibration limits and best practicable means defined in CMP. Scheme of vibration monitoring defined in CMP.	Negligible to Minor (Temporary)
	Potential damage to neighbouring buildings	-	-	Negligible (Temporary)

9.159.

Operational Phase

9.160. Noise limits for the proposed commercial unit within the Proposed Development have been established. Compliance with these noise limits should ensure that the environmental noise impact

9.161. from the commercial unit is Negligible during the operational phase.

9.162. The noise impact of additional traffic on the roads local to the Proposed Development during the operational phase of the development is expected to be Negligible.

Noise limits for future fixed plant serving the Proposed Development have been established. Compliance with these noise limits should ensure that the environmental noise impact from the Proposed Development is Negligible during the operational phase.

Table 9.26 summarises the operational phase noise impact assessment.

Table 9.26: Summary of operational phase noise impacts

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitgiation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)

Noise from commercial unit operations	Existing local residents and proposed future local residents	Tenant to adhere to noise limit	Tenant lease agreements	Negligible (Permanent)
Change in road traffic noise on local roads	Existing local residents and proposed future local residents	-	-	Negligible (Permanent)
Noise from building services plant	Existing local residents and proposed future local residents	Landlord and commercial tenant to adhere to noise limit	Acoustic design specification Planning condition	Negligible (Permanent)

Monitoring

Not applicable.

Reference List

9.163. This ES Chapter has been prepared in reference to the following:

9.164.
- [1] “A Prediction for Rail Transportation Ground-borne Noise and Vibration” James Turner Nelson and High Saurenman Transportation Research Record 1143.
- [2] "Handbook for Urban Noise and Vibration Control” Saurenman, Nelson, Wilson US Department of Commerce National Technical Information Services – February 1982.

10. Daylight, Sunlight & Overshadowing

Introduction

10.1 This Chapter of the ES has been prepared by GIA and asseses the likely significant effects of the Proposed Development with respect to daylight and sunlight. This chapter also describes the methods used to assess the effects; the baseline conditions against which the assessments have been undertaken; the mitigation measures required to prevent, reduce or offset any significant negative effects; and the likely residual effects after these measures have been adopted.

10.2 As can be seen from the drawings in Appendix 10.1 and 10.3, there are very few areas of amenity space, apart from those listed below, which are located within 90° of due north of the site and in close enough proximity to potentially be adversely affected in overshadowing terms:

- Roman Gardens;
- Castlefield Urban Heritage Park;
- Porchfield Square Gardens; and
- St Johns Gardens.

10.3 Detailed overshadowing assessments have not, however, been undertaken on the above listed amenity spaces as only the shadow cast from the tower element of the Proposed Development has the potential to reach these amenity areas and, even if it does, as the tower element of the Proposed Development is located behind Viadux 1 and is slender in form, any additional shadow is likely to pass across these areas quickly and so have no significant effects.

10.4 This Chapter is accompanied by the following appendices:

- Appendix 10.1 – Drawings of the Baseline and Proposed Assessment Scenario;
- Appendix 10.2 – Daylight and Sunlight Results for Baseline v Proposed;
- Appendix 10.3 – Drawings of the Baseline and Proposed + Cumulatives Assessment Scenario;
- Appendix 10.4 – Daylight and Sunlight Results for Baseline v Proposed + Cumulatives.

10.5 The authors of this Chapter have the following qualifications and experience:

	Lead Author	Reviewer
Name	Nicola Hensey	Michael Beatty
Company	GIA	GIA
Qualifications/Accreditations relevant to technical area	LLB (Hons)	BSc (Hons) MRICS
Does the practitioner hold any IEMA qualification?	No	No
Company hold IEMA QMark?	No	
Years technical experience (in technical area)	16	10
Number of EIA's delivered to date	33	16

Assumptions and Limitations

10.6 Where actual room layouts were available on the planning portal, these have been considered in regard to the modelling of the internal layouts within the existing surrounding properties. Where layout information was not available, assumptions have been made as to the use and internal configuration of the rooms (from external observations during a site inspection) behind the fenestration observed.

10.7 In such cases a standard 4.2 metre (m) (14ft) room depth has been assumed, unless the building form dictated otherwise. This is common practice where access to buildings for surveying is unavailable. Obtaining these room layouts enables precise evaluation of the diffuse levels of daylight within each of the rooms via the NSL.

10.8 Floor levels have been assumed for adjoining properties assessed, where access has not been obtained. This dictates the level of the working plane which is relevant for the NSL assessments.

Relevant Legislation, Policy and Guidance

Legislation

10.9 There is no legislation that governs daylight and sunlight, with the criteria for assessment relating to daylight and sunlight covered by national and local policy in addition to BRE guidance as set out below.

Policy

National Planning Policy

National Planning Policy Framework (2023)

10.10 The National Planning Policy Framework 2023 stipulates at paragraph 129 (c) that:-

"Local planning authorities should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework. In this context, 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 Practice Guidance

10.11 The Planning Practice Guidance (PPG) – Effective Use of Land, published on 22 July 2019 and regularly updated as a 'live' resource, 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."

10.12 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 buildings predominate, lower 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."

Local Planning Policy

Manchester Core Strategy (2012 – 2027)

10.13 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.

10.14 Policy EN2 – Tall Buildings – States that, by their very size, tall buildings can have a significant impact on the local environment and its micro-climate. 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 and Planning Guidance (Adopted April 2007)

10.15 The SPD sets out a series of design principles which should be considered and implemented where in accordance with the agreed 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.

Guidance

Building Research Establishment (BRE) 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice', Third Edition, 2022

10.16 The Building Research Establishment (BRE) Guidelines 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice 2022, 3rd edition' 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 (LPAs). 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 2011 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."

10.17 It also states:

"The advice is 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).

10.18 In addition, the BRE Guidelines state (para. 1.3) that:

"…it is intended to be read in conjunction with the interior daylighting recommendations in BS EN 17037 Daylighting in Buildings, and in the CIBSE publication LG 10 Daylighting – a guide for designers".

Assessment Methodology and Significance Criteria

Scenarios Tested

10.19 The following scenarios have been assessed and are reported within this Chapter:

- 1 - Existing Baseline (Site as it is today);
- 3 - Existing Baseline with Proposed Development; and
- 3a - Existing Baseline with Proposed Development + Cumulatives

The Study Area

10.20 The BRE Guidelines suggest that residential properties have the highest requirement for daylight and sunlight and states that:

"the guidelines are intended for use for rooms in adjoining dwellings where light is required, including living rooms, kitchens and bedrooms."

10.21 The scope of residential properties that have been assessed has been determined through professional judgement, considering their orientation and proximity to the Proposed Development.

10.22 The following properties are defined as receptors and will be considered due to their proximity to the Site, and their use:

- Hill Quays
- Riverside Mews
- The Rhine
- The Nile
- 30 City Road East
- Lumiere Building
- 14 Albion Street
- The Ropeworks
- 21 Little Peter Street
- 8-16 Bridgewater St
- 20 Southern St
- 18-12 Southern St
- 8-10 Southern St
- 357-361 Deansgate
- Deansgate Quay
- Ropeworks Apartments Block 1
- The Danube
- Jurys Inn
- Beetham Tower
- 21-35 Whitworth St
- 84 Great Bridge St
- Chepstow House
- Hacienda
- 325-327 Deansgate
- Viadux 1
- Free Trade Hall Peter Street
- Great Northern Tower
- Midland Hotel

- Axis Tower

10.23 These properties are identified in the drawings contained at Appendix 10.1.

10.24 The assessment has considered other residential properties which may have a view of the completed Proposed Development but, due to the distance and orientation from the Proposed Development, their daylight and sunlight amenity levels are unlikely to be adversely affected. They have not, therefore, been assessed in detail.

Source of Effect

10.25 The assessment of daylight and sunlight effects is based principally on the amount of visible sky before and after the construction of a new development.

10.26 The Building Research Establishment (BRE) recommends the following assessment methodologies:

- Daylight
  - Vertical Sky Component (VSC); and
  - No Sky Line (NSL) Method.
- Sunlight
  - Annual Probable Sunlight Hours (APSH).

10.27 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.

10.28 The 3D model uses Waldram Diagrams to establish the VSC and 3D geometric calculations for daylight distribution (NSL).

Daylight

Vertical Sky Component (VSC) Method

10.29 The VSC method of assessment is defined in the BRE Guidelines as the:

"ratio of that part of illuminance at a point on a given vertical plane that is received directly from a CIE standard overcast sky, to illuminate on a horizontal plane due to an unobstructed hemisphere of this sky".

10.30 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.

10.31 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'.

10.32 The Waldram Diagram is effectively 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.

10.33 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 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".

No Sky Line (NSL) Method

10.34 The BRE Guidelines 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.

10.35 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.

10.36 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 state that they are less important. The BRE Guidelines 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.

10.37 Therefore, it is implied that an NSL of at least 80% would be considered satisfactory.

10.38 In regard to deep rooms which are lit by windows on one side, the BRE Guidelines 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."

Diffuse Daylight

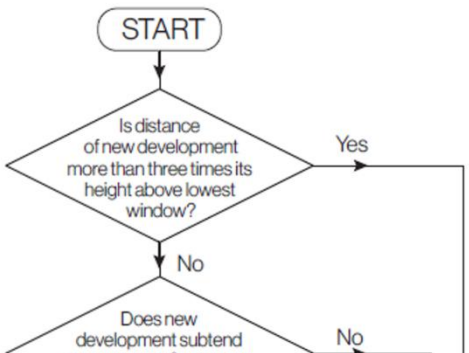
10.39 Paragraph 2.2.23 of the BRE Guidelines states:-

"…the diffuse daylighting of the existing building may be adversely affected…if either:

- the VSC measured at the centre of an existing main window is less than 27%, and less than 0.80 times its former value
- the area of the working plane in a room which can receive direct skylight is reduced to less than 0.80 times its former value."

This assessment process is summarised in Figure 20 of the BRE Guidelines, Decision Chart: diffuse daylight in existing buildings, which can be seen below in Figure 10.1

Figure 10.1 - BRE Figure 20: Decision Chart: diffuse daylight in existing buildings



Sunlight

Annual Probable Sunlight Hours

10.40 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 1486, and each spot equates to 14.86 hours of the total annual sunlight hours.

10.41 The number of spots is 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.

10.42 Paragraph 3.2.3 of the BRE Guidelines states:-

"To assess loss of sunlight to an existing building, it is suggested that all main living rooms of dwellings, and conservatories, should be checked if they have a window facing within 90° of due south…Normally loss of sunlight need not be analysed to kitchens and bedrooms, except for bedrooms that also comprise a living space, for example a bed sitting room in an old people's home"

10.43 Regarding existing surrounding receptors, the BRE Guidelines 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%.

10.44 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 window should be considered as the 'main windows'. Therefore, unless the rooms 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

10.45 The following table provides a summary of the criteria set out within the BRE Guidelines for daylight and sunlight.

Table 10.1 Summary of Daylight and Sunlight Assessment Criteria

Method	BRE Assessment 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, 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%.

Significance Criteria

Significance Evaluation Methodology

Daylight and Sunlight

10.46 For daylight and sunlight, the BRE Guidelines outline the approach within the accompanying Appendix H. In terms of assigning criteria to assess the effects, Appendix H states the following:

"H3 Adverse impacts occur when there is a significant decrease in the amount of skylight and sunlight reaching an existing building where it is required…"

"H4 The assessment of impact will depend on a combination of factors, and there is no simple rule of thumb that can be applied."

"H5 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…"

"H6 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
- The affected building only has a low level of requirement for skylight or sunlight
- There are particular reasons why an alternative, less stringent, guideline should be applied…"

"H7 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…"

"H8 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 principals as adverse impacts."

10.47 The BRE Guidelines do not provide any guidance on what constitutes a moderate adverse impact. Best practice guidance and professional judgment will be used to determine any impacts based on the guidance set out in Appendix H of the BRE Guidelines. Potential effects will be identified as beneficial, adverse, or negligible, and their magnitude of effects will be set out as Minor, Moderate and Major.

10.48 The initial numerical criteria for determining the magnitude of effect is based on percentage alterations, as follows:

Table 10.2 – Daylight and Sunlight Magnitude of Effect

Magnitude	Percentage Alteration from Baseline
Negligible	0-20%

Minor	20-29.9%
Moderate	30-39.9%
Major	40%+

10.49 Appendix F of the BRE guidelines provides an alternate baseline VSC value for city centre regions of 18% rather than the 27% referenced through the body of the document which is the level of VSC to be expected in an environment where the neighbouring construction angle is around 25 degrees i.e. a more suburban location.

10.50 18% is 67% of 27%. 67% of the BRE target value for NSL (80%) is 53.6% Therefore, as the Proposed Development is in a more urban location, if the changes in VSC and/or NSL should breach the standard BRE guidelines beyond a minor extent, the magnitude of effect is still considered to be of minor significance provided that the windows either experience no change or retain 18% VSC and the rooms retain at least 53.6% NSL.

Sensitivity of Identified Daylight & Sunlight Receptors

10.51 It is important that the location and nature of the Site and surrounding are considered when determining the significance of any impacts identified. The BRE Guide is very clear that the targets provided are not mandatory. The location of the development could be deemed to be 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 NPPF and NPPG.

10.52 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 development. The existing residential receptors surrounding the Site are in a developing city centre location where there is an expectation for a higher density of development. The Site is currently undeveloped. As such, the Site is underdeveloped given the dense, urban location, and the surrounding receptors are therefore receiving higher levels of daylight and sunlight than would typically be expected in a city centre location.

10.53 All of the daylight and sunlight sensitive receptors are therefore considered to be of medium sensitivity.

Significance of Daylight & Sunlight Effects

10.54 The significance of any identified environmental effects is determined by the assessment of their magnitude against their sensitivity. The table below illustrates how the sensitivity of the receptors and the magnitude of any effect combine to confirm significance.

Table 10.3 - Daylight and Sunlight Significance of Effect

Magnitude	Sensitivity		
	High	Medium	Low
Major	Major Adverse / Beneficial*	Major Adverse / Beneficial*	Moderate-Minor Adverse / Beneficial
Moderate	Moderate Adverse / Beneficial*	Moderate Adverse / Beneficial*	Minor Adverse / Beneficial
Minor	Moderate-Minor Adverse / Beneficial	Minor Adverse / Beneficial	Minor-Negligible

Negligible	Negligible	Negligible	Negligible
Key	* Significant in terms of EIA regulations		

10.55 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.

Significance of Effects in Context to the Locality

10.56 The context of the Site and surrounding area is key to understanding the sensitivity of the surrounding receptors and significance of daylight and sunlight effects.

10.57 It is well established that the published targets within the BRE Guide are based on low rise, suburban development. The PPG – Making Effective Use of Land - Paragraph 007 Reference ID: 66-007-20190722 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 buildings predominate, lower 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."

10.58 This is a key point to consider in respect of the Proposed Development and its impact on surrounding properties, particularly as it is situated in Manchester City Centre. The Manchester Core Strategy 2012-2027 sets out development principles for the city centre in Policy CC 6 (p60), which states the following:

"City Centre development will generally be high-density. It is a location where land should be used to its maximum efficiency. The appropriate scale, massing and height of development in the City Centre will significantly exceed what is appropriate elsewhere in the City."

10.59 This approach is also acknowledged in the BRE Guide, which states:

"…in special circumstances the developer or planning authority may wish to use different target values… in a historic city centre, or in an area with modern high rise buildings, a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings".

10.60 It would therefore be unrealistic for the surrounding residential properties to expect to maintain similar levels of daylight as those currently experienced, as the Site is currently undeveloped.

Manchester City Centre Benchmarking

10.61 Considering the contextual discussion above, in order to fully understand the results in context, it is appropriate to consider what are deemed to be appropriate daylight levels in the city centre. The retained VSC daylight levels in established, successful residential areas in the city centre of Manchester have therefore been reviewed and are set out below. The areas reviewed all include residential buildings and are recognised as positive urban environments that people choose to live in.

The locations give practical, recognisable examples of living conditions around the city centre. This is an evidential method of benchmarking daylight levels in a dense, urban area, which allows a better understanding of the application of the BRE guide in such locations.

Table 10.4 – Retained VSC Daylight Levels in Manchester City Centre

Address	Retained VSC Daylight Level
Deansgate Quay, Deansgate	4.0%
Boxworks, Castlefield	5.1%
MoHo, Castlefield	6.4%
Hill Quays, Great Jackson Street	6.2%
Anvil Street, McIntosh Village	8.0%
Lumiere, Great Jackson Street	7.1%
Princess House, Oxford Road	11.9%
The Hacienda, Whitworth Street West	13.6%
Gallery Gardens, Castlefield	13.9%
Britannia Mills, Castlefield	18.0%
Deansgate Square, Great Jackson Street	19.8%
12 Thomas Street, Northern Quarter	20.2%

10.62 The above table demonstrates that several of the most successful and desirable residential locations in Manchester City Centre do not meet the BRE target criteria. In some cases, the levels of retained daylight are substantially below the written BRE targets. The city centre context is such that deviations from the BRE target criteria are to be anticipated, and this sets the benchmark of what is acceptable in terms of daylight giving due consideration to the specific site characteristics, history and location. It is an inevitable consequence of living in a city centre that compromises are made on certain aspects, such as daylight amenity, in order to avail of other benefits that living in such a location provides.

10.63 The impacts discussed to the surrounding sensitive receptors below have therefore been considered in context to the BRE guidance, but also against what is considered acceptable in other residential locations in Manchester City Centre.

Baseline Conditions

Daylight & Sunlight

10.64 In accordance with the scoping agreed with MCC the Existing Baseline assumes the completion of the following currently under construction buildings:

- 1 - Plot 9a First Street (massing only);
- 2 - Plot 10b First Street (massing only); and
- 3 - First Street South (massing only);
- 5 - Plot F Great Jackson Street (massing only).
- 6 - 70 Great Bridgewater Street (massing only);
- 8 - Viadux One (assessed due to proximity);
- 9 - Staycity Deansgate (assessed due to proximity);and

- 14 - Deansgate South (massing only).

10.65 Drawings of this assessment scenario can be found in Appendix 10.1.

10.66 A total of 3905 windows facing the Site serving 2221 rooms within 29 buildings were assessed for VSC and NSL (daylight) and 698 rooms containing a living room element were assessed for APSH (sunlight) within the 23 buildings which are material for consideration in sunlight terms ie their windows are orientated to within 90 degrees of due south.

10.67 The full Baseline daylight and sunlight results can be found in Appendix 10.2 and are summarised in Table 10.5 below.

Table 10.5 – Baseline levels of VSC, NSL & APSH within the surrounding sensitive receptors

Address	Total No. Windows That Meet VSC Criteria		Total No. Rooms That Meet NSL Criteria		Total No. Rooms That Meet APSH Criteria	
	Total	Pass	Total	Pass	Total	Pass
Hill Quays	192	51	95	69	60	23
Riverside Mews	17	10	7	7	1	0
The Rhine	83	14	62	50	14	0
The Nile	183	34	127	75	25	8
30 City Road East	36	6	33	15	0	0
Lumiere Building	130	51	89	52	10	5
14 Albion Street	8	4	6	4	0	0
The Ropeworks	20	2	8	8	0	0
21 Little Peter Street	43	8	22	16	3	1
8-16 Bridgewater St	13	1	8	7	4	4
20 Southern St	11	2	9	4	9	8
18-12 Southern St	9	0	6	0	5	4
8-10 Southern St	12	4	6	2	2	2
357-361 Deansgate	43	20	36	20	4	0
Deansgate Quay	81	22	43	42	17	9
Ropeworks Block 1	208	12	88	62	11	4
The Danube	101	5	74	22	13	0
Jurys Inn	100	21	96	35	0	0

Address	Total No. Windows That Meet VSC Criteria		Total No. Rooms That Meet NSL Criteria		Total No. Rooms That Meet APSH Criteria	
Beetham Tower	282	206	108	99	45	44
21-35 Whitworth St	56	24	48	44	0	0
84 Great Bridge St	47	28	27	25	12	12
Chepstow house	32	8	12	5	11	6
Hacienda	211	85	164	91	11	11
325 - 327 Deansgate	422	18	102	98	102	20
Viadux 1	798	798	418	418	190	190
Free Trade Hall Peter Street	164	38	154	87	0	0
Great Northern Tower	95	37	54	44	54	46
Midland Hotel	153	119	63	49	31	31
Axis Tower	355	298	256	150	64	63
Total	**3905**	**1926**	**2221**	**1600**	**698**	**491**

10.68 Out of the 3905 windows assessed for VSC daylight, 1926 (49%) meet or exceed the BRE recommended criteria. For NSL, 1600 (72%) of the 2221 rooms assessed meet the BRE recommended criteria. For sunlight, 491 (70%) of the 698 rooms assessed meet the BRE criteria for both Winter and Annual APSH.

10.69 Overall, there is a reasonable level of baseline daylight and sunlight compliance considering the city centre context of the Site and the height and density in the immediate locality.

If the Proposed Development was not constructed, the baseline daylight and sunlight levels would remain the same as there are no 'natural' factors that would influence baseline conditions, only human induced changes (i.e., development). The site is, however, seen as a redevelopment opportunity and so, in reality, it would be unlikely for the baseline to remain as it is indefinitely. With respect to human induced changes, any development could influence the baseline conditions of varying degrees, as any drivers for change in baseline conditions would be linked to massing and layout of the surrounding context.

Identification and Evaluation of Likely Significant Effects

Construction Phase

10.70 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 have not been modelled.

10.71 Since the potential daylight and sunlight effects relating to construction works will gradually increase to the potential effects identified for the completed Proposed Development, the interim construction effects will not be assessed quantitatively as it is considered that the completed Proposed Development represents the worst-case assessment in terms of likely daylight and sunlight.

10.72 During the construction phase, the daylight and sunlight effects will gradually change from negligible in the baseline position to minor adverse with the Proposed Development in place, which is described below in the operational phase.

Operational Phase

Daylight & Sunlight

10.73 The outputs of the computer modelling for both daylight and sunlight is provided in full within Appendix 10.2, with the key metrics provided in Tables 10.7 to 10.10 below.

10.74 A total of 3905 windows facing the Site serving 2221 rooms within 29 buildings were assessed for VSC and NSL (daylight) and 698 rooms were assessed for APSH (sunlight) within the 23 buildings which are material for consideration in sunlight terms i.e., their windows are orientated to within 90 degrees of due south.

10.75 The breakdown of the Existing Baseline results against the Proposed Development for each of the individual buildings forming part of this assessment are discussed in more detail below.

Table 10.7 – Summary of VSC Daylight Results

Address	Total No. of windows	No. of windows that meet BRE Guidelines Negligible	Below BRE Guidelines - Magnitude of Change		
			Minor	Moderate	Major
Hill Quays	192	175	8	8	1
Riverside Mews	17	17	0	0	0
The Rhine	83	83	0	0	0
The Nile	183	181	2	0	0
30 City Road East	36	36	0	0	0
Lumiere Building	130	128	1	1	0
14 Albion Street	8	8	0	0	0
The Ropeworks	20	20	0	0	0
21 Little Peter Street	43	43	0	0	0
8-16 Bridgewater St	13	13	0	0	0
20 Southern St	11	11	0	0	0
18-12 Southern St	9	9	0	0	0
8-10 Southern St	12	12	0	0	0
357-361 Deansgate	43	42	0	0	1
Deansgate Quay	81	75	1	5	0
Ropeworks Block 1	208	146	29	25	8
The Danube	101	101	0	0	0
Jurys Inn	100	96	4	0	0
Beetham Tower	282	282	0	0	0

Address	Total No. of windows	No. of windows that meet BRE Guidelines Negligible	Below BRE Guidelines - Magnitude of Change		
			Minor	Moderate	Major
21-35 Whitworth St	56	56	0	0	0
84 Great Bridge St	47	47	0	0	0
Chepstow house	32	32	0	0	0
Hacienda	211	209	2	0	0
325 - 327 Deansgate	422	422	0	0	0
Viadux 1	798	76	0	157	565
Free Trade Hall Peter Street	164	164	0	0	0
Great Northern Tower	95	90	4	0	1
Midland Hotel	153	153	0	0	0
Axis Tower	355	218	45	67	25
Total	**3905**	**2945**	**96**	**263**	**601**

Table 10.8 – Summary of NSL Daylight Results

Address	Total No. of Rooms	No. of rooms that meet BRE Guidelines Negligible	Below BRE Guidelines - Magnitude of Change		
			Minor	Moderate	Major
Hill Quays	95	95	0	0	0
Riverside Mews	7	7	0	0	0
The Rhine	62	62	0	0	0
The Nile	127	127	0	0	0
30 City Road East	33	33	0	0	0
Lumiere Building	89	89	0	0	0
14 Albion Street	6	6	0	0	0
The Ropeworks	8	8	0	0	0
21 Little Peter Street	22	22	0	0	0
8-16 Bridgewater St	8	8	0	0	0
20 Southern St	9	9	0	0	0
18-12 Southern St	6	6	0	0	0
8-10 Southern St	6	6	0	0	0
357-361 Deansgate	36	34	0	0	2
Deansgate Quay	43	39	0	4	0
Ropeworks Block 1	88	78	10	0	0
The Danube	74	74	0	0	0

Address	Total No. of Rooms	No. of rooms that meet BRE Guidelines Negligible	Below BRE Guidelines - Magnitude of Change		
			Minor	Moderate	Major
Jurys Inn	96	96	0	0	0
Beetham Tower	108	108	0	0	0
21-35 Whitworth St	48	48	0	0	0
84 Great Bridge St	27	27	0	0	0
Chepstow house	12	12	0	0	0
Hacienda	164	164	0	0	0
325 - 327 Deansgate	102	102	0	0	0
Viadux 1	418	76	69	7	266
Free Trade Hall Peter Street	154	154	0	0	0
Great Northern Tower	54	54	0	0	0
Midland Hotel	63	63	0	0	0
Axis Tower	256	154	74	28	0
Total	**2221**	**1761**	**153**	**39**	**268**

Table 11.9 – Summary of Annual Sunlight Results

Address	Total No. of rooms	No. of rooms that meet BRE Guidelines Negligible	Below BRE Guidelines - Magnitude of Change		
			Minor	Moderate	Major
Hill Quays	60	60	0	0	0
Riverside Mews	1	1	0	0	0
The Rhine	14	14	0	0	0
The Nile	25	25	0	0	0
Lumiere Building	10	10	0	0	0
21 Little Peter Street	3	3	0	0	0
8-16 Bridgewater St	4	4	0	0	0
20 Southern St	9	9	0	0	0
18-12 Southern St	5	5	0	0	0
8-10 Southern St	2	2	0	0	0
357-361 Deansgate	4	4	0	0	0
Deansgate Quay	17	17	0	0	0
Ropeworks Block 1	11	11	0	0	0
The Danube	13	13	0	0	0

Address	Total No. of rooms	No. of rooms that meet BRE Guidelines Negligible	Below BRE Guidelines - Magnitude of Change		
			Minor	Moderate	Major
Beetham Tower	45	45	0	0	0
84 Great Bridge St	12	12	0	0	0
Chepstow house	11	11	0	0	0
Hacienda	11	11	0	0	0
325 - 327 Deansgate	102	102	0	0	0
Viadux 1	190	190	0	0	0
Great Northern Tower	54	51	1	1	1
Midland Hotel	31	31	0	0	0
Axis Tower	64	64	0	0	0
Total	**698**	**695**	**1**	**1**	**1**

Table 11.10 – Summary of Winter Sunlight Results

Address	Total No. of rooms	No. of rooms that meet BRE Guidelines Negligible	Below BRE Guidelines - Magnitude of Change		
			Minor	Moderate	Major
Hill Quays	60	60	0	0	0
Riverside Mews	1	1	0	0	0
The Rhine	14	14	0	0	0
The Nile	25	25	0	0	0
Lumiere Building	10	10	0	0	0
21 Little Peter Street	3	3	0	0	0
8-16 Bridgewater St	4	4	0	0	0
20 Southern St	9	9	0	0	0
18-12 Southern St	5	5	0	0	0
8-10 Southern St	2	2	0	0	0
357-361 Deansgate	4	4	0	0	0

Address	Total No. of rooms	No. of rooms that meet BRE Guidelines Negligible	Below BRE Guidelines - Magnitude of Change		
			Minor	Moderate	Major
Deansgate Quay	17	17	0	0	0
Ropeworks Block 1	11	11	0	0	0
The Danube	13	13	0	0	0
Beetham Tower	45	45	0	0	0
84 Great Bridge St	12	12	0	0	0
Chepstow house	11	11	0	0	0
Hacienda	11	11	0	0	0
325 - 327 Deansgate	102	102	0	0	0
Viadux 1	190	190	0	0	0
Great Northern Tower	54	50	1	0	3
Midland Hotel	31	0	0	0	0
Axis Tower	64	0	0	0	0
Total	**698**	**694**	**1**	**0**	**3**

10.76 In situations where the construction of the Proposed Development would result in VSC, NSL and APSH alterations to the windows and rooms within a property which are all within the BRE guidelines, the effect of the Proposed Development upon the daylight and sunlight amenity to that property is considered to be negligible.

10.77 Of the 29 properties assessed, the effect of the Proposed Development upon the daylight and sunlight amenity within the 17 properties listed within Table 10.11 would be negligible (not significant).

Table 10.11: Properties with a Negligible Daylight and Sunlight effect

Properties with a Negligible Daylight and Sunlight effect	
Riverside Mews	8-10 Southern St
The Rhine	The Danube
30 City Road East	Beetham Tower
14 Albion Street	21-35 Whitworth St
	84 Great Bridge St
21 Little Peter Street	Chepstow House
8-16 Bridgewater St	325 - 327 Deansgate
20 Southern St	Free Trade Hall Peter Street
18-12 Southern St	Midland Hotel

10.78 In accordance with the significance criteria described above, the effect upon the daylight amenity within the below properties is considered to be minor adverse (not significant). The sunlight effect upon these properties is negligible (not significant)

- Jury's Inn
- Hacienda
- The Nile

10.79 The remaining eight properties are discussed in detail below:-

Hill Quays

Diffuse Daylight

10.80 A total of 192 windows serving 95 rooms were assessed for daylight within this building.

10.81 Any changes in daylight amenity (VSC & NSL) to 78 (82%) of the 95 rooms assessed will be fully BRE compliant. The effect upon daylight amenity within these 78 rooms is therefore considered to be negligible (not significant).

10.82 In accordance with the significance criteria described above, 8 (8%) of the remaining 17 rooms will experience changes in VSC and/or NSL which are minor. The effect upon the daylight amenity within these 8 rooms is therefore considered to be minor adverse (not significant).

10.83 One of the windows serving each of the remaining 9 rooms has a very low baseline VSC level (0.1% to 4.7%) due to their recessed location under balconies restricting their view of the sky. The unnoticeable 0.1% and 1.5% absolute VSC changes therefore disproportionately represent themselves as being of moderate to major adverse significance. As absolute VSC changes of this level will not be noticeable to the occupants and all of the rooms are fully BRE compliant in NSL terms, the overall effect upon the daylight amenity within these rooms is considered to be minor adverse (not significant).

10.84 The overall effect of the Proposed Development upon the daylight amenity within this property is considered to be minor adverse (not significant).

Sunlight

10.85 Any changes to the sunlight amenity within the 60 rooms will be fully BRE compliant. The effect upon sunlight amenity within this property is therefore considered to be negligible (not significant).

Lumiere Building

Diffuse Daylight

10.86 A total of 130 windows serving 89 rooms were assessed for daylight within this building.

10.87 Any changes in daylight amenity (VSC & NSL) to 87 (98%) of the 89 rooms assessed will be fully BRE compliant. The effect upon daylight amenity within these 87 rooms is therefore considered to be negligible (not significant).

10.88 In accordance with the significance criteria described above, 1 (1%) of the remaining 2 rooms will experience changes in VSC and/or NSL which are minor. The effect upon the daylight amenity within this 1 room is therefore considered to be minor adverse (not significant).

10.89 The window serving the remaining room (a bedroom) has a very low (0.3%) baseline VSC level due to its low level location under a balcony restricting its view of the sky. The unnoticeable 0.1% absolute VSC change therefore disproportionately represent itself as being of moderate adverse significance. As an absolute VSC change of this level will not be noticeable to the occupants and the room is fully BRE compliant in NSL terms, the overall effect upon the daylight amenity within this room is considered to be minor adverse (not significant).

10.90 The overall effect of the Proposed Development upon the daylight amenity within this property is considered to be minor adverse (not significant).

Sunlight

10.91 Any changes to the sunlight amenity within the 10 rooms will be fully BRE compliant. The effect upon sunlight amenity within this property is therefore considered to be negligible (not significant).

357-361 Deansgate

Diffuse Daylight

10.92 A total of 43 windows serving 36 rooms were assessed for daylight within this building.

10.93 Any changes in daylight amenity (VSC & NSL) to 34 (94%) of the 36 rooms assessed will be fully BRE compliant. The effect upon daylight amenity within these 34 rooms is therefore considered to be negligible (not significant).

10.94 The windows serving the remaining 2 rooms will experience either a BRE compliant or a 0.1% absolute change in VSC and the rooms will experience absolute changes in NSL of 0.1 sqm i.e., a 10cm square area of each room will not be able to see the sky from working plane height with the Proposed Development in place. The effect upon the daylight amenity within these 2 rooms is therefore considered to be minor adverse (not significant).

10.95 The overall effect of the Proposed Development upon the daylight amenity within this property is considered to be minor adverse (not significant).

Sunlight

10.96 All 4 of the rooms material for consideration in sunlight terms will experience no change in their sunlight amenity with the Proposed Development in place. The effect upon sunlight amenity within this property is therefore considered to be negligible (not significant).

Deansgate Quay

Diffuse Daylight

10.97 A total of 81 windows serving 43 rooms were assessed for daylight within this building.

10.98 Any changes in daylight amenity (VSC & NSL) to 37 (86%) of the 43 rooms assessed will be fully BRE compliant. The effect upon daylight amenity within these 38 rooms is therefore considered to be negligible (not significant).

10.99 In accordance with the significance criteria described above, 1 (2%) of the remaining 6 rooms will experience changes in VSC and/or NSL which are minor. The effect upon the daylight amenity within this 1 room is therefore considered to be minor adverse (not significant).

10.100 The windows serving the remaining 5 rooms have low baseline VSC level (5.7% to 7.6%) due to their recessed locations restricting their view of the sky. The unnoticeable 1.9% to 2.5% absolute VSC changes therefore disproportionately represent themselves as being of moderate adverse significance. As absolute VSC changes of this level will not be noticeable to the occupants and all of the rooms will continue to benefit from daylight distribution at working plane height (NSL) to between 58% and 94% of the room areas, the overall effect upon the daylight amenity within these rooms is considered to be minor adverse (not significant).

10.101 The overall effect of the Proposed Development upon the daylight amenity within this property is considered to be minor adverse (not significant).

Sunlight

10.102 Any changes to the sunlight amenity within the 17 rooms will be fully BRE compliant. The effect upon sunlight amenity within this property is therefore considered to be negligible (not significant).

Ropeworks

Diffuse Daylight

10.103 A total of 228 windows serving 96 rooms were assessed for daylight within this building.

10.104 Any changes in daylight amenity (VSC & NSL) to 79 (82%) of the 96 rooms assessed will be fully BRE compliant. The effect upon daylight amenity within these 79 rooms is therefore considered to be negligible (not significant).

10.105 In accordance with the significance criteria described above, 7 (7%) of the remaining 17 rooms will experience changes in VSC and/or NSL which are minor. The effect upon the daylight amenity within these 8 rooms is therefore considered to be minor adverse (not significant).

10.106 10 of the remaining 12 rooms are all served by 5 windows which will experience VSC changes ranging from minor to major in significance. The windows experiencing moderate or major changes all have low baseline VSC levels (0.9% to 8.1%) due to their location under balconies restricting their view of the sky. The unnoticeable 0.4% to 2.8% absolute VSC changes therefore disproportionately represent themselves in terms of significance. As absolute VSC changes of this level will not be noticeable to the occupants and all of the rooms will continue to benefit from daylight distribution at working plane height (NSL) to between 69% and 95% of the room areas with changes no greater than minor adverse, the overall effect upon the daylight amenity within these rooms is considered to be minor adverse (not significant).

10.107 The remaining 2 rooms are served by just one window but, as above, they both have low baseline VSC levels (3% to 5.7%) due to their location under balconies restricting their view of the sky. As a result, the unnoticeable 1% to 2.2% absolute VSC changes therefore disproportionately represent themselves in terms of significance. As absolute VSC changes of this level will not be noticeable to

the occupants and all of the rooms will continue to benefit from daylight distribution at working plane height (NSL) to between 69% and 95% of the room areas with changes no greater than minor adverse, the overall effect upon the daylight amenity within these rooms is also considered to be minor adverse (not significant).

10.108 The overall effect of the Proposed Development upon the daylight amenity within this property is considered to be minor adverse (not significant).

Sunlight

10.109 Any changes to the sunlight amenity within the 11 rooms will be fully BRE compliant. The effect upon sunlight amenity within this property is therefore considered to be negligible (not significant).

Viadux 1

Diffuse Daylight

10.110 A total of 798 windows serving 418 rooms were assessed for daylight within this building.

10.111 In accordance with the significance criteria described above, 133 (32%) of the 418 rooms will experience changes in VSC and/or NSL which are minor. The effect upon the daylight amenity within these 133 rooms is therefore considered to be minor adverse (not significant).

10.112 One or more of the windows serving the remaining 285 (68%) rooms will experience changes in VSC which are major adverse in significance when expressed in percentage of baseline terms. The rooms served by these windows will, again in percentage of baseline terms, experience changes in NSL which range from minor to major adverse.

10.113 Paragraph F7 of the BRE guidelines states:-

"In assessing the loss of light to an existing building, the VSC is generally recommended as the appropriate parameter to use. This is because the VSC depends only on obstruction, and is therefore a measure of the daylit environment as a whole."

10.114 The reason for the large VSC changes to the above referenced windows is because, in the Existing Baseline scenario, the windows serving these 285 rooms enjoy uncharacteristically high levels of sky visibility (31.9% to 39.6%) which are reduced to between 12.8% to 20.3% which, as can be seen from the retained VSC levels detailed in Table 10.4, are very reasonable considering the City Centre location of this property.

10.115 In view of the very reasonable levels of retained daylight amenity, the effect of the Proposed Development upon these 285 rooms is considered to be minor adverse (not significant).

10.116 In summary, the overall effect of the Proposed Development upon the daylight amenity within this property is considered to be minor adverse (not significant).

Sunlight

10.117 Any changes to the sunlight amenity within the 190 rooms will be fully BRE compliant. The effect upon sunlight amenity within this property is therefore considered to be negligible (not significant).

Great Northern Tower

Diffuse Daylight

10.118 A total of 95 windows serving 54 rooms were assessed for daylight within this building.

10.119 Any changes in daylight amenity (VSC & NSL) to 50 (93%) of the 54 rooms assessed will be fully BRE compliant. The effect upon daylight amenity within these 50 rooms is therefore considered to be negligible (not significant).

10.120 In accordance with the significance criteria described above, 3 of the remaining 4 rooms will experience changes in VSC which are minor and BRE compliant changes in NSL. The effect upon the daylight amenity within these rooms is therefore considered to be minor adverse (not significant).

10.121 The windows serving the remaining room have very low baseline VSC levels (1.1% and 0.3%) due to their low level, enclosed location and balconies restricting their view of the sky. The unnoticeable 0.2% and 0.3% absolute VSC changes therefore disproportionately represent themselves as being of minor and major adverse significance. As absolute VSC changes of this level will not be noticeable to the occupants and there is a BRE compliant change in NSL, the overall effect upon this room is considered to be minor adverse (not significant).

10.122 The overall effect of the Proposed Development upon the daylight amenity within this property is considered to be minor adverse (not significant).

Sunlight

10.123 54 rooms were assessed for sunlight within this property on the basis that they are orientated to within 90 degrees of due south.

10.124 Any changes in sunlight amenity to 50 of the 54 rooms assessed will be fully BRE compliant. The effect upon sunlight amenity within these 50 rooms is therefore considered to be negligible (not significant).

10.125 In accordance with the significance criteria described above, 1 of the remaining 3 rooms will experience changes in APSH which are minor. The effect upon the sunlight amenity within this room is therefore considered to be minor adverse (not significant).

10.126 Based on the size of their windows and recessed location, the remaining 3 rooms are likely to be bedrooms, which do not need to be assessed for sunlight amenity.

10.127 The overall effect of the Proposed Development upon the sunlight amenity within this property is considered to be minor adverse (not significant).

Axis Tower

Diffuse Daylight

10.128 A total of 355 windows serving 256 rooms were assessed for daylight within this building.

10.129 Any changes in daylight amenity (VSC & NSL) to 115 (45%) of the 256 rooms assessed will be fully BRE compliant. The effect upon the daylight amenity within these 115 rooms is therefore considered to be negligible (not significant).

10.130 In accordance with the significance criteria described above, 70 (27%) of the remaining 141 rooms will experience changes in VSC and/or NSL which are minor. The effect upon the daylight amenity within these 70 rooms is therefore considered to be minor adverse (not significant).

10.131 One or both of the windows serving 47 of the remaining 71 rooms (all bedrooms) will experience changes in VSC which, in percentage of baseline terms, are from minor to major in significance. One of the windows serving each room will, however, retain VSC levels of in excess of 18.1% and, as a result, all of the rooms will be affected to a negligible to minor adverse extent in NSL terms and all 47 rooms will retain daylight distribution to between 53% and 99% of their areas. The effect upon the daylight amenity within these 47 bedrooms, which by virtue of their usage have a lower expectation for daylight amenity, is therefore considered to be minor adverse (not significant).

10.132 The remaining 24 single aspect rooms (22 bedrooms and 2 LKDs) will experience changes in both their VSC and NSL levels which are minor to moderate adverse in significance. With the exception of 2 bedrooms, which by virtue of their usage have a lower expectation for daylight amenity, the compliant windows serving these rooms will retain VSC levels of between 21.9% and 29.4% which, as can be seen from the retained VSC levels detailed in Table 10.4, are very reasonable considering the City Centre location of this property. In view of the very reasonable levels of retained daylight amenity, the effect of the Proposed Development upon these 24rooms is considered to be minor adverse (not significant).

10.133 In summary, the overall effect of the Proposed Development upon the daylight amenity within this property is considered to be minor adverse (not significant).

Sunlight

10.134 Any changes to the sunlight amenity within the 64 rooms material for sunlight assessment will be fully BRE compliant. The effect upon sunlight amenity within this property is therefore considered to be negligible (not significant).

Cumulative Effects

10.135 This section reports upon the effects of the Proposed Development in combination with the following consented neighbouring developments:

- 15 - 1 City Road (massing only);
- 16 - 1 Medlock Street (massing only);
- 18 - 10-12 Whitworth Street (included in baseline to enable assessment);
- 19 - Plot 10a First Street (massing only);
- 21 - Bridgewater House (massing only);
- 22 - Great Northern Warehouse (included in baseline to enable assessment);
- 26 - Plot D Great Jackson Street (massing only).
- 27 - Plot C & E Great Jackson Street (massing only); and

- 28 - Trumpet, Albion & Great Bridgewater Street Site (included in baseline to enable assessment);
- 30 - Hotspur House (massing only)

Operational Phase

Daylight & Sunlight

10.136 The outputs of the computer modelling for both daylight and sunlight is provided in full within Appendix 10.4, with the key metrics for the effects upon the non-cumulative developments being assessed provided in Tables 10.12 to 10.15 below.

10.137 The same 3905 windows facing the Site serving 2221 rooms within 29 buildings were assessed for daylight and 698 rooms within the 26 buildings assessed for sunlight as were assessed in the existing baseline versus Proposed Development scenario.

10.138 The effect of the Proposed Development upon the daylight and sunlight amenity within the cumulative developments included within the baseline are reported on separately.

Table 10.12 – Summary of VSC & NSL Daylight Results – Proposed Development Only

	VERTICAL SKY COMPONENT WINDOW					NO SKY LINE ROOM				
			LOSS (%)					LOSS (%)		
ADDRESS	TOTAL	PASS	20-30	30-40	40+	TOTAL	PASS	20-30	30-40	40+
Hill Quays	192	175	8	8	1	95	95	0	0	0
Riverside Mews	17	17	0	0	0	7	7	0	0	0
The Rhine	83	83	0	0	0	62	62	0	0	0
The Nile	183	181	2	0	0	127	127	0	0	0
30 City Road East	36	36	0	0	0	33	33	0	0	0
Lumiere Building	130	128	1	1	0	89	89	0	0	0
14 Albion Street	8	8	0	0	0	6	6	0	0	0
The Ropeworks	20	20	0	0	0	8	8	0	0	0
21 Little Peter Street	43	43	0	0	0	22	22	0	0	0
8-16 Bridgewater St	13	13	0	0	0	8	8	0	0	0
20 Southern St	11	11	0	0	0	9	9	0	0	0
18-12 Southern St	9	9	0	0	0	6	6	0	0	0
8-10 Southern St	12	12	0	0	0	6	6	0	0	0
357-361 Deansgate	43	42	0	0	1	36	34	0	0	2
Deansgate Quay	81	75	1	5	0	43	39	0	4	0
Ropeworks Apartment Block 1	208	146	29	25	8	88	78	10	0	0
The Danube	101	101	0	0	0	74	74	0	0	0
Jurys Inn	100	96	4	0	0	96	96	0	0	0
BEETHAM TOWER	282	282	0	0	0	108	108	0	0	0
21-35 Whitworth St	56	56	0	0	0	48	48	0	0	0
84 Great Bridge St	47	47	0	0	0	27	27	0	0	0
Chepstow house	32	32	0	0	0	12	12	0	0	0
Hacienda	211	209	2	0	0	164	164	0	0	0

	VERTICAL SKY COMPONENT WINDOW					NO SKY LINE ROOM				
			LOSS (%)					LOSS (%)		
ADDRESS	TOTAL	PASS	20-30	30-40	40+	TOTAL	PASS	20-30	30-40	40+
325-327 Deansgate	422	422	0	0	0	102	102	0	0	0
Viadux 1	798	76	0	157	565	418	76	69	7	266
Free Trade Hall Peter Street	164	164	0	0	0	154	154	0	0	0
Great Northern Tower	95	90	4	0	1	54	54	0	0	0
Midland Hotel	153	153	0	0	0	63	63	0	0	0
Axis Tower	355	218	45	67	25	256	154	74	28	0
TOTALS	**3905**	**2945**	**96**	**263**	**601**	**2221**	**1761**	**153**	**39**	**268**

Table 10.13 – Summary of VSC & NSL Daylight Results – Proposed Development & Cumulative Schemes

	VERTICAL SKY COMPONENT WINDOW					NO SKY LINE ROOM				
			LOSS (%)					LOSS (%)		
ADDRESS	TOTAL	PASS	20-30	30-40	40+	TOTAL	PASS	20-30	30-40	40+
Hill Quays	192	174	8	5	5	95	94	1	0	0
Riverside Mews	17	16	1	0	0	7	7	0	0	0
The Rhine	83	83	0	0	0	62	62	0	0	0
The Nile	183	167	0	0	16	127	127	0	0	0
30 City Road East	36	35	0	0	1	33	33	0	0	0
Lumiere Building	130	125	4	1	0	89	89	0	0	0
14 Albion Street	8	8	0	0	0	6	5	0	0	1
The Ropeworks	20	19	1	0	0	8	8	0	0	0
21 Little Peter Street	43	43	0	0	0	22	22	0	0	0
8-16 Bridgewater St	13	13	0	0	0	8	8	0	0	0
20 Southern St	11	11	0	0	0	9	9	0	0	0
18-12 Southern St	9	9	0	0	0	6	6	0	0	0
8-10 Southern St	12	12	0	0	0	6	6	0	0	0
357-361 Deansgate	43	42	0	0	1	36	34	0	0	2
Deansgate Quay	81	72	3	6	0	43	39	0	4	0
Ropeworks Apartment Block 1	208	208	0	0	0	88	78	5	1	4
The Danube	101	100	0	0	1	74	74	0	0	0
Jurys Inn	100	98	2	0	0	96	96	0	0	0
BEETHAM TOWER	282	282	0	0	0	108	108	0	0	0
21-35 Whitworth St	56	56	0	0	0	48	48	0	0	0
84 Great Bridge St	47	47	0	0	0	27	27	0	0	0
Chepstow house	32	32	0	0	0	12	12	0	0	0
Hacienda	211	210	1	0	0	164	164	0	0	0
325-327 Deansgate	422	421	1	0	0	102	102	0	0	0
Viadux 1	798	76	0	141	581	418	77	66	9	266

ADDRESS	VERTICAL SKY COMPONENT WINDOW TOTAL	PASS	LOSS (%) 20-30	30-40	40+	NO SKY LINE ROOM TOTAL	PASS	LOSS (%) 20-30	30-40	40+
Free Trade Hall Peter Street	164	164	0	0	0	154	154	0	0	0
Great Northern Tower	95	90	4	0	1	54	54	0	0	0
Midland Hotel	153	153	0	0	0	63	63	0	0	0
Axis Tower	355	201	81	48	25	256	154	77	24	1
TOTALS	**3905**	**2967**	**106**	**201**	**631**	**2221**	**1760**	**149**	**38**	**274**

10.139 The reason for the small magnitude of change alterations is due to the additional effect of the cumulative schemes listed at paragraph 10.136.

Table 10.14 – Summary of APSH Sunlight Results – Proposed Development Only

ADDRESS	ANNUAL PROBABLE SUNLIGHT HOURS ROOM TOTAL	PASS	ANNUAL (%) 20-30	30-40	40+	WINTER (%) 20-30	30-40	40+
Hill Quays	60	60	0	0	0	0	0	0
Riverside Mews	1	1	0	0	0	0	0	0
The Rhine	14	14	0	0	0	0	0	0
The Nile	25	25	0	0	0	0	0	0
30 City Road East	0	0	0	0	0	0	0	0
Lumiere Building	10	10	0	0	0	0	0	0
14 Albion Street	0	0	0	0	0	0	0	0
The Ropeworks	0	0	0	0	0	0	0	0
21 Little Peter Street	3	3	0	0	0	0	0	0
8-16 Bridgewater St	4	4	0	0	0	0	0	0
20 Southern St	9	9	0	0	0	0	0	0
18-12 Southern St	5	5	0	0	0	0	0	0
8-10 Southern St	2	2	0	0	0	0	0	0
357-361 Deansgate	4	4	0	0	0	0	0	0
Deansgate Quay	17	17	0	0	0	0	0	0
ROPEWORKS APARTMENTS BLOCK 1	11	11	0	0	0	0	0	0
The Danube	13	13	0	0	0	0	0	0
Jurys Inn	0	0	0	0	0	0	0	0
BEETHAM TOWER	45	45	0	0	0	0	0	0
21-35 Whitworth St	0	0	0	0	0	0	0	0
84 Great Bridge St	12	12	0	0	0	0	0	0
Chepstow house	11	11	0	0	0	0	0	0
Hacienda	11	11	0	0	0	0	0	0

ADDRESS	ANNUAL PROBABLE SUNLIGHT HOURS ROOM TOTAL	PASS	ANNUAL (%) 20-30	30-40	40+	WINTER (%) 20-30	30-40	40+
325 Deansgate Staycity Aparthotel	102	102	0	0	0	0	0	0
Viadux 1	190	190	0	0	0	0	0	0
Free Trade Hall Peter Street	0	0	0	0	0	0	0	0
Great Northern Tower	54	50	1	1	1	1	0	3
Midland Hotel	31	31	0	0	0	0	0	0
AXIS TOWER	64	64	0	0	0	0	0	0
TOTALS	**698**	**694**	**1**	**1**	**1**	**1**	**0**	**3**

Table 10.15 – Summary of APSH Sunlight Results – Proposed Development & Cumulative Schemes

ADDRESS	ANNUAL PROBABLE SUNLIGHT HOURS ROOM TOTAL	PASS	ANNUAL (%) 20-30	30-40	40+	WINTER (%) 20-30	30-40	40+
Hill Quays	60	57	0	0	0	1	0	2
Riverside Mews	1	1	0	0	0	0	0	0
The Rhine	14	14	0	0	0	0	0	0
The Nile	25	17	0	0	8	0	0	8
Lumiere Building	10	9	1	0	0	0	0	0
21 Little Peter Street	3	3	0	0	0	0	0	0
8-16 Bridgewater St	4	4	0	0	0	0	0	0
20 Southern St	9	9	0	0	0	0	0	0
18-12 Southern St	5	5	0	0	0	0	0	0
8-10 Southern St	2	2	0	0	0	0	0	0
357-361 Deansgate	4	4	0	0	0	0	0	0
Deansgate Quay	17	17	0	0	0	0	0	0
ROPEWORKS APARTMENTS BLOCK 1	11	11	0	0	0	0	0	0
The Danube	13	13	0	0	0	0	0	0
Beetham Tower	45	45	0	0	0	0	0	0
84 Great Bridge St	12	12	0	0	0	0	0	0
Chepstow house	11	11	0	0	0	0	0	0
Hacienda	11	11	0	0	0	0	0	0
325 Deansgate Staycity Aparthotel	102	102	0	0	0	0	0	0
Viadux 1	190	183	0	0	7	0	0	0
Great Northern Tower	54	45	5	1	1	0	2	3
Midland Hotel	31	31	0	0	0	0	0	0
AXIS TOWER	64	64	0	0	0	0	0	0
TOTALS	**698**	**670**	**6**	**1**	**16**	**1**	**2**	**13**

10.140 The reason for the small magnitude of change alterations is due to the additional effect upon total sunlight amenity of the cumulative schemes listed at paragraph 10.113.

10.141 In order to present a worst case scenario assessment, the following three cumulative schemes have been included in the assessment baseline for this scenario in order to assess the potential effect upon them if they were to be built out prior to the Proposed Development.

10-12 Whitworth Street

Daylight

10.142 A total of 486 windows serving 352 rooms were assessed for daylight within this building.

10.143 Any changes in daylight amenity (VSC & NSL) to 216 (61%) of the rooms assessed will be fully BRE compliant. The potential effect upon the daylight amenity within these 216 rooms is therefore considered to be negligible (not significant).

10.144 In accordance with the significance criteria described above 90 (26%) of the remaining 136 rooms will experience changes in VSC and/or NSL which are minor. The potential effect upon the daylight amenity within these 83 rooms is therefore considered to be minor adverse (not significant).

10.145 One or more of the windows serving 40 of the remaining 46 rooms will experience VSC changes ranging from minor to moderate and NSL changes ranging from negligible to major. These windows will, however, retain VSC levels of between 12% and 15.2% which, as can be seen from the retained VSC levels detailed in Table 10.4, are very reasonable considering the City Centre location of this property. In view of the very reasonable levels of retained daylight amenity, the potential effect of the Proposed Development upon these 40 rooms is considered to be minor adverse (not significant).

10.146 The windows serving the remaining 6 rooms will all have very low (2% to 6.3%) baseline VSC levels which means that the small (0.5% to 3.2%) absolute VSC changes disproportionately present themselves as major adverse in significance. With the exception of 1 proposed bedroom, all of the rooms will continue to benefit from daylight distribution (NSL) to between 62% and 91% of the rooms areas.

10.147 The overall potential effect of the Proposed Development upon the daylight amenity within this property is considered to be minor adverse (not significant).

Sunlight

10.148 None of the Site facing rooms in this property are material for consideration in sunlight terms as they are not orientated to within 90 degrees of due south.

Great Northern Warehouse

Daylight

10.149 A total of 271 windows serving 178 rooms were assessed for daylight within this building.

10.150 Any changes in daylight amenity (VSC & NSL) to 139 (78%) of the rooms assessed will be fully BRE compliant. The potential effect upon the daylight amenity within these 139 rooms is therefore considered to be negligible (not significant).

10.151 In accordance with the significance criteria described above the remaining 3 (2%) rooms will experience changes in VSC which are minor. All NSL changes will be fully BRE compliant. The potential effect upon the daylight amenity within these 3 rooms is therefore considered to be minor adverse (not significant).

10.152 One or more of the windows serving 23 (13%) of the remaining 35 rooms will experience VSC changes ranging from moderate to major, but because these rooms are served by one or more other windows which will retain between 22.1% and 32.9% VSC, any changes in NSL to these rooms will be fully BRE compliant. The potential effect upon the daylight amenity within these 23 rooms is therefore considered to be minor adverse (not significant).

10.153 The windows serving the remaining 12 (7%) rooms (11 bedrooms and 1 LKD) will all have low (8.7% to 16.3%) baseline VSC values. The small (3.8% to 8.3%) VSC changes therefore disproportionately present themselves as being of moderate to major significance. 11 of the 12 rooms will be fully BRE compliant in NSL terms (the remaining room will experience a minor NSL change) and retain daylight distribution to between 43% and 82% of their room areas with, for context, the average being 76%. In view of the fact that the majority of these rooms are bedrooms, which have a lesser requirement for daylight amenity, the effect upon these rooms is considered to be minor adverse (not significant)

10.154 In summary, the overall potential effect of the Proposed Development upon the daylight amenity within this property is considered to be minor adverse (not significant).

Sunlight

10.155 69 rooms were assessed for sunlight within this property on the basis that they are orientated to within 90 degrees of due south.

10.156 Any changes in sunlight amenity to 37 (54%) of the rooms assessed will be fully BRE compliant. The potential effect upon sunlight amenity within these 37 rooms is therefore considered to be negligible (not significant).

10.157 The remaining 32 rooms will all potentially experience major adverse changes in winter sunlight amenity and minor to moderate changes in annual sunlight amenity.

10.158 Despite these changes, all rooms will retain annual sunlight amenity levels of between 21% and 28% against the BRE recommended 25% and winter sunlight levels of between 2% & 4% against the BRE recommended 5%. In view of the very good levels of retained sunlight amenity considering the urban location of this building, the potential effect upon these 32 rooms is considered to be minor adverse (not significant).

10.159 The overall potential effect of the Proposed Development upon the sunlight amenity within this property is considered to be minor adverse (not significant).

Trumpet, Albion & Great Bridgewater Street Site

Daylight

10.160 A total of 276 windows serving 168 rooms were assessed for daylight within this building.

10.161 Any changes in daylight amenity (VSC & NSL) to 156 (93%) of the rooms assessed will be fully BRE compliant. The potential effect upon the daylight amenity within these 156 rooms is therefore considered to be negligible (not significant).

10.162 In accordance with the significance criteria described above the remaining 12 (7%) rooms will experience changes in VSC or NSL which are minor. The potential effect upon the daylight amenity within these 12 rooms is therefore considered to be minor adverse (not significant).

10.163 The overall potential effect of the Proposed Development upon the daylight amenity within this property is considered to be minor adverse (not significant).

Sunlight

10.164 None of the Site facing rooms in this property are material for consideration in sunlight terms as they are not orientated to within 90 degrees of due south.

Mitigation Measures

Operational Phase

Daylight & Sunlight

10.165 Overall, the impact on daylight impacts to the surrounding properties is considered negligible to minor adverse and the impact on sunlight is considered negligible to minor adverse. Overall, this is considered to result in non-significant effects. Given the context of the Site and nature of effects, no further mitigation is considered necessary.

Residual Effects

Operational Phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Adverse reduction in daylight amenity	Hill Quays	None	n/a	Minor Adverse (Permanent)
	Riverside Mews	None	n/a	Negligible (Permanent)
	The Rhine	None	n/a	Negligible (Permanent)
	The Nile	None	n/a	Minor Adverse (Permanent)
	30 City Road East	None	n/a	Negligible (Permanent)
	Lumiere Building	None	n/a	Minor Adverse (Permanent)
	14 Albion Street	None	n/a	Negligible (Permanent)
	The Ropeworks	None	n/a	Negligible (Permanent)
	21 Little Peter St	None	n/a	Negligible (Permanent)
	8-16 Bridgewater St	None	n/a	Negligible (Permanent)
	20 Southern St	None	n/a	Negligible (Permanent)
	18-12 Southern St	None	n/a	Negligible (Permanent)
	8-10 Southern St	None	n/a	Negligible (Permanent)
	357-361 Deansgate	None	n/a	Minor Adverse (Permanent)
	Deansgate Quay	None	n/a	Minor Adverse (Permanent)

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
	Ropeworks Block 1	None	n/a	Minor Adverse (Permanent)
	The Danube	None	n/a	Negligible (Permanent)
	Jurys Inn	None	n/a	Minor Adverse (Permanent)
	Beetham Tower	None	n/a	Negligible (Permanent)
	21-35 Whitworth St	None	n/a	Negligible (Permanent)
	84 Great Bridge St	None	n/a	Negligible (Permanent)
	Chepstow house	None	n/a	Negligible (Permanent)
	Hacienda	None	n/a	Minor Adverse (Permanent)
	325-327 Deansgate	None	n/a	Negligible (Permanent)
	Viadux 1	None	n/a	Minor Adverse (Permanent)
	Free Trade Hall	None	n/a	Negligible (Permanent)
	Great Northern Twr	None	n/a	Minor Adverse (Permanent)
	Midland Hotel	None	n/a	Negligible (Permanent)
	Axis Tower	None	n/a	Minor Adverse (Permanent)
Adverse reduction in sunlight amenity	Hill Quays	None	n/a	Negligible (Permanent)
	Riverside Mews	None	n/a	Negligible (Permanent)
	The Rhine	None	n/a	Negligible (Permanent)
	The Nile	None	n/a	Negligible (Permanent)
	Lumiere Building	None	n/a	Negligible (Permanent)
	The Ropeworks	None	n/a	Negligible (Permanent)
	21 Little Peter Street	None	n/a	Negligible (Permanent)
	8-16 Bridgewater St	None	n/a	Negligible (Permanent)
	20 Southern St	None	n/a	Negligible (Permanent)
	18-12 Southern St	None	n/a	Negligible (Permanent)
	8-10 Southern St	None	n/a	Negligible (Permanent)
	357-361 Deansgate	None	n/a	Negligible (Permanent)
	Deansgate Quay	None	n/a	Negligible (Permanent)
	Ropeworks Block 1	None	n/a	Negligible (Permanent)
	The Danube	None	n/a	Negligible (Permanent)
	Jurys Inn	None	n/a	Negligible (Permanent)
	Beetham Tower	None	n/a	Negligible (Permanent)
	84 Great Bridge St	None	n/a	Negligible (Permanent)
	Chepstow house	None	n/a	Negligible (Permanent)
	Hacienda	None	n/a	Negligible (Permanent)
	325 - 327 Deansgate	None	n/a	Negligible (Permanent)
	Viadux 1	None	n/a	Negligible (Permanent)

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
	Free Trade Hall Peter Street	None	n/a	Negligible (Permanent)
	Great Northern Tower	None	n/a	Minor Adverse (Permanent)
	Midland Hotel	None	n/a	Negligible (Permanent)
	Axis Tower	None	n/a	Negligible (Permanent)

Monitoring

10.166 None required.

Reference List

10.167 This ES Chapter has been prepared in reference to the following:

- Ministry of Housing, Communities & Local Government (2021). National Planning Policy Framework. 2021.
- Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (2021). Planning Policy Guidance. 2021.
- Manchester City Council (2012). Manchester Core Strategy (2012 – 2027).
- Manchester City Council (2007). Guide to Development in Manchester Supplementary Planning Document and Planning Guidance Adopted April 2007.
- Building Research Establishment (BRE) (2022). Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice, Third Edition.
- Commission Internationale De L'Eclairage (CIE), CIE 146:2002 & CIE 147:2002 - Collection on Glare, CIE, 2002

11. Solar Glare

Introduction

11.1 This Chapter of the ES has been prepared by GIA Surveyors Ltd and asseses the likely solar glare 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.

11.2 This Chapter assesses the potential solar glare impact to road users and rail/tram drivers only, for sensitive locations within 500m of the Site. Potential solar glare impacts on neighbouring residential amenity is not expected to be significant and an assessment of solar glare to neighbouring buildings is not considered proportionate or necessary. Solar glare effects to occupants of neighbouring buildings is scoped out of the EIA and is not reported upon further within this Chapter.

11.3 This Chapter is accompanied by the following appendices:

- Appendix 11.1 – Solar Glare Assessment. This appendix contains the technical analysis for all relevant viewpoints prepared to support the solar glare assessment.
- Appendix 11.2 – Solar Glare Intensity Summary Note. This appendix provides supplementary information for locations where glazing reflectance thresholds are recommended for mitigation of solar glare effects.

11.4 The authors of this Chapter has a Masters in Buildings Science (MBSc Dist) from Victoria University of Wellington, NZ and 8 years of UK experience in preparing solar glare for EIA developments. GIA are the largest specialist daylight and sunlight advisor in the UK, with over 30 years of specialisation and expertise, having advised on some of the largest developments within Greater Manchester and the United Kingdom.

	Lead Author	Reviewer
Name	Krystle Stewart	
Company	GIA	
Qualifications/Accreditations relevant to technical area	MBSc (Dist)	
Does the practitioner hold any IEMA qualification?	No	
Company hold IEMA QMark?	No	
Years technical experience (in technical area)	15	

Number of EIA's delivered to date	20

Assumptions and Limitations

11.5 Although great care is taken in identifying typical viewpoints, this does not guarantee that there are no additional sensitive locations where reflected solar glare could present a particular risk. This assessment is based on the assumption that in an urban environment moving traffic represents the biggest risk factor and so viewpoints and focus points are selected accordingly. For practical reasons the area of the assessment is limited to the area surrounding the Proposed Development. The occurrence of reflected solar glare at greater distances is not the subject of this assessment.

11.6 It is also to be noted that the hours presented reflect solar time and therefore do not take Daylight Saving Hours into account.

Relevant Legislation, Policy and Guidance

11.7 There is no legislation, National or Local Planning Policy relevant to Solar Glare.

Guidance

Building Research Establishment (BRE) – Site Layout Planning for Daylight and Sunlight: A guide to good practice (2022)

11.8 The BRE Guidelines includes the following statement with regard to the potential for reflected solar glare from a new development:

> *"Glare or solar dazzle can occur when sunlight is reflected from a glazed façade. This can affect road users outside and the occupants of adjoining buildings. The problem can occur either when there are large areas of reflective glass or cladding on the façade, or when there are areas of glass or cladding which slope back so that high altitude sunlight can be reflected along the ground. Thus solar dazzle is only a long term problem only for some heavily glazed (or mirror clad) buildings…"*

Commission Internationale de L'Eclairage (CIE) 146:2002 & CIE 147:2002 Collection on glare (2002)

11.9 The CIE 146:2002 Collection on glare states:

> *"Disability glare is glare that impairs vision (CIE, 1987). It is caused by scattering of light inside the eye [...]. The veiling luminance of scattered light will have a significant effect on visibility when intense light sources are present in the peripheral visual field and the contrast of objects to be seen is low."*
>
> *"Disability glare is most often of importance at night when contrast sensitivity is low and there may well be one or more bright light sources near to the line of sight, such as car headlights, streetlights or floodlights. But even in daylight conditions disability glare may be of practical significance: think of traffic lights when the sun is close to them, or the difficulty viewing paintings hanging next to windows."*

Assessment Methodology and Significance Criteria

Scenarios Tested

11.10 The worst-case scenario is portrayed by the complete and operational Proposed Development, where all reflective facade materials have been installed and any covers, films or hoarding used during the construction period have been removed.

11.11 As construction works progress, and the facades of the Proposed Development are installed, the potential solar glare effects would be similar to those once the Proposed Development is complete and operational. It is therefore considered that the completed Proposed Development represents the worst-case assessment in terms of likely solar glare effects. The construction scenario has been assessed qualitatively, based on professional judgement.

11.12 As the Proposed Development is a phased application, there is the potential that changes in the intended construction programme may occur. Due to the location of the buildings in relation to the sensitive viewpoints, and the angles of the facades, based on professional judgement, the residual effects are not expected to differ from those of the fully implemented Proposed Development, Scenario 3. Therefore, it is unlikely that phased solar reflections would be generated in isolation that do not occur in the complete and operational Proposed Development scenario (Scenario 3), and the phased solar glare effects are not discussed further within this Chapter.

11.13 The following scenario has been technically assessed and is reported on in detail within this chapter of the ES:

- Scenario 3 (Baseline + Viadux Phase 2 Plot a + Viadux Phase 2 Plot b).

11.14 Based on a common practice approach to portray the worst-case scenario, the cumulative effect will not be considered as neighbouring Committed Developments can block sunlight reaching the facades of the Proposed Development and/or obscure the Proposed Development from the viewpoints to be assessed. However, the following committed developments are included within the surrounding context, where visible from sensitive receptors, as their completed form due to their construction having commenced:

- 1. 70 Great Bridgewater Street (129081/FO/2021)
- 2. Plot 11 First Street (125573/FO/2019)
- 3. Plot 9a First Street (132600/FO/2021)
- 5. Land Bounded By Jackson Row, Bottle Street, Southmill Street & 201 Deansgate (114664/FO/2016)
- 6. 325-327 Deansgate (125804/FO/2019)
- 10. Plot F Great Jackson Street (132199/FO/2021)

The Study Area

11.15 Sensitive receptors are considered road users at junctions and train/or tram drivers on tracks within the surrounding area. Viewpoints at road junctions and on train/or tram lines within 500 metres of the Site where the Proposed Development is visible within the driver's field of view have been identified and assessed. At distances greater than 500m from the Proposed Development, instances of solar glare would be unlikely to occur.

11.16 At each of the identified sensitive road locations, viewpoints are located at the minimum stopping distance for road users and at the driver's eye level with the focal point being a relevant traffic

element, such as signals or incoming traffic. For rail drivers, viewpoints are assessed where signals are visible or at representative intervals where the Proposed Development would be visible close to the direct line of sight for a substantial stretch of track.

11.17 The identified road junctions and rail/tram viewpoints assessed are considered most sensitive in relation to solar glare due to a combination of the nature of the use and proximity to the site, and therefore consideration has been given to several viewpoints at traffic junctions and tram lines from which the Proposed Development will be visible. These viewpoints were identified in the scoping report and have been agreed by MCC. The locations assessed are indicated in Figure 11.1:

- BV1 – Bridgewater Viaduct junction with Castle Street;
- CS1 – Castle Street junction with Bridgewater Viaduct;
- DG3 – Deansgate junction with Whitworth Street West;
- DG1 – Deansgate junction with Quay Street/Peter Street;
- TS – Tonman Street junction with Deansgate;
- LR1 – Liverpool Road junction with Deansgate;
- LR2 – Liverpool Road pedestrian crossing;
- CSCP - Collier Street Car Park pedestrian crossing;
- WS1 - Watson Street junction Great Bridgewater Street;
- PS1 - Portland Street junction with Oxford Street;
- GBS2 – Great Bridgewater Street junction Chepstow Street;
- GBS1 – Great Bridgewater Street junction with Lower Mosley Street;
- LMS1 – Lower Mosley Street junction with Great Bridgewater Street;
- LMS2 – Lower Mosley Street pedestrian crossing;
- LMS3 – Lower Mosley Street junction with Bishopsgate;
- TRAM_Eastbound – From Cornbrook to Deansgate-Castlefield.
- TRAM_Southbound – From St Peter's Square stop to Deasngate-Castlefield stop;
- RAIL_Westbound – From Manchester Oxford Road Station to Deansgate Station;
- RAIL_Eastbound1 – From Trafford Park to Deansgate; and
- RAIL_Eastbound2 – From Salford to Deansgate.

Source of Effect

11.18 The façade treatment for the Proposed Development is understood to include large areas of glazing which could reflect sunlight within a driver's field of view at sensitive locations, resulting in potential effects in terms of solar glare.

Significance Criteria

Methodology for Determining Demolition and Construction Effects

11.19 Owing to the evolving and changing nature of demolition and construction activities, the assessment of potential effects during demolition and construction of the Proposed Development on solar glare

has not been modelled. Instead, a qualitative assessment has been undertaken using professional judgement and experience.

11.20 The potential solar glare effects relating to demolition and construction works will vary throughout the construction programme, starting from installation of the first glazed façade panels and gradually increasing to the potential effects identified for the completed Proposed Development once all cladding has been installed. It is therefore considered that the completed Proposed Development represents the worst-case assessment in terms of likely solar glare effects.

Methodology for Determining Operational Effects

11.21 The technical analyses carried out to inform the assessments and identify possible solar glare effects on road users and train drivers have been undertaken by creating a digital three-dimensional (3D) model of the surrounding area, based on photogrammetry survey data, and insertion of a 3D model of the Proposed Development.

11.22 The potential for reflected solar glare or dazzle from the glazed or reflective façade cladding of the Proposed Development has been assessed using specialist lighting software. The assessment shows the path of the sun for the entire year around the Proposed Development. From this, two computer generated angular images have been produced for each selected viewpoint, indicating the area which sees the reflection of the sun-path at any point during the year. A modified diagram portraying a standardised extent of human vision is then overlaid onto the image.

11.23 The fovea centralis (also generally known as the fovea) is a part of the eye, located in the centre of the macula region of the retina. The fovea is responsible for sharp central vision (also called foveal vision), which is necessary in humans for reading, watching television, driving, and any activity where visual detail is of primary importance. The macula corresponds to the central 13° of the visual field; the fovea to the central 3°.

11.24 Appendix 11.1: Figure 10 highlights the degrees of vision corresponding to the foveal view, with a red circle of 3° of angle in order to identify the area most sensitive to reflected solar glare. Another red circle represents the incidence of the 30° radius of our typical field of view in order to identify a secondary area of sensitivity to potential reflected glare instances.

11.25 The degrees of vision provide a reference from which potential concerns can be judged. At 3°, the potential for the reflected glare to cause a hazard is high and mitigation would be required. Between 3° and 30°, there is the potential that there could be an issue and mitigation may be necessary.

11.26 As stated in the CIE 146:2002, occurrences at angles beyond 30° would be of little significance in most situations, but may be relevant in exceptional circumstances. When seated in a driving seat of a typical car, for example, the limits of the windscreen would generally obstruct the driver's view at angles beyond 30° from the line of sight. Therefore, the risk of reflective solar glare causing a hazard is reduced.

Viewpoints for Road Users

11.27 The assessment considers potentially sensitive viewpoints for road users surrounding the Site. The viewpoints are generally located at the minimum stopping distance and at the driver's eye level. The focal point is a relevant traffic element, such as signals or incoming traffic.

11.28 Identifying the viewpoints based on the stopping distance is calculated as the combination of thinking and braking distances, using the following formula:

11.29 $D_{total} = D_{thinking} + D_{braking} = V*T + V^2/(2\mu*g)$

11.30 Where each component is:

V = Relevant vehicle speed, typically the road speed limit.

T = Thinking time (0.67 sec)

μ = Braking effort (considered 0.65 for cars and 0.5 for buses)

g = Gravity acceleration.

11.31 The height of the viewpoint is considered to be 1.5m for cars and 2.0m for buses. Appendix 11.1: Figure 08 identifies the typical stopping distance range for a car travelling at different speeds. Therefore, a viewpoint for a car driving at 30 mph (i.e. speed limit for a dense urban location) would be placed at 23m from a traffic light and 1.5m above the ground.

Viewpoints for Train/Tram Drivers

11.32 The assessment considers potentially sensitive viewpoints for train/tram drivers surrounding the Site. The viewpoints are assessed where signals are visible or at representative intervals where the Proposed Development would be visible close to the direct line of sight for a substantial stretch of track.

11.33 The height of the viewpoint is considered to be 2.75m above the rails. Appendix 11.1: Figure 09 identifies the driver viewpoint location.

11.34 For both receptor types, the assessment also considers a driver's field of vision which takes the angular extent seen at any given time, which for humans facing forwards is approximately 180 degrees.

Evaluating Effects and Significance

11.35 The key terminology used to describe the magnitude of impact is as follows and is further described in the below sections of this chapter:

- Major;
- Moderate;
- Minor; and
- Negligible.

11.36 There are no quantitative criteria within the BRE Guidelines or elsewhere regarding acceptable levels of solar glare. Generally, however, solar reflections at high altitudes are less likely to cause nuisance or distraction.

11.37 Professional judgement has therefore been applied to assign the magnitude of impact for solar glare arising from the Proposed Development and to determine the criteria for assessing the significance of solar glare set out in Table 11.2.

11.38 The following guide is used to ascertain the possible initial magnitude of impact for each viewpoint assessed. Where reflections occur from multiple façades and from multiple buildings, an initial magnitude of impact is given for each instance of potential solar glare.

Table 11.2: Criteria Used for Determining the Effect of Solar Glare

Significance Guidance	Possible Factors
Negligible	No reflections are visible or if visible all occur at angles greater than 30° from the driver's line of sight and so, as stated by the CIE, will be of "little significance".
Minor	Solar reflections are visible within 30° to 10° or between 10° to 5° of the driver's line of sight for a short period of time.
Moderate	Solar reflections are visible within 10° and 5° of the driver's line of sight occurring for a long period of time.
Major	Solar reflections are visible within 5° of a driver's line of sight.
Note - mitigating factors such as alternative and unaffected signals/traffic lights and car visor angle may result in the assignment of significance which differs from the above.	

11.39 Consideration is then given to mitigating factors that could influence the likelihood of solar reflections resulting in an instance of solar glare, these may include:

- sunlight availability probability;
- area of façade off which reflections are visible, particularly where the area of reflection visible is less than 8 pixels in diameter and cannot reflect the full solar disc;
- period of time reflections are visible;
- angle at which reflections are visible from line of sight;
- views of the development being obscured; and
- the time of day at which the solar reflection will occur for example during peak traffic times.

11.40 Effects in terms of solar glare can only be adverse (negative) in nature due to this not being a comparative assessment.

11.41 All road junctions and tram tracks assessed have been identified as being of high sensitivity as an action is required by a driver that is a safety concern if their visibility is impaired by solar glare. In determining the overall effect at a junction, whilst consideration is given to both controlled and uncontrolled junctions, the later, those where a driver does not have a fixed viewpoint such as a traffic light or where no specific manoeuvres are required by a driver, are less likely to be impacted by solar glare this is a safety concern but are still considered high risk.

11.42 As the sensitive receptor is a driver approaching a road junction, multiple viewpoints at any one junction may be assessed for each of the traffic lanes or signals affected. In terms of significance criteria however, professional judgement has been used to determine the overall effect at the junction as a whole, taking into consideration the effects at all viewpoints assessed for that junction. Similarly for train drivers, the overall effect is reported for the stretch of track assessed as a whole. Therefore, following the initial magnitude of an effect for each viewpoint and consideration of mitigating factors, a clear statement is then made as to whether the overall effect is significant or not significant. As a general rule, the following criteria is applied:

- 'Moderate' or 'major' effects are deemed to be 'significant';

- ‘Minor’ effects are considered to be ‘not significant’, although they may be a matter of local concern; and
- ‘Negligible’ effects are considered to be ‘not significant’ and not a matter of local or wider concern.

Baseline Conditions

11.43 The solar glare assessment is undertaken on the worst-case scenario. Solar Glare is not a comparative assessment; the fact it may occur in the baseline does not necessarily justify its occurrence as a result of the Proposed Development. Therefore, the assessment considers the effect of the Proposed Development in absolute terms.

11.44 However, it should be noted that the Proposed Development will be located on a Site where its existing state is split-level car parking, thus there is limited opportunity for instances of solar glare from the Site to be experienced. Solar glare from surrounding buildings is not assessed.

Identification and Evaluation of Likely Significant Effects

Embedded Mitigation

11.45 Owing to the proximity of the EIA Site to several sensitive road and tram/rail locations, as well as the highly glazed nature of the Proposed Development, a comprehensive, iterative review process was undertaken to incorporate mitigation strategies within the detailed façade design.

11.46 The iterative review process has run alongside the development of the façades from the early massing stages and has comprised of an initial massing review, whereby the massing was tested to identify which nearby junctions are most sensitive to reflections and identify any facades that would likely require strategies deployed to reduce the area and intensity of any reflections. Then as the façade design progressed, the façade strategies were reviewed to ensure the embedded solar glare mitigation reduced the risk of solar glare as much as practicable.

11.47 Numerous options were explored to break up reflections and / or lower the intensity of any reflections that occurred. This included:

- the use of anodised aluminium panels, purge ventilation panels and dummy purge ventilation panels all with a non-specular finish to break up reflections;
- vertical angling of glazed panels for the eastern and western elevations of Plot A to avoid large areas of flat glazing of the same plane;
- vertical fins have been applied to the lower portion of the southern elevation of Plot A and all downward facing panels of the eastern and western elevations of Plot A; and
- use of low reflectance glazing where necessary.

11.48 Therefore, the assessments reported within this ES Chapter have been undertaken on a scheme that has been fine-tuned to address potential solar glare risks. However, as with any tall building within a low-rise context, the Proposed Development is visible from some distance and sits within the field of view for drivers at several nearby junctions. It is likely that solar reflections may be unavoidable at all locations, so the façade design has sought to limit the area of reflections and their intensity to minimise the risk of solar reflections resulting in an instance of solar glare being generated by the buildings’ facades.

Construction Phase

11.49 The likely effects in relation to solar glare for the surrounding road users and train/tram drivers would vary throughout the demolition and construction works, starting from installation of the first glazed façade panels and gradually increasing as all reflective cladding is installed.

11.50 The effects during the demolition works is considered negligible. As construction works progress, and the facades of the Proposed Development are installed, the potential solar glare effects would be similar to those once the Proposed Development is complete and operational, as presented below. It is therefore considered that the completed Proposed Development represents the worst-case assessment in terms of likely solar glare effects.

11.51 As such, the overall effect in terms of solar glare would range from being temporary negligible effects during demolition, then gradually changing to post mitigation residual effects of **negligible** to **permanent**, **moderate adverse** and **significant**, once the Proposed Development is complete, as set out in the assessment of the Proposed Development scenario below.

Operational Phase

11.52 The full solar glare assessment is provided in Technical Appendix 11.1.

11.53 The assessment has been undertaken from nearby road locations which are considered sensitive in terms of solar glare. These include traffic junctions, pedestrian crossings and motorway locations. At locations where there is more than one traffic signal from which the Proposed Development is visible, several viewpoints have been tested (noted by the reference a, b, c etc.) in order to have a better understanding of the likely impact that the Proposed Development might have upon road users' responsiveness. The number of viewpoints tested per location varies according to the number of lanes, direction of travel and number of traffic lights. This is specified in the discussion below, where appropriate.

11.54 Following a review of an extended area of investigation (approximately 500m radius from the Proposed Development), a total of 18 road locations and four train/tram lines were assessed. The assessment considers the potential occurrence of solar reflections from the Proposed Development owing to its size and large areas of glazing on the façade at these locations. The duration of solar reflections as well as their proximity to a driver's line of sight have been considered within the discussion below.

11.55 The assessment has been undertaken in a worst-case scenario considering there is no cloud cover, so assuming the sun is shining for all days of the year for the full duration of daylight hours.

11.56 Of the total 15 road locations and five train/tram lines, a total of nine road locations and four tram/rail lines have at least one viewpoint which sees the potential for solar glare within 30° of a drivers' line of sight but great than 10°. At these 13 locations, the effect is considered to be **permanent**, **Minor Adverse** and **not significant**. These locations are listed below and are not discussed further within the Chapter:

- BV1 – Bridgewater Viaduct junction with Castle Street;
- DG3 – Deansgate junction with Whitworth Street West;
- TS – Tonman Street junction with Deansgate;
- LR1 – Liverpool Road junction with Deansgate;

- LR2 – Liverpool Road pedestrian crossing;
- CSCP - Collier Street Car Park pedestrian crossing;
- GBS2 – Great Bridgewater Street junction Chepstow Street;
- LMS1 – Lower Mosley Street junction with Great Bridgewater Street;
- LMS3 – Lower Mosley Street junction with Bishopsgate;
- TRAM_Southbound – From St Peter's Square stop to Deasngate-Castlefield stop;
- RAIL_Westbound – From Manchester Oxford Road Station to Deansgate Station;
- RAIL_Eastbound1 – From Trafford Park to Deansgate; and
- RAIL_Eastbound2 – From Salford to Deansgate.

11.57 At the remaining six road locations and one tram line, reflections occur within 10° of a road user's line of sight which require further consideration.

Castle Street junction with Bridgewater Viaduct (CS1)

11.58 Two viewpoints have been assessed at this junction, CS1a and CS1b. Viewpoint CS1a shows the view of drivers looking straight ahead as they approach the junction, whilst viewpoint CS1b shows drivers looking at the left side traffic lights. There is a second traffic light on the opposite side of the junction primarily for use by stationary vehicles.

11.59 Table 11.3 provides a summary of the duration of potential reflections that could occur within a 10° drivers field of view, where they would occur within the field of view of drivers, from which element of the Proposed Development the reflections could occur and finally, an initial significance of effect is given for each instance of reflection, prior to consideration being given to factors such as those outlined in paragraph 11.39.

11.60 Reflections at viewpoint CS1a are outside 10° of a drivers' line of sight and so this viewpoint has an initial viewpoint significance of effect of Minor.

Table 11.3 - Summary of Potential Reflections within 10° for drivers on Castle Street junction with Bridgewater Viaduct (CS1)

Viewpoint	Elevation	Times of day that reflections occur	Times of year that reflections occur	Location within 10° of driver's line of sight	Initial Magnitude of Effect*
CS1b	Plot A: Southern	09:00-10:00 GMT	Mid-January to mid-March and mid-September to mid-November	Very thin strips visible from 1° - 5°. Slightly larger strips visible from 5°, above the visor cut-off line.	Major
	Plot A: South-Western Chamfer	15:00-16:00 GMT			Major
	All other reflections occur outside 10° so are considered Minor Adverse.				
*Prior to consideration of any mitigating factors outlined below.					

11.61 At this location, for the viewpoints assessed:

- Reflections occurring at one of the viewpoints (CS1a), where drivers are looking forward approaching the junction, are well outside the direct line of sight and so would not impact driver visibility.
- When reflections are seen behind the left side traffic lights (viewpoint CS1b), drivers can rely on the alterative traffic lights on the other side of the junction to respond safely at this junction.
- The reflections occurring within the most sensitive 5° are from very thin strips within the field of view, therefore the area of reflection is very small within the field of view.
- The reflections from the southern elevation are at a glancing angle.
- The areas of reflection are less than 8 pixels in diameter within the view, as such, it is not possible for the full sun's intensity to be reflected.
- Anodised aluminium solid and ventilation panels have been distributed across the southern elevation and lower portion of the south-western chamfer elevation to break up reflections and lower the intensity of any reflections that do occur.
- Vertical fins have been included for the lower portion of the southern elevation to break up and reduce the areas of reflection.
- Low reflectance glazing is proposed to the southern elevation and south-western chamfer to minimize the intensity of reflections that do occur.
- The majority of potential reflections occur above the driver's visor line, which would mitigate most of the effects when deployed.
- The reflections occur in the early mornings or mid-afternoons during the mid-seasons when the solar intensity is low, therefore any reflections generated would be low intensity.
- The sun path sits within the field of view of a driver at this location. Once implemented the Proposed Development will partially obscure the direct view of the sun in the early mornings. Any reflections visible from the Proposed Development would be significantly less intense than a direct view of the sun, as is currently experienced at this location between April and August. A large portion of the sun's path would remain visible at this junction with a greater intensity than the reflections that would be generated from the Proposed Development.
- The probability of the sun shining at the times of day and year when reflections occur within 10° of a driver's line of sight is 20%-40%.
- Between 09:00-10:00 GMT, when reflection occur from the southern elevation, there would typically be c. 20 cars that pass through this location, which corresponds to one car every 3 minutes. Between 13:00-14:00 GMT, when reflections occur from the south-western chamfer, there would typically be c. 40 cars that pass through this location, which corresponds to one car every 1.5 minutes. As such, this location is considered to have a low traffic volume and only a very small number of cars could be impacted by reflections at this location.

11.62 Based on professional judgement, in consideration of the initial magnitude of potential effects (Table 11.3) and the factors outlined above (para 11.61), the overall effect in terms of solar glare to drivers at the Castle Street junction with Bridgewater Viaduct is considered to be permanent, Moderate Adverse and significant. Given the dynamic nature of traffic movement, the potential effects as reported would only occur momentarily when looking precisely at the affected traffic lights, 12 metres from the junction.

Deansgate junction with Quay Street/Peter Street (DG1)

11.63 Two viewpoints have been assessed at this junction, DG1c and DGd. Viewpoint DG1c shows the view of drivers in the right lane looking straight ahead as they approach the junction, whilst viewpoint DG1d shows drivers right lane looking at the left side traffic lights. There is a second traffic light on the opposite side of the junction primarily for use by stationary vehicles.

11.64 Table 11.4 provides a summary of the duration of potential reflections that could occur within a 10° drivers field of view, where they would occur within the field of view of drivers, from which element of the Proposed Development the reflections could occur and finally, an initial significance of effect is given for each instance of reflection, prior to consideration being given to factors such as those outlined in paragraph 11.39.

11.65 Reflections at viewpoint DG1c are outside 30° of a drivers' line of sight and so this viewpoint has an initial viewpoint significance of effect of Negligible.

Table 11.4 - Summary of Potential Reflections within 10° for drivers on Deansgate junction with Quay Street/Peter Street (DG1)

Viewpoint	Elevation	Times of day that reflections occur	Times of year that reflections occur	Location within 10° of driver's line of sight	Initial Magnitude of Effect*
DG1d	Plot A: Western	14:00-15:00 GMT	Mid-February to mid-March and mid-September to mid-October	From 9° and above the driver's visor cut-off line	Moderate
	All other reflections occur outside 10° so are considered Minor Adverse.				
*Prior to consideration of any mitigating factors outlined below.					

11.66 At this location, for the viewpoints assessed:

- Reflections occurring at one of the viewpoints (DG1c), where drivers are looking forward approaching the junction, are well outside the direct line of sight and so would not impact driver visibility.
- When reflections are seen behind the left side traffic lights (viewpoint DG1d), drivers can rely on the alterative traffic lights on the other side of the junction to respond safely at this junction.
- The Proposed Development is located c. 360m from this junction, therefore the Proposed Development is visible within only a small portion of the field of view.
- The reflections occur from only a very small area that only just falls within the 10° field of view, and are at a glancing angle, therefore the area of reflection is very small within the field of view and would only reflect the solar disc for a very short period of time.
- Anodised aluminium solid and ventilation panels have been distributed across the western elevation to break up reflections and lower the intensity of any reflections that do occur.
- Low reflectance glazing is proposed to the western elevation to minimize the intensity of reflections that do occur.
- All potential reflections occur above the driver's visor line, which would mitigate the effects when deployed.

- The reflections occur in the mid-afternoons during the mid-seasons when the solar intensity is low, therefore any reflections generated would be low intensity.
- The reflections occur outside peak traffic times.
- The sun path sits within the field of view of a driver at this location. Once implemented the Proposed Development will partially obscure the direct view of the sun in the late mornings. Any reflections visible from the Proposed Development would be significantly less intense than a direct view of the sun, as is currently experienced at this location during the mid-seasons. A large portion of the sun's path would remain visible at this junction with a greater intensity than the reflections that would be generated from the Proposed Development.
- The probability of the sun shining at the times of day and year when reflections occur within 10° of a driver's line of sight is 30%-50%.

11.67 Based on professional judgement, in consideration of the initial magnitude of potential effects (Table 11.4) and the factors outlined above (para 11.66), the overall effect in terms of solar glare to drivers at the Deansgate junction with Quay Street/Peter Street is considered to be permanent, Minor Adverse and not significant. Given the dynamic nature of traffic movement, the potential effects as reported would only occur momentarily when looking precisely at the affected traffic lights, 12 metres from the junction.

Watson Street junction Great Bridgewater Street (WS1)

11.68 Two viewpoints have been assessed at this junction, WS1c and WS1d. Viewpoint WS1c shows the view of drivers in the right lane looking straight ahead as they approach the junction, whilst viewpoint WS1d shows drivers looking at the right side traffic lights. There is an alternative lights on the left side of the road and a second traffic light on the right side after the crossing primarily for use by stationary vehicles.

11.69 Table 11.5 provides a summary of the duration of potential reflections that could occur within a 10° drivers field of view, where they would occur within the field of view of drivers, from which element of the Proposed Development the reflections could occur and finally, an initial significance of effect is given for each instance of reflection, prior to consideration being given to factors such as those outlined in paragraph 11.39.

11.70 Reflections at viewpoint WS1c are outside 10° of a drivers' line of sight and so this viewpoint has an initial viewpoint significance of effect of Minor.

Table 11.5 - Summary of Potential Reflections within 10° for drivers on Watson Street junction Great Bridgewater Street (WS1)

Viewpoint	Elevation	Times of day that reflections occur	Times of year that reflections occur	Location within 10° of driver's line of sight	Initial Magnitude of Effect*
WS1d	Plot B: Eastern	12:00-13:00 GMT	Mid-October to mid-February	From 5° and mostly above the driver's visor cut-off line	Moderate
	All other reflections occur outside 10° so are considered Minor Adverse.				
*Prior to consideration of any mitigating factors outlined below.					

11.71 At this location, for the viewpoints assessed:

- Reflections occurring at one of the viewpoints (WS1c), where drivers are looking forward approaching the junction, are well outside the direct line of sight and so would not impact driver visibility.
- When reflections are seen behind the right side traffic lights (viewpoint WS1d), drivers can rely on the alterative traffic lights on the other side of the road to respond safely at this junction.
- The reflections occur from only a thin strip within the field of view, and at a glancing angle, therefore the area of each panel is small within the field of view and reflections would only occur for a very short period of time.
- Anodised aluminium solid and ventilation panels have been distributed across the eastern elevation to break up reflections and lower the intensity of any reflections that do occur.
- Low reflectance glazing is proposed to the eastern elevation to minimize the intensity of reflections that do occur.
- The majority of potential reflections occur above the driver's visor line, which would mitigate most of the effects when deployed.
- The reflections occur outside peak traffic times.
- The sun path sits within the field of view of a driver at this location. Once implemented the Proposed Development will partially obscure the direct view of the sun in the afternoons. Any reflections visible from the Proposed Development would be significantly less intense than a direct view of the sun, as is currently experienced at this location during the winter months. A portion of the sun's path would remain visible at this junction with a greater intensity than the reflections that would be generated from the Proposed Development.
- The probability of the sun shining at the times of day and year when reflections occur within 10° of a driver's line of sight is 30%.
- Between 12:00-13:00 GMT, when reflection occur from the eastern elevation, there would typically be c. 60 cars that pass through this location across both lanes however only those turning right would be impacted, assuming half the cars are turning right this corresponds to one car every 2 minutes. As such, this location is considered to have a low traffic volume at the time when reflections could occur and only a very small number of cars could be impacted by reflections at this location.

11.72 Based on professional judgement, in consideration of the initial magnitude of potential effects (Table 11.5) and the factors outlined above (para 11.71), the overall effect in terms of solar glare to drivers at the Watson Street junction Great Bridgewater Street is considered to be permanent, Minor to Moderate Adverse and significant. Given the dynamic nature of traffic movement, the potential effects as reported would only occur momentarily when looking precisely at the affected traffic lights, 12 metres from the junction.

Portland Street junction with Oxford Street (PS1)

11.73 Two viewpoints have been assessed at this junction, PS1c and PS1d. Viewpoint PS1c shows the view of drivers in the right lane looking straight ahead as they approach the junction, whilst viewpoint PS1d shows drivers looking at the right side traffic lights. There is an alternative lights on the left side of the road and a second traffic light on the opposite side of the junction primarily for use by stationary vehicles.

11.74 Table 11.6 provides a summary of the duration of potential reflections that could occur within a 10° drivers field of view, where they would occur within the field of view of drivers, from which element of the Proposed Development the reflections could occur and finally, an initial significance of effect is given for each instance of reflection, prior to consideration being given to factors such as those outlined in paragraph 11.39.

11.75 Reflections at viewpoint PS1c are outside 10° of a drivers' line of sight and so this viewpoint has an initial viewpoint significance of effect of Minor.

Table 11.6 - Summary of Potential Reflections within 10° for drivers on Portland Street junction with Oxford Street (PS1)

Viewpoint	Elevation	Times of day that reflections occur	Times of year that reflections occur	Location within 10° of driver's line of sight	Initial Magnitude of Effect*
PS1d	Plot A: Eastern	09:00-10:00 GMT	Mid-September to mid-March	From 5° and mostly above the driver's visor cut-off line	Moderate
	All other reflections occur outside 10° so are considered Minor Adverse.				
*Prior to consideration of any mitigating factors outlined below.					

11.76 At this location, for the viewpoints assessed:

- Reflections occurring at one of the viewpoints (PS1c), where drivers are looking forward approaching the junction, are outside the direct line of sight and so would not impact driver visibility.
- When reflections are seen behind the right side traffic lights (viewpoint PS1d), drivers can rely on the alterative traffic lights on the other side of the junction and on the left side of the road to respond safely at this junction.
- The Proposed Development is located c. 430m from this junction, therefore the Proposed Development is visible within only a small portion of the field of view.
- Reflections occur from a combination of up-facing and down-facing panels which results in the times when reflections occur differing between up-facing and down-facing panels and the effective area of reflections at any one time within 10° being reduced.
- Anodised aluminium solid and ventilation panels have been distributed across the eastern elevation to break up reflections and lower the intensity of any reflections that do occur.
- Vertical fins have been included for the down-facing panels to break and reduce the areas of reflection.
- Low reflectance glazing is proposed to the eastern elevation to minimize the intensity of reflections that do occur.
- The majority of potential reflections occur above the driver's visor line, which would mitigate most of the effects when deployed.
- The reflections occur in the mornings during the mid-seasons when the solar intensity is low, therefore any reflections generated would be low intensity.

- The sun path sits within the field of view of a driver at this location. Once implemented the Proposed Development will partially obscure the direct view of the sun in the afternoon. Any reflections visible from the Proposed Development would be significantly less intense than a direct view of the sun, as is currently experienced at this location during the mid-seasons. A large portion of the sun's path would remain visible at this junction with a greater intensity than the reflections that would be generated from the Proposed Development.
- The probability of the sun shining at the times of day and year when reflections occur within 10° of a driver's line of sight is 20%-40%.

11.77 Based on professional judgement, in consideration of the initial magnitude of potential effects (Table 11.6) and the factors outlined above (para 11.76), the overall effect in terms of solar glare to drivers at the Portland Street junction with Oxford Street is considered to be permanent, Moderate Adverse and significant. Given the dynamic nature of traffic movement, the potential effects as reported would only occur momentarily when looking precisely at the affected traffic lights, 12 metres from the junction.

Great Bridgewater Street junction with Lower Mosley Street (GBS1)

11.78 Two viewpoints have been assessed at this junction, GBS1a and GBS1b. Viewpoint GBS1a shows the view of drivers in the left lane looking straight ahead as they approach the junction, whilst viewpoint GBS1b shows drivers looking at the left side traffic lights. There is an alternative lights on the right side of the road and a second traffic light on the opposite side of the junction primarily for use by stationary vehicles.

11.79 Table 11.7 provides a summary of the duration of potential reflections that could occur within a 10° drivers field of view, where they would occur within the field of view of drivers, from which element of the Proposed Development the reflections could occur and finally, an initial significance of effect is given for each instance of reflection, prior to consideration being given to factors such as those outlined in paragraph 11.39.

11.80 Reflections at viewpoint GBS1a are outside 10° of a drivers' line of sight and so this viewpoint has an initial viewpoint significance of effect of Minor.

Table 11.7 - Summary of Potential Reflections within 10° for drivers on Great Bridgewater Street junction with Lower Mosley Street (GBS1)

Viewpoint	Elevation	Times of day that reflections occur	Times of year that reflections occur	Location within 10° of driver's line of sight	Initial Magnitude of Effect*
GBS1b	Plot A: Eastern (Podium)	07:00-08:00 GMT	Mid-February to mid-March and mid-September to mid-October	A very small area at 0°-1°	Major
	Plot A: Eastern (up-tilted panels)	08:00-09:00 GMT	Mid-March to mid-April and mid-August to mid-September	From 5° and above the driver's visor cut-off line	Moderate
	Plot A: Northern	18:00-19:00 GMT	Mid-May to mid-July	A very small area at 4°-5°	Major
	All other reflections occur outside 10° so are considered Minor Adverse.				
*Prior to consideration of any mitigating factors outlined below.					

11.81 At this location, for the viewpoints assessed:

- Reflections occurring at one of the viewpoints (GBS1a), where drivers are looking forward approaching the junction, are outside the direct line of sight and so would not impact driver visibility.
- When reflections are seen behind the left side traffic lights (viewpoint GBS1b), drivers can rely on the alterative traffic lights on the other side of the junction and on the right side of the road to respond safely at this junction.
- The area of reflection visible from eastern podium glazing is very small within the field of view and as a result, any reflections that occur would be for a very short period of time.
- Reflections within 10° from the eastern elevation occur from up-facing panels only.
- Anodised aluminium solid and ventilation panels have been distributed across the eastern elevation to break up reflections and lower the intensity of any reflections that do occur.
- Low reflectance glazing is proposed to the eastern elevation to minimize the intensity of reflections that do occur.
- Reflections from the northern façade have an area of each panel much less than 8 pixels in diameter within the view, as such, it is not possible for the full sun's intensity to be reflected.
- Reflections from the main elevation occur above the driver's visor line, which would mitigate most of the effects when deployed.
- The reflections that occur from the northerly elevation are in the early mornings when the solar intensity is very low, therefore any reflections generated would be very low intensity.
- The reflections that occur from the eastern elevation and podium occur in the early mornings during the mid-seasons when the solar intensity is low, therefore any reflections generated would be low intensity.
- The probability of the sun shining at the times of day and year when reflections occur from the up-tilted panels of the eastern elevation within 10° of a driver's line of sight is 40%-50%. The probability of the sun shining at the times of day and year when reflections occur from the eastern podium is 10%-30% and from the northern elevation is 30%.

11.82 Based on professional judgement, in consideration of the initial magnitude of potential effects (Table 11.7) and the factors outlined above (para 11.81), the overall effect in terms of solar glare to drivers at the Great Bridgewater Street junction with Lower Mosley Street is considered to be permanent, Major Adverse and significant. Given the dynamic nature of traffic movement, the potential effects as reported would only occur momentarily when looking precisely at the affected traffic lights, 12 metres from the junction.

Lower Mosley Street pedestrian crossing (LMS2)

11.83 Two viewpoints have been assessed at this junction, LMS2a and LMS2c. Viewpoint LMS2a shows the view of drivers in the looking straight ahead as they approach the junction, whilst viewpoint LMS2c shows drivers looking at the right side traffic lights. There is an alternative lights on the left side of the road and a second traffic light on the opposite side of the crossing for use by stationary vehicles.

11.84 Table 11.8 provides a summary of the duration of potential reflections that could occur within a 10° drivers field of view, where they would occur within the field of view of drivers, from which element of the Proposed Development the reflections could occur and finally, an initial significance of effect is

given for each instance of reflection, prior to consideration being given to factors such as those outlined in paragraph 11.39.

11.85 Reflections at viewpoint LMS2a are outside 10° of a drivers' line of sight and so this viewpoint has an initial viewpoint significance of effect of Minor.

Table 11.8 - Summary of Potential Reflections within 10° for drivers on Lower Mosley Street pedestrian crossing (LMS2)

Viewpoint	Elevation	Times of day that reflections occur	Times of year that reflections occur	Location within 10° of driver's line of sight	Initial Magnitude of Effect*
LMS2c	Plot A: Eastern (up-tilted panels)	10:00-11:00 GMT	Mid-October to mid-February	From 4°	Major
	Plot A: North-Eastern Chamfer	Sunrise to 06:00 GMT	Mid-April to mid-August	Thin strip between 6°-8°	Moderate
	All other reflections occur outside 10° so are considered Minor Adverse.				
*Prior to consideration of any mitigating factors outlined below.					

11.86 At this location, for the viewpoints assessed:

- Reflections occurring at one of the viewpoints (LMS2a), where drivers are looking forward approaching the junction, are well outside the direct line of sight and so would not impact driver visibility.
- When reflections are seen behind the right side traffic lights (viewpoint LMS2b), drivers can rely on the alterative traffic lights on the left side of the to respond safely at this junction.
- The reflections occurring from north-eastern chamfer are from a small area, therefore the area of reflection would only result in reflections for a very short period of time.
- Anodised aluminium solid and ventilation panels have been distributed across the eastern elevation to break up reflections and lower the intensity of any reflections that do occur.
- Low reflectance glazing is proposed to the eastern elevation and north-eastern chamfer to minimize the intensity of reflections that do occur.
- Some potential reflections occur above the driver's visor line, which would mitigate some of the effects when deployed.
- The reflections occur from the north-eastern chamfer are in the early mornings when the solar intensity is very low, therefore any reflections generated would be very low intensity.
- The reflections from the eastern elevation occur in the mornings during the winter when the solar intensity is low, therefore any reflections generated would be low intensity.
- The reflections occur outside peak traffic times.
- The sun path sits within the field of view of a driver at this location. Once implemented the Proposed Development will partially obscure the direct view of the sun in the afternoon. Any reflections visible from the Proposed Development would be significantly less intense than a direct view of the sun, as is currently experienced at this location during the mid-seasons. A

large portion of the sun's path would remain visible at this junction with a greater intensity than the reflections that would be generated from the Proposed Development.

- The probability of the sun shining at the times of day and year when reflections occur from the up-tilted panels of the eastern elevation within 10° of a driver's line of sight is 20%-50%. The probability of the sun shining at the times of day and year when reflections occur from the north-eastern chamfer is 10%-30%.

11.87 Based on professional judgement, in consideration of the initial magnitude of potential effects (Table 11.8) and the factors outlined above (para 11.86), the overall effect in terms of solar glare to drivers at the Lower Mosley Street pedestrian crossing is considered to be permanent, Moderate Adverse and significant. Given the dynamic nature of traffic movement, the potential effects as reported would only occur momentarily when looking precisely at the affected traffic lights, 12 metres from the junction.

Eastbound Tramline from Cornbrook to Deansgate-Castlefield (TRAM_Eastbound)

11.88 Three viewpoints have been assessed along the eastbound tramline with reflections occurring with 10° of a driver's direct line of sight on this track, TRAM_Eastbound. TDS is the view of drivers next to Duke Street, TCS shows the view of tram drivers further along the track as they travel next to the Collier Street Car park and TDE is the view of drivers as they pass over Deansgate on their approach to the Deansgate-Castlefield stop.

11.89 Table 11.9 provides a summary of the duration of potential reflections that could occur within a 10° drivers field of view, where they would occur within the field of view of drivers, from which element of the Proposed Development the reflections could occur and finally, an initial significance of effect is given for each instance of reflection, prior to consideration being given to factors such as those outlined in paragraph 11.39.

11.90 Reflections at viewpoints TCS and TDE are outside 10° of a drivers' line of sight and so this viewpoint has an initial viewpoint significance of effect of Minor.

Table 11.9 - Summary of Potential Reflections within 10° for drivers on Eastbound Tramline from Cornbrook to Deansgate-Castlefield (TRAM_Eastbound)

Viewpoint	Elevation	Times of day that reflections occur	Times of year that reflections occur	Location within 10° of driver's line of sight	Initial Magnitude of Effect*
TDS	Plot B: Western	19:00 GMT to sunset	Mid-May to mid-July	A small area between 3°-5°	Major
	All other reflections occur outside 10° so are considered Minor Adverse.				
*Prior to consideration of any mitigating factors outlined below.					

11.91 At this location, for the viewpoints assessed:

- The tracks are on a bend; therefore, any instances of reflection would only be visible momentarily before the reflection angle changes.
- The reflections occur from only thin strips within the field of view, and within a small area of facade, therefore the area of each panel is small within the field of view and reflections would only occur for a very short period of time.

- Anodised aluminium solid and ventilation panels have been distributed across the western elevation to break up reflections and lower the intensity of any reflections that do occur.
- Low reflectance glazing is proposed to the eastern elevation of Block A to minimize the intensity of reflections that do occur.
- The areas of reflection are less than 8 pixels in diameter within the view, as such, it is not possible for the full sun's intensity to be reflected.
- The reflections occur in the early evenings when the solar intensity is very low, therefore any reflections generated would be very low intensity.
- The sun path sits within the field of view of a driver at this location. Once implemented the Proposed Development will partially obscure the direct view of the sun in the mornings. Any reflections visible from the Proposed Development would be significantly less intense than a direct view of the sun, as is currently experienced at this location during the summer months. A large portion of the sun's path would remain visible at this junction with a greater intensity than the reflections that would be generated from the Proposed Development.
- The probability of the sun shining at the times of day and year when reflections occur within 10° of a driver's line of sight is less than 30%.

11.92 Based on professional judgement, in consideration of the initial magnitude of potential effects (Table 11.9) and the factors outlined above (para 11.91), the overall effect in terms of solar glare to tram drivers travelling eastbound towards the Deansgate-Castlefield stop is considered to be permanent, Minor to Moderate Adverse and significant. Given the dynamic nature of tram movement travelling along a set of tracks, the potential effects as reported would only occur momentarily when at each of the precise viewpoints assessed.

Construction Phase

Cumulative Effects

Mitigation Measures

11.93 It is not necessary to include temporary mitigation measures during the construction phase, all mitigation embedded within the design of the facades and mitigation measures recommended for the Operational Phase would apply to the construction phase also.

Operational Phase

11.94 As detailed in para 11.45 to 11.48 of this Chapter, the design has evolved with solar glare effects in mind through the inclusion of angled facades, vertical fins, non-specular anodised aluminium panels and screens to break up potential reflections. As such, potential effects have been mitigated by design to be lower intensity, reducing the potential for the reflections to result in an occurrence of solar glare.

11.95 Permanent, significant adverse effects are predicted to occur for a driver at five road locations and one tram line. Given the location of the site and scale of the development, the potential for reflections from the Proposed Development are unavoidable. It should be noted that the assessment considers a scenario whereby the sun shines on every day of the year to consider all potential circumstances in which reflections will occur (i.e. 'worst case'). According to the sunlight availability protractor, based on UK weather data, the sunshine probability will be significantly reduced and therefore the likelihood of the instances of reflections are reduced accordingly. The probability of the sun shining during the times of the year when significant potential reflections are

expected to occur ranges from 10% in the early mornings from the mid-seasons through summer months, up to 50% in the mid-morning in the winter months and mid-seasons.

11.96 Furthermore, the assessment does not include the sun itself within any viewpoints which would also cause very intense glare to drivers at many of the affected viewpoints. For the majority of viewpoints, the sun would be directly visible at other times of the day if the Proposed Development were not present as seen in the solar glare assessment in Appendix 11.1. In comparison, the reflections from the Proposed Development would appear less intense and would not cause significantly worse effects when compared with a direct view of the sun.

11.97 The assessment has been based on a worst-case scenario that assumes high reflectivity glazing.

11.98 Subsequent to the standard EIA solar glare assessments, more detailed supplementary solar glare intensity studies have been undertaken, and are reported upon in Appendix 11.2, to establish whether the reflections that do occur are of low intensity. The detailed solar glare intensity study has determined that with low Visible Light Reflectance (VLR) glazing used on certain façade areas, the reflections are considered to have the lowest achievable intensity. The following VLR thresholds should be used as determined by the supplementary solar glare intensity studies:

- 8% VLR or less:
  - Block A North-eastern chamfer – Levels 05-19;
  - Block A Eastern Elevation – Levels 06-09 and 12-16 (northern half – see Appendix 11.2);
  - Block A Southern Elevation – Level 05-75;
  - Block A South-western chamfer – Levels 05-38;
  - Block B Eastern Elevation – Levels 02-07.
- 12% VLR or less:
  - Block A Eastern Elevation – Levels 06-09 and 12-16 (central section – see Appendix 11.2), and 20-25;
  - Block A Western Elevation – Levels 29-36 and 40-47.
- 14% VLR or less:
  - Block A Northern Elevation – Level 05;
  - Block A North-eastern chamfer – Levels 20-25;
  - Block A Eastern Elevation –Levels 29-36, Levels 40-47, Levels 51-58 and Levels 62-75;
  - Block A Western Elevation –Levels 51-58, and Levels 62-75.
- 16% VLR or less: All other areas of glazing.

11.99 To mitigate the significant reflections from the eastern podium glazing, it will be necessary to substitute the two glazed panels responsible with non-reflective panels or apply a non-reflective screen in front of the glazing. It is recommended that this is resolved within the further detailed design stages and secured via a condition.

11.100 To mitigate the intensity of the significant reflections from the three strips of glazing at levels 06-09 on the northern end of the eastern elevation, it will be necessary to include additional mitigation measures to limit the areas of glazing that could give off reflections towards the Great Bridgewater Street junction. Further detailed analysis and design development will be undertaken to determine

the appropriate mitigation, but this may include fins or dummy ventilation panels as has been used within other areas of the scheme. It is recommended that this is resolved within the further detailed design stages and secured via a condition.

11.101 Appendix 11.2 provides a summary demonstrating that glazing below these VLR thresholds and non-reflective components for the eastern podium glazing would minimise the potential for glare at the six locations where significant effects have been reported, the impact at one of these locations would be reduced to minor adverse and not significant and the remaining five would be moderate adverse and significant.

11.102 Due to the design of the facades already including extensive mitigation and the effectiveness of low VLR glazing at minimising the potential for an instance of solar glare occurring, except for the two locations identified in para 1.99 and 1.100, there are no further façade design mitigation measures proposed for the Proposed Development.

Residual Effects

11.103 Demolition & Construction

11.104 The likely effects in relation to solar glare for the surrounding road users and train/tram drivers would vary throughout the demolition and construction works, starting from installation of the first glazed façade panels and gradually increasing as all reflective cladding is installed. Once the glazed façade elements have been installed, the potential solar glare effects would be similar to those once the Proposed Development is complete and operational therefore the overall effect in terms of solar glare would range from being temporary negligible effects during demolition, then gradually changing to post mitigation residual effects of **negligible** to **permanent**, **moderate adverse** and **significant**, once the Proposed Development is complete.

11.105 Operational Phase

11.106 The likely significant effects of solar glare from the Proposed Development described above are considered a worst-case scenario. All solar glare effects are considered moderate to high sensitivity depending on the whether it is a controlled junction or not, and the effects are permanent and long term, therefore the residual effects are the same as during the operational stage.

Operational Phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Minor adverse and not significant effects on Solar Glare	Road users at nearby road junctions	Embedded in the design, no further mitigation needed.	N/A	**Minor adverse and not significant effects on Solar Glare**
	Train/Tram Drivers on nearby tracks			
Minor to Moderate adverse and significant effects on Solar Glare	Road users at Watson Street (WS1)	Para 11.97: Proposed Glazing Specifications should be low reflectance to areas of elevations specified.	Planning Condition	**Minor to Moderate adverse and significant effects on Solar Glare**
	Tram Drivers travelling eastbound (TRAM_Eastbound)			**Minor adverse and not significant effects on Solar Glare**

Moderate adverse and significant effects on Solar Glare	Road users at Castle Street (CS1) Road users at Portland Street (PS1) Road users at Lower Mosley Street (LMS2)	Para 11.97: Proposed Glazing Specifications should be low reflectance to areas of elevations specified.		Moderate adverse and significant effects on Solar Glare
Major adverse and significant effects on Solar Glare	Road users at Great Bridgewater Street (GBS1)	Para 11.97: Proposed Glazing Specifications should be low reflectance to areas of elevations specified and Para 11.98: substitution of 2x glazed panels at podium level to non-reflective materials.		Moderate adverse and significant effects on Solar Glare

Monitoring

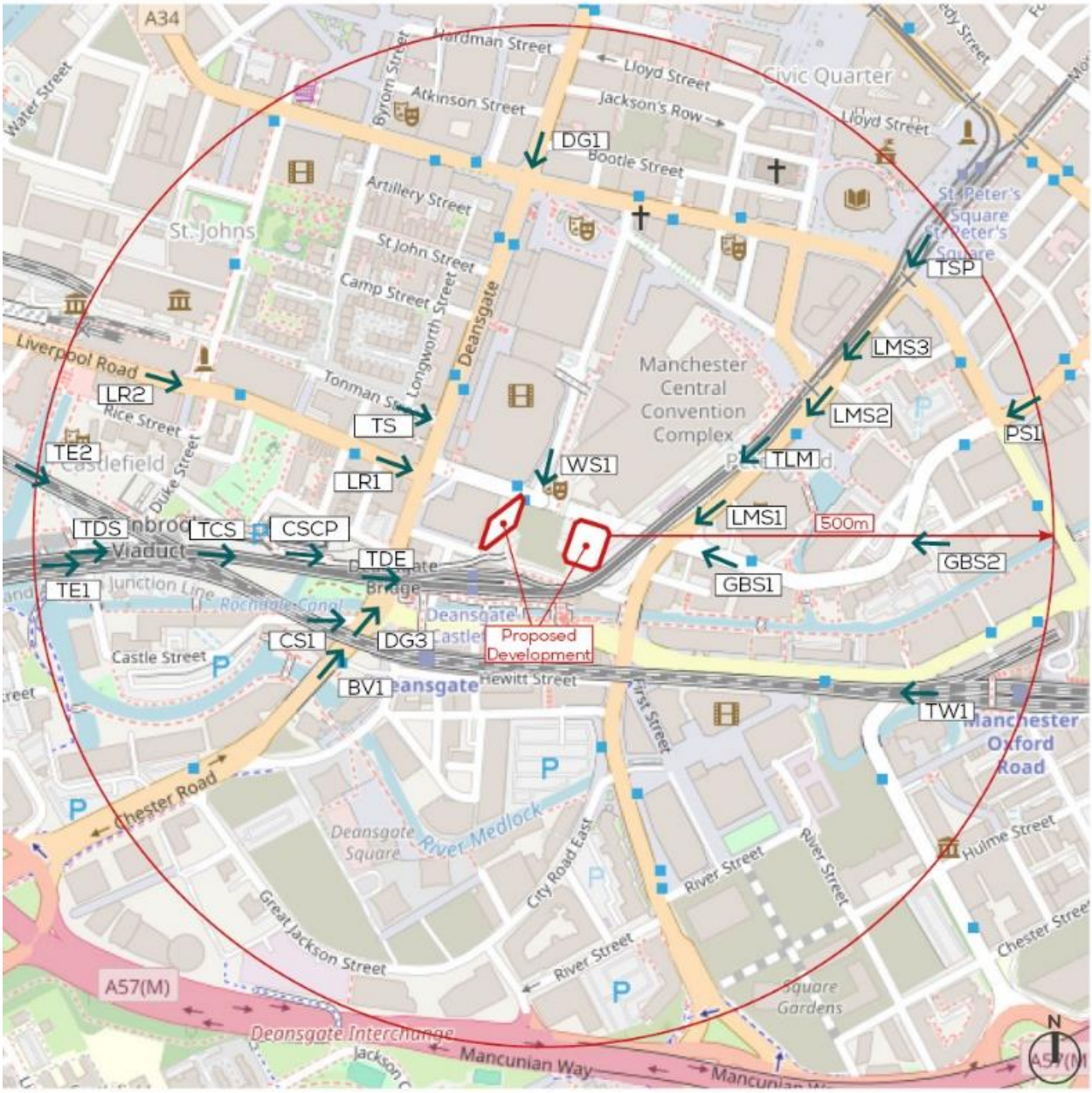
11.107 None required.

Reference List

11.108 This ES Chapter has been prepared in reference to the following:

- Building Research Establishment (BRE) (2022). Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice, Third Edition.
- Commission Internationale De L'Eclairage (CIE), CIE 146:2002 & CIE 147:2002 - Collection on Glare, CIE, 2002.

Figure 11.1



Location of Viewpoints assessed for Solar Glare

Not to Scale	Date: 17/10/2024

12. Wind Microclimate

Introduction

12.1 This Chapter of the ES has been prepared by Architectural Aerodynamics (ArcAero) and asseses Wind Microclimate.

12.2 This Chapter is accompanied by the following appendices:

- Appendix 12.1: Wind Microclimate Technical Report

12.3 The authors of this Chapter have the following qualifications / experiences:

	Lead Author	Reviewer
Name	Imran Rasol	Dr Robin Stanfield
Company	Architectural Aerodynamics Limited (ArcAero)	Architectural Aerodynamics Limited (ArcAero)
Qualifications/Accreditations relevant to technical area	BEng (Hons) Mechanical Engineering, MSc Advanced Mechanical Engineering	BEng (Hons) Aeronautical Engineering, MSc Aerodynamics & CFD, Engineering Doctorate
Does the practitioner hold any IEMA qualification?	No	No
Company hold IEMA QMark?	No	
Years technical experience (in technical area)	2 years	15 years
Number of EIA's delivered to date	5	50+

Assumptions and Limitations

12.4 A combined wind tunnel and CFD based approach has been carried out, where the Proposed Development has been substantially assessed by wind tunnel testing in early 2024, before further exploration of a specific mitigation concept was carried out in CFD, and the performance of the final Proposed Development, has also been examined via CFD, to gauge the potential effect of limited changes to the original wind tunnel results.

12.5 Wind tunnel testing has adopted a discrete measurement approach, where sensors are positioned in sensitive locations and those locations that are expected by veteran practitioners, to experience the most significant acceleration of winds. An approach of this nature is expected to capture worst-case conditions.

12.6 Where employed, CFD modelling does not explicitly model the turbulence of the wind. Instead, numerical methods are used to estimate the gust wind speeds.

12.7 Unless otherwise specified, the wind tunnel model included deciduous trees in order to obtain conservative results during winter. Deciduous trees have been modelled in bare winter format.

Relevant Legislation, Policy and Guidance

Legislation

12.8 There are no legislative policies relating to the assessment of environmental wind flows in the built environment.

Policy

National Planning Policy Framework, 2023

12.9 The National Planning Policy Framework (NPFF) was revised in December 2023 by the Department of Levelling Up, Housing & Communities (DCLG). The relevant paragraphs are as follows:

> Paragraph 135 of the National Planning Policy Framework 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."

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

Manchester's Local Development Framework, Core Strategy Development Plan Document

12.11 Manchester's Local Development Framework, Core Strategy Development Plan Document, Policy EN 2 relates to Tall Buildings. Paragraph 12.4 supporting this states "Tall buildings by their very nature can dominate the street scene and be highly visible over long distances. They can also have an impact on the local micro-climatic conditions, for example, by creating wind tunnels. It is for these reasons that it is considered particularly important that they are designed to the highest quality, both in terms of appearance and their impact on the functioning of surrounding space."

Guidance

National Planning Practice Guidance (NPPG), 2019

12.12 The NPPG states under 'Consider form' that, "Some forms pose specific design challenges, for example how taller buildings meet the ground and how they affect local wind and sunlight patterns should be carefully considered."

12.13 The NPPG states under 'Consider scale' that, " Account should be taken of local climatic conditions, including daylight and sunlight, wind, temperature and frost pockets."

12.14 Paragraph 41 of the National Design Guidance states that a new development, "enhances positive qualities and improves negative ones. Some features are physical, including:…environment – including landscape and visual impact, microclimate, orientation, flood risk, noise, air and water quality."

12.15 Paragraph 71 of the National Design Guidance states that "Proposals for tall buildings (and other buildings with a significantly larger scale or bulk than their surroundings) require special consideration. This includes their location and siting; relationship to context; impact on local character, views and sight lines; composition - how they meet the ground and the sky; and environmental impacts, such as sunlight, daylight, overshadowing and wind. These need to be resolved satisfactorily in relation to the context and local character."

Assessment Methodology and Significance Criteria

Scenarios Tested

12.16 Physical and digital model of the existing buildings within a 600-metre radius from the centre of the Site was constructed.

12.17 For the wind assessment a future baseline has also been considered both with and without the Proposed Development, and with and without mitigation measured relating to the Proposed Development. Future Baseline assesses the baseline (the site as it is today with implemented schemes) and with the cumulative surroundings. The purpose of this 'Future baseline' scenario is to assess and provide evidence that any exceedances of the safety / comfort criteria are not introduced nor worsened by the introduction of the Proposed Development. i.e. they already exist and are not related to the Proposed Development.

12.18 For completeness and to illustrate the effects caused by the Proposed Development itself, the wind assessment has assessed the Future Baseline without and with the Proposed Development. i.e. to show the effects with the cumulative surrounds as it is today, and the effects with the Proposed development within cumulative surroundings.

12.19 This results in the following scenario being assessed:

- Scenario 1 – Existing Baseline (as assessed across all the technical disciplines including developments under construction)
- Scenario 1a– Future Baseline (as noted above this assesses the existing site with the cumulative surrounds)
- Scenario 2 - Existing Baseline plus the Proposed Development (as assessed across all the technical disciplines)
- Scenario 2a – Future Baseline plus the Proposed Development (this is referred to as proposed development plus cumulative in the other technical disciplines)

12.20 Furthermore, the Wind assessment has looked at two additional scenarios assessed with the Proposed Development (Scenario 2 and 2a above) with and without additional mitigation i.e mitigation which is not embedded into the design – resulting in two further scenarios being presented – Scenario 2b and Scenario 2c – for clarity Scenario 2b is Scenario 2 (as explained above) plus additional mitigation measures; and Scenario 2c is Scenario 2a (as explained above) plus additional mitigation measures.

12.21 The resulting further scenarios are:

- Scenario 2b - Existing Baseline plus the Proposed Development (as assessed across all the technical disciplines) with mitigation measures
- Scenario 2c – Future Baseline plus the Proposed Development (this is referred to as proposed development plus cumulative in the other technical disciplines) with mitigation measures

12.22 Once wind tunnel testing was completed, an isolated & specific mitigation concept was explored in greater detail via CFD.

12.23 Where so, this focused on Scenario 2a. This is because the mitigation concepts being examined were most relevant for the cumulative surrounding context, this being the worst-case scenario for the area in question.

12.24 Later, minor alterations to the Proposed Development - specifically the minor increase in height of the tower, increased tower core, and introduction of the hotel access area (previously a retail unit) were assessed via CFD.

Overview

12.25 The microclimate of any development is the distinctive climate of a small-scale area. The weather variables in a microclimate, such as wind, may be different to the conditions prevailing over the area as a whole. This assessment considers the wind conditions that would result upon the introduction of the Proposed Development into the study area. This assessment further considers the cumulative impact following the introduction of consented developments within the surrounding area, as set out below.

12.26 The current assessment considers the study area to comprise the Site plus buildings and spaces within a radius of 600 metres from the centre of the Site, as defined and agreed through the EIA Scoping Report. This allows for approximately 600 metres of the surrounding area to be modelled, including relevant cumulative developments.

12.27 The assessment predicts the proportion of time an area will experience wind speeds in excess of threshold values for safety as well as a series of typical activities such as walking, waiting and outdoor sitting. It can therefore be shown within the various parts of a new development proposal and the adjacent developments, whether wind conditions are suitable or unsuitable, and whether design adjustment or mitigation measures are required.

12.28 The Proposed Development has been modelled using the following drawings:

- 10448_Viadux Phase 2_241023.dwg, received on 23rd October 2024.
- 2843-PLA-XX-XX-DR-L-0000.pdf, received on 6th Nov 2024.

Wind Tunnel Testing

12.29 Wind tunnel testing is the most well-established and robust means of assessing the pedestrian wind microclimate. It enables the wind conditions at the Site to be quantified and classified in accordance with the widely accepted Lawson Criteria for comfort and safety, which require the assessment of mean and gust wind conditions. Gust wind conditions are those driven by the turbulent environment induced by the presence of buildings.

12.30 The principal steps within the procedure are as follows:

- Undertake a wind tunnel test to identify the degree to which the Proposed Development increases or decreases local wind speeds, per wind direction, relative to a known reference point;
- Combine wind tunnel test data with meteorological data for the area to derive an accurate picture of the expected wind microclimate at the Site; and
- Using the Lawson Criteria, compare the expected conditions with the planned suitability of conditions, and assess the exceedance (or otherwise) of the safety criteria.

12.31 Full details describing the approach to wind tunnel testing are provided within Appendix 12.1.

Computational Fluid Dynamics Modelling

12.32 As already noted, after wind tunnel testing was completed, final refinements to the Proposed Development and mitigation measures were explored in detail via CFD modelling.

12.33 Where employed, CFD modelling has employed a steady-state RANS approach. This method employs turbulence models to approximate the magnitude of velocity fluctuations about the average wind speeds predicted, in order to derive an estimation of the effect of gusts. Full details describing this approach are provided Appendix 12.1.

12.34 As with wind tunnel testing, the industry standard criteria for wind microclimate assessments, the Lawson criteria, has been employed to compare the expected conditions with the planned suitability of conditions, and assess the exceedance (or otherwise) of the safety criteria.

Site Wind Climate

12.35 Wind environment studies require that wind speed data obtained from a measurement station be transposed to the site of interest. The measurement station of choice for the assessment is that at Manchester Airport.

12.36 The wind speed history, provided by weather organisations such as the UK Met Office or the National Oceanic & Atmospheric Administration, is reformatted into the number of observations of wind speeds within each of several wind speed ranges, for each wind direction and for each month of the year. The months are grouped into seasons and a Weibull distribution is fitted to the wind speed distribution for each wind direction, for each season. The resulting weather centre wind data is transposed to open country terrain at sea-level, accounting for upwind terrain. The open country wind data is then transposed to reference height at the Site.

12.37 Full details on the derivation of the site wind climate and its modelling are provided Appendix 12.1.

Assessment Criteria

12.38 The industry standard criteria for wind microclimate assessments are commonly referred to in the UK as the Lawson criteria after one of their main authors. As with most other leading practitioners, ArcAero use the 'LDDC' (London Docklands Development Corporation) variant of the Lawson Criteria.

12.39 The LDDC variant applies a single percentage probability of exceedance of a range of wind speeds and associates different wind speeds to different types of usage. This offers a relatively simple and practical manner for the assessment of wind comfort and safety.

12.40 A wind speed of 15 m/s occurring once per year is rated as unsuitable, in terms of safety, with the potential to de-stabilise the less able members of the public including the elderly, cyclists and children.

12.41 The LDDC variant of the Lawson criteria prescribes that wind conditions are suitable for a given activity when the threshold is exceeded no more than 5% of the time. The value of 5% has been established as giving a reasonable allowance for extreme and relatively infrequent winds that are tolerable within each category.

12.42 Where certain activities are year-round, such as walking, entrance use or for waiting areas, comfort ratings are required to be met in all seasons. For more seasonal activities, such as outdoor recreation or for sitting spaces, the assessment focuses on relevant seasons where the expectation will exist for conditions to be suitable. The LDDC comfort threshold wind speed values are presented in Table 12.1.

Table 12.1 Lawson Comfort Criteria

Threshold Wind Speed [m/s]	Comfort Rating / Activity		Qualifying Comments
4	C4	Long-term sitting	Reading a newspaper and eating and drinking.
6	C3	Short-term standing / sitting	Appropriate for bus stops, window shopping and building entrances.
8	C2	Strolling	General areas of walking and sightseeing.
10	C1	Walking	Local areas around tall buildings where people are not likely to linger.

12.43 The assessment takes full account of seasonal variations in wind conditions and pedestrian activities. For example, conditions for recreational activities focus on summer (June, July, August), but also consider spring (March, April, May) and autumn (September, October, November), while conditions for pedestrian thoroughfare, access or waiting (e.g. bus stops) consider all seasons, with winter (December, January, February) usually being the critical season. The assessment is summarised in terms of suitability for various activities. The activities considered, and their relation to the Lawson comfort criteria are summarised in Table 12.2.

Table 12.2 - Suitability Assessment

Suitability	Lawson Comfort Criteria
For passage in areas where tolerance of less comfortable windy conditions is expected, e.g. in substantially built-up areas of commerce where transit from A to B is often prompt, with pedestrians unlikely to linger.	Walking in all seasons.

For access to and passage through the Development and surrounding area.	Strolling in all seasons.
For leisure uses such as a park, children's play area, etc.	Standing or short-term sitting from spring to autumn.
For pedestrian ingress/egress at a building entrance, or short periods of sitting or standing such as at a bus stop, taxi rank, meeting point, etc.	Standing or short-term sitting' in all seasons.
For long periods of sitting such as for an outdoor café.	Long-term sitting in summer.

The Study Area

12.44 The study considers all wind effects up to 600m radius from the Proposed Development and contains all features which are likely to affect the wind flow at the Site. This distance is considered sufficient to capture all wind effects on Site, as well as those effects on the surrounding area.

Source of Effect

12.45 Potentially adverse wind effects impacting the safety and comfort of pedestrians in and around the Proposed Development which may be caused by interaction of the wind with the Proposed Development, but not necessarily, be limited to:

- Downdrafts
- Funnelling / channeling of winds
- Corner accelerations
- Significant exposure to prevailing winds.

Significance Criteria

12.46 During construction, receptors are defined to be pedestrians and cyclists on the road around the Site and construction workers within the Site. During construction, sensitivity to wind is typically reduced, for reasons expanded upon at paragraph 12.69. All receptors are considered to be medium sensitivity to the local wind microclimate conditions and are given an equal weighting.

12.47 For the scenario for the Proposed Development in place, receptors are defined to be persons on foot, seated or travelling by bicycle within the Proposed Development and surrounding areas. All receptors are equally sensitive to the presence or absence of an acceptable wind microclimate. An unacceptable microclimate exists when either an exceedance of the safety criteria exists, or when the comfort criteria is not met for the existing / planned use at a receptor. All receptors are considered to be highly sensitive to the local wind microclimate conditions and are given an equal weighting.

Determining the Magnitude of Change

12.48 Effect magnitude is defined by the severity of the deviation from the standards set out by the Lawson criteria. Exceedances of the safety criteria are deemed to be the most critical, given their potential

effect on pedestrians' wellbeing, i.e. they may be unduly exposed to the potential for harm. Such effects are thus deemed to have a high impact magnitude. Where the comfort criteria are not met, i.e. where the conditions are too windy for a particular receptor to be sufficiently comfortable for existing or planned pedestrian uses and thus inconvenient but not unsafe, such effects are deemed to be of medium impact magnitude. Where the comfort criteria are marginally exceeded, to the extent that the exceedance is expected to be perceptible, but tolerable, such effects are deemed to be of low impact magnitude.

12.49 On this basis, therefore, exceedances of the safety criteria are considered to be of major magnitude, while exceedances of the comfort criteria are considered to be of moderate or minor magnitude. Where the Proposed Development is unlikely to cause a noticeable change at a receptor, despite its level of sensitivity or there is a considerable change at a receptor which is not considered to be sensitive to that change, this will be considered to be negligible.

12.50 Major and moderate effects are considered to be significant in EIA terms. Minor effects, as noted above being tolerable, are not considered to be significant.

Determining the Level of Effect

12.51 The level of effect has been informed by the magnitude of change due to the Proposed Development and the evaluation of the sensitivity of the affected receptor. The level of effect has additionally been informed using professional judgement and Table X.3 has been a tool which has assisted with this process. For each effect, it has been concluded whether the effect is 'beneficial' or 'adverse'.

Table 12.3 - Matrix to support determining the level of effect

		Sensitivity (or value / importance)			
		High	Medium	Low	Negligible
Magnitude of change / impact	Large	Major	Moderate to Major	Minor to Moderate	Negligible
	Medium	Moderate to Major	Moderate	Minor	Negligible
	Small	Minor to Moderate	Minor	Negligible to Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

12.52 The following are the significance criteria used to assess likely wind conditions as a result of the introduction of the Proposed Development:

- Major Beneficial: Any effect on wind conditions which is expected to improve pedestrian safety, namely an improvement in conditions from being considered to be unsafe to being considered safe. This is considered to be significant.
- Moderate Beneficial: Any effect on wind conditions which is expected to improve pedestrian comfort from unsuitable to suitable for planned activities. This is considered to be significant.

- Minor Beneficial: Any effect on wind conditions which is expected to improve pedestrian comfort from unsuitable to marginal / tolerable for planned activities, or from marginal / tolerable to suitable for planned activities. This is not considered to be significant.
- Negligible: Any effect that does not alter the suitability of existing wind conditions with respect to planned activities. This is not considered to be significant.
- Minor Adverse: Any effect on wind conditions which worsens pedestrian comfort from suitable to marginal / tolerable for planned activities, or from marginal / tolerable to unsuitable for planned activities. This is not considered to be significant.
- Moderate Adverse: Any effect on wind conditions that worsens pedestrian comfort from suitable to unsuitable for planned activities. This is considered to be significant.
- Major Adverse: Any effect on wind conditions adversely affecting pedestrian safety, namely a deterioration in conditions from being considered to be safe to being considered unsafe. This is considered to be significant.

12.53 The duration of the effect has been assessed as either 'short-term', 'medium-term' or 'long-term'. Short-term is considered to be up to 1 year, medium-term is considered to be between 1 and 10 years and long-term is considered to be greater than 10 years.

Determining Significance

12.54 Significance has only been concluded for residual effects (i.e. following the identification of secondary mitigation).

Baseline Conditions

Scenario 1: Existing Baseline

12.55 The results for the existing baseline are presented graphically within Figure 4.1 and Figure 4.2 for worst-seasonal and summer conditions, respectively, within Appendix 12.1. While substantially, the safety criteria for wind are met, there are isolated areas within the Site and immediate surrounds which fail to meet the wind criteria for safety:

- West & northwest of Beetham Tower (locations 68 & 72)
- Great Bridgewater Street (location 92)
- Viaduct level, south-west of Viadux Phase 1 corner (location 119)

12.56 Elsewhere, all locations within the Site and immediate surrounds meet the safety criteria.

12.57 Overall, existing wind conditions are expected to be suitable for existing uses. This includes thoroughfares which are substantially suitable for strolling or better, entrances and the Metrolink Station that are suitable for short-term standing / sitting, and the outdoor seating areas within the Deansgate Locks area.

12.58 Where the comfort criteria are not entirely met:

- Wind conditions at the southwest corner of the Phase 1 tower (location 119) marginally exceed the comfort criteria, being suitable for strolling approximately 93% of the time in the winter.

- Conditions for outdoor seating at the east end of the canal (location 12) also marginally exceed comfort criteria, being suitable for long-term sitting approximately 93% of the time in summer.
- Wind conditions at the street level entrance to Phase 1 (location 90) modestly exceed comfort criteria, being suitable for short-term standing / sitting approximately 93% of the time in winter.

Scenario 1a: Future Baseline

12.59 The results for the future baseline are presented graphically within Figure 4.3 and Figure 4.4 for worst-seasonal and summer conditions, respectively, within Appendix 12.1.

12.60 For the wind tunnel testing, a number of schemes have been considered in the assessment as discussed in section 12.xx with one exception: Hotspur House (138805/FO/2023).

12.61 Hotspur House is located a considerable distance (320m) from the Site and it is located on a non-prevailing wind sector. This scheme is expected not to materially impact the wind conditions within and around the proposed development, nor will the proposed development materially affect conditions around Hotspur House.

12.62 There are several areas within the Site and immediate surrounds which fail to meet the wind criteria for safety within the future baseline scenario:

- Viaduct level 01, south-west corner of Viadux phase 1 (location 119)
- Great Bridgewater Street (locations 90, 91, 92)
- Watson Street (locations 125, 126 & 127)

12.63 Elsewhere, all locations within the Site and immediate surrounds meet the safety criteria.

12.64 In general, wind conditions within the Site are suitable for strolling or better in the worst-season, and are thus suitable for thoroughfare and cycleway use.

12.65 Some areas within the site are somewhat windy for comfortable thoroughfare or cycleway use, particularly in the winter months, in the areas below:

- Great Bridgewater Street (locations 90, 91 & 92) suitable for strolling approximately 93% of the time at worst.
- Viadux podium (location 119) suitable for strolling approximately 92% of the time at worst.

12.66 Within this future baseline scenario, wind conditions at the street level entrances to Phase 1 (locations 87 & 90) exceed comfort criteria, being suitable for short-term standing 94% and 88% of the time in winter. Other entrances are suitable for the intended use.

12.67 Within the wider surrounding area, for the future baseline scenario, wind conditions are generally suitable for existing and planned pedestrian uses, including the use of thoroughfares, cycleways and entrances, the Metrolink platform waiting area and the canalside outdoor seating venues.

12.68 Exceptions are predicted to exist within Watson Street (locations 125, 126) suitable for fast walking in winter (suitable for strolling 92% of the time in winter).

Identification and Evaluation of Likely Significant Effects

Construction Phase

12.69 During the demolition and construction works, there would be potential for wind to blow into and across any open areas of the Site with the potential to inconvenience passers-by. However, given the conditions typical of a construction site, pedestrians moving in the vicinity would be likely to have lowered expectations, in terms of comfort. Construction activity is likely to be less sensitive to general wind conditions due to the nature of the Site during construction (ie site hoardings, restricted site access for workers) compared to when the Proposed Development is completed. Additionally, there would be appropriate health and safety measures implemented (through a Construction Environmental Management Plan (CEMP)) to ensure that the construction workers are adequately protected. Conditions for passers-by would predominantly be suitable for strolling and as a result would be acceptable, in terms of comfort. Conditions within the Site will also be acceptable for construction workers and other Site operatives. In terms of comfort therefore, there is generally a negligible effect of the Development during construction, and that effect is not significant.

Operational Phase

Scenario 2: Existing Baseline plus the Proposed Development

12.70 The results for Plot 2a & Plot 2b are presented graphically within Figure 12.2 for worst-seasonal and Figure 12.3 and Figure 12.4 for summer comfort, respectively.

Safety

12.71 All locations within the site and surrounds satisfy the safety criteria. Two exceptions exist:

- To the west of Beetham Tower – this exceedance is present within the Existing Baseline (scenario 1) and is not introduced by the proposed development.
- Within Great Bridgewater Street (location 96).

Comfort

12.72 With the introduction of Plot 2a & Plot 2b, all thoroughfares and cycleways within the site are suitable for at least strolling throughout the year, and are thus acceptable. This represents a negligible effect that is not considered to be significant.

12.73 Wind conditions at all entrances within the site are suitable for short-term standing/sitting or better, and thus for comfortable pedestrian ingress/egress.

12.74 CFD modelling has predicted marginally windier conditions on the Level 03 podium; nevertheless, wind tunnel testing confirms that the Level 03 podium is generally suitable for short-term standing / sitting or better during summer, with mild exceptions. This represents a negligible-to-minor effect and is therefore not significant.

12.75 Wind tunnel testing indicates that the designated seating areas around the perimeter of Plot 2a are suitable for long-term sitting in summer even though CFD results appeared to be slightly windier. This represents a negligible effect and is therefore not significant.

12.76 Wind conditions within the wider surrounding area are materially the same as they are in scenario 2. Specifically, therefore, wind conditions for the Deansgate Locks outdoor seating are generally suitable for long-term sitting in summer, and where not are similar to conditions within the existing baseline scenario. This represents a negligible effect and is therefore not significant.

12.77 Elsewhere, conditions within the surrounding area are substantially acceptable. This represents a negligible effect and is therefore not significant.

Cumulative Effects

12.78 A number of committed developments have been considered in the assessment as cumulative developments that have been granted planning consent. These schemes are presented in tabular format in Table 12.4.

Table 12.4 – Developments considered within the cumulative context

Development Name	Planning Reference
One City Road	128002/FO/2020
One Medlock Street	135419/FO/2022
10-12 Whitworth Street (Vision)	111003/FO/2016/C1
Plot 10a, First Street	136043/FO/2023
Park Place (Plot G, Great Jackson Street)	129273/FO/2021
Bridgewater House Great Jackson Street	134694/FO/2022
Great Northern Warehouse	135565/FO/2022
Student Castle	121252/FO/2018
Great Jackson Street - Crown Street Plot D (The Lighthouse)	137227/FO/2023
Great Jackson Street Plot C and E (The Green)	137226/FO/2023
Apex Tower	133172/FO/2022
Hotspur House	138805/FO/2023

Scenario 2a: Future Baseline plus the Proposed Development

12.79 The results for the Plot 2a & Plot 2b within cumulative surrounds are presented graphically within Figure 12.5 for worst-seasonal and Figure 12.6 and Figure 12.7 for summer comfort, respectively.

Safety

12.80 Following the introduction of Plot 2a & Plot 2b within cumulative surrounds, the safety criteria are met in a majority of areas within the site and surrounding area. Where so, this represents a negligible effect.

12.81 All locations within the site and surroundings satisfy the safety criteria with two exceptions:

- Within Great Bridgewater Street (location 96). This represents a major adverse effect and is considered to be significant.
- Within Watson Street (locations 125 and 126), though this area is improved relative to the future baseline scenario (scenario 1b) . Correspondingly this represents a negligible effect and is therefore not significant.

Comfort

12.82 With the introduction of Plot 2a & Plot 2b within cumulative surroundings; thoroughfares and cycleways within the site are substantially suitable for at least strolling throughout the year, and are thus acceptable. This represents a negligible effect and is therefore not significant.

12.83 The level 03 podium conditions are broadly suitable for short-term standing/sitting or better in summer, and thus suitable for recreational use. This represents a negligible effect and is therefore not significant.

12.84 Wind conditions within the surrounding area are substantially acceptable following the introduction of Plot 2a & Plot 2b. This represents a negligible effect.

Mitigation Measures

Construction Phase

12.85 Mitigation measures are not currently proposed for the construction phase of the Proposed Development.

Operational Phase

12.86 The assessment above takes into account embedded mitigation, in which wind aspects have formed part of the proposed design. In addition to mitigation which is embedded, additional mitigation has also been considered below:

- Glazed canopy structure at the northern edge of level 01;

Residual Effects

Construction Phase

12.87 There is generally a negligible effect of the Development during construction and that effect is not significant.

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Negligible effects	All	None	N/A	Negligible effects

Operational Phase

Scenario 2b: Existing Baseline plus the Proposed Development with Mitigation Measures

12.88 In all areas but one, wind conditions meet the safety criteria. One exception exists, on Great Bridgewater Street (location 96) where, without mitigation, conditions exceed the wind safety criteria following the introduction of Plot 2a and Plot 2b of the proposed development.

12.89 Initial solutions were examined in the wind tunnel, before being further developed and explored in greater detail via CFD. CFD results show that these mitigation concepts are effective in reducing wind speeds in this location, indicating that while these are not yet finalised components of the design, they do represent concepts that are likely to form part of an eventual solution. This would represent a negligible effect and is therefore not significant.

Scenario 2c: Future Baseline plus the Proposed Development with Mitigation Measures

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Exceedance of safety criteria as a result of the Proposed Development	- Great Bridgewater Street (location 90 & 96)	Glazed canopy structure at the northern edge of level 01	Mitigation to be designed and developed in detail, secured via planning condition.	Major adverse, to be reduced to Negligible upon finalisation of mitigation detail.

Monitoring

12.90 No monitoring of the wind microclimate is recommended.

Reference List

12.91 This ES Chapter has been prepared in reference to the following:

- Lawson, T.V. The determination of the wind environment of a building complex before construction. Bristol : University of Bristol, Department of Aeronautical Engineering, 1990.

Figures

Figure 12. 1 CFD Comparison (Feb 2024 VS Nov 2024

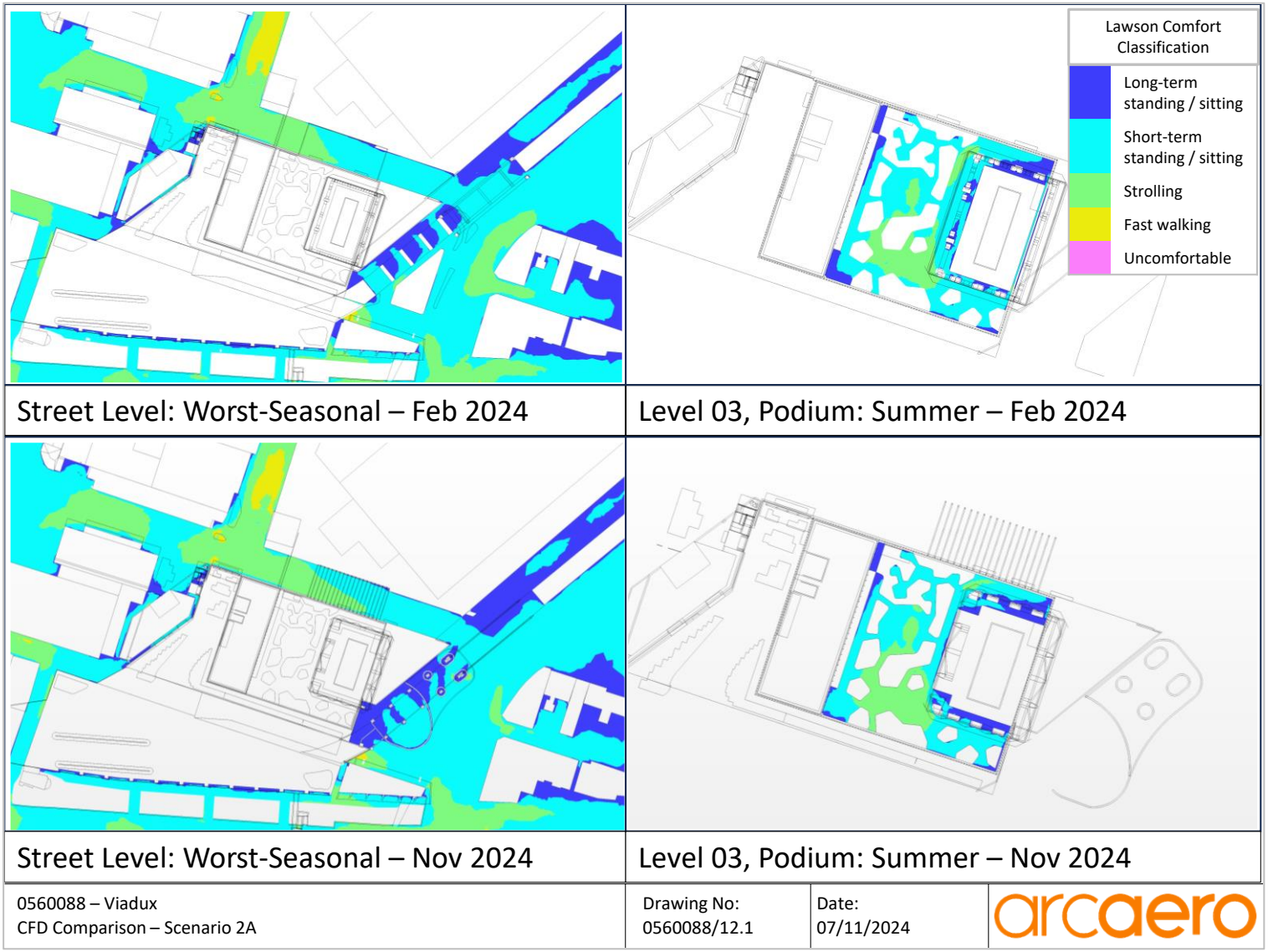
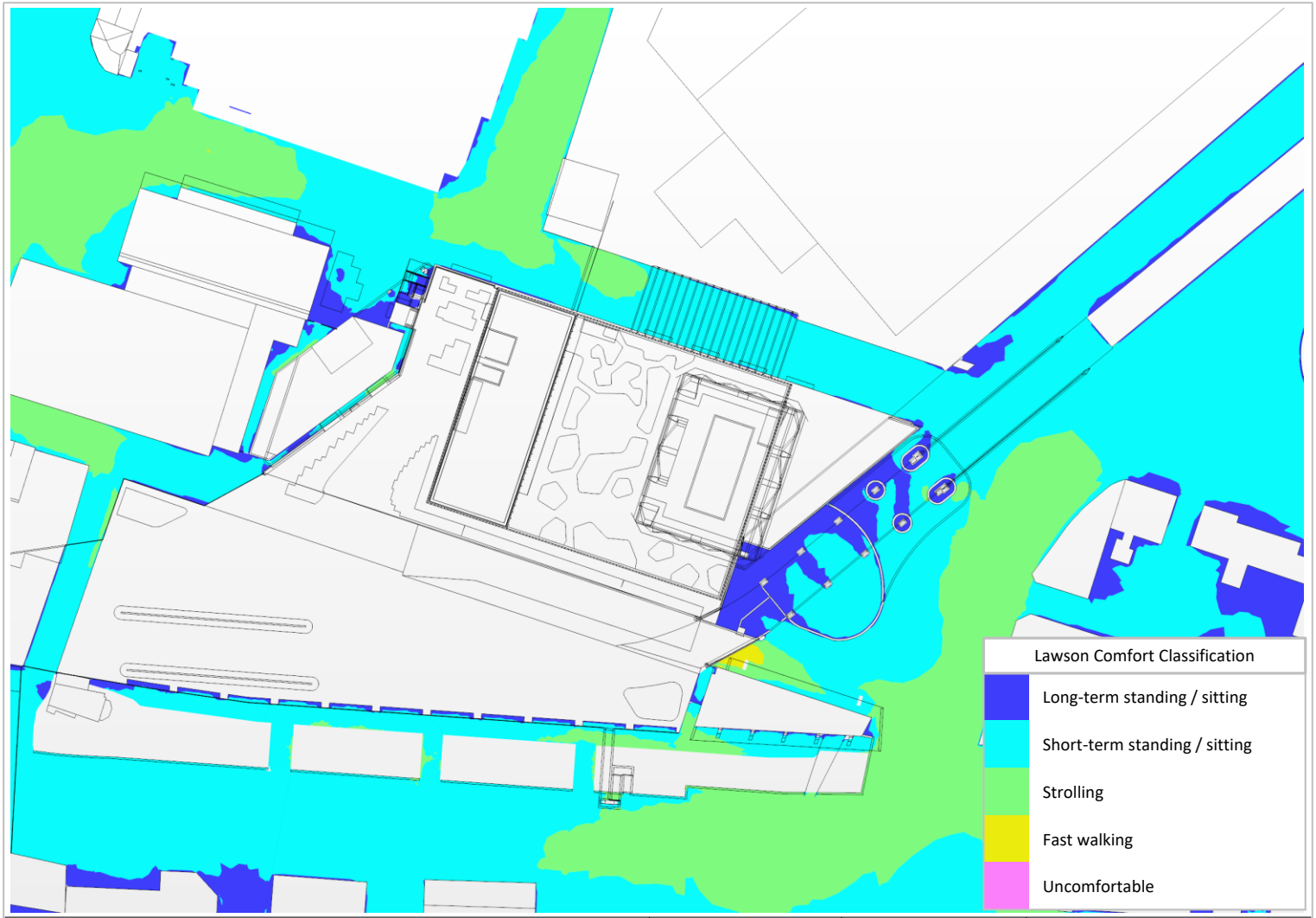
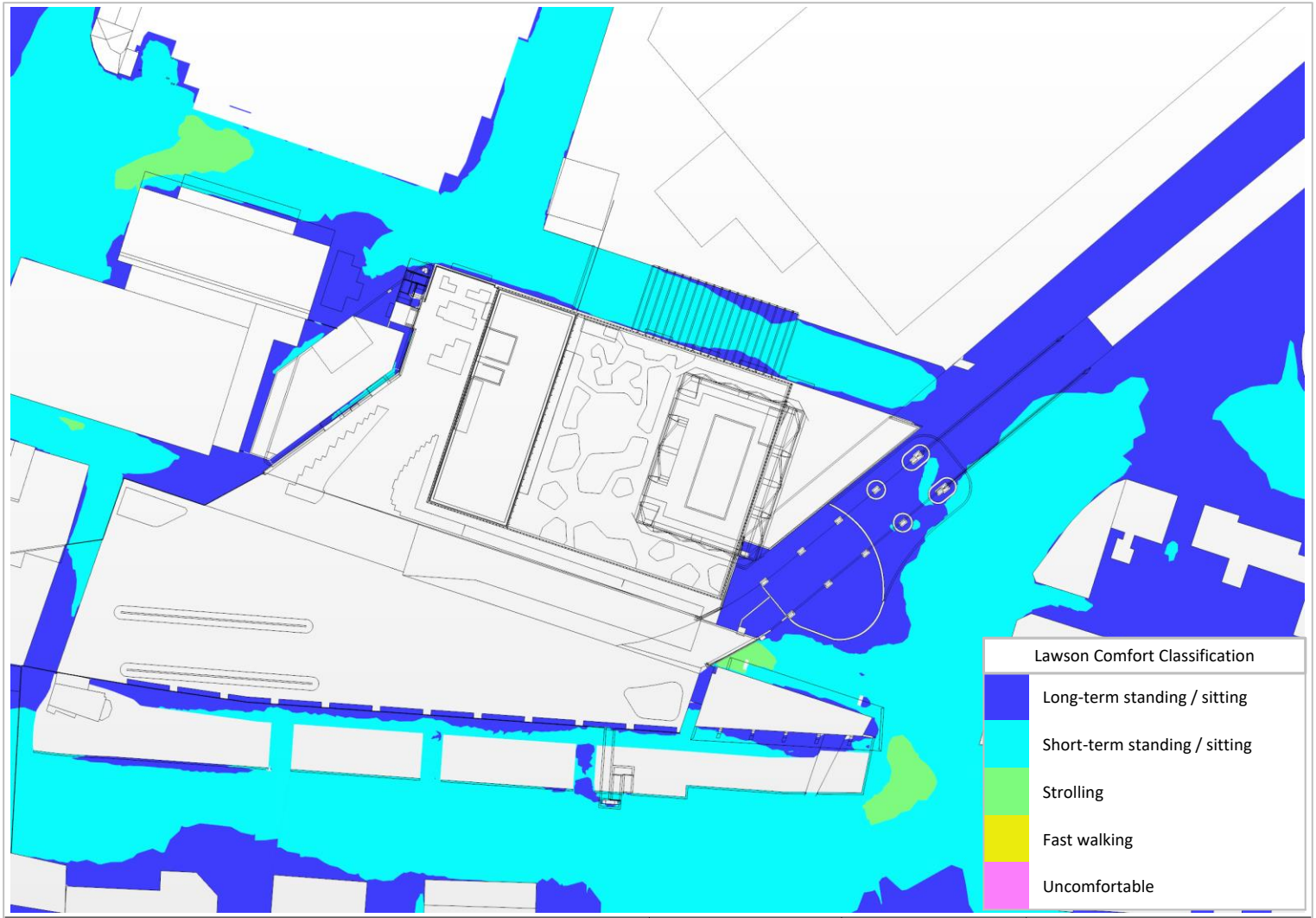


Figure 12.2 - Pedestrian wind conditions, Scenario 2: Existing Baseline with Viadux Plot 2a & Plot 2b with mitigation, 'worst' season



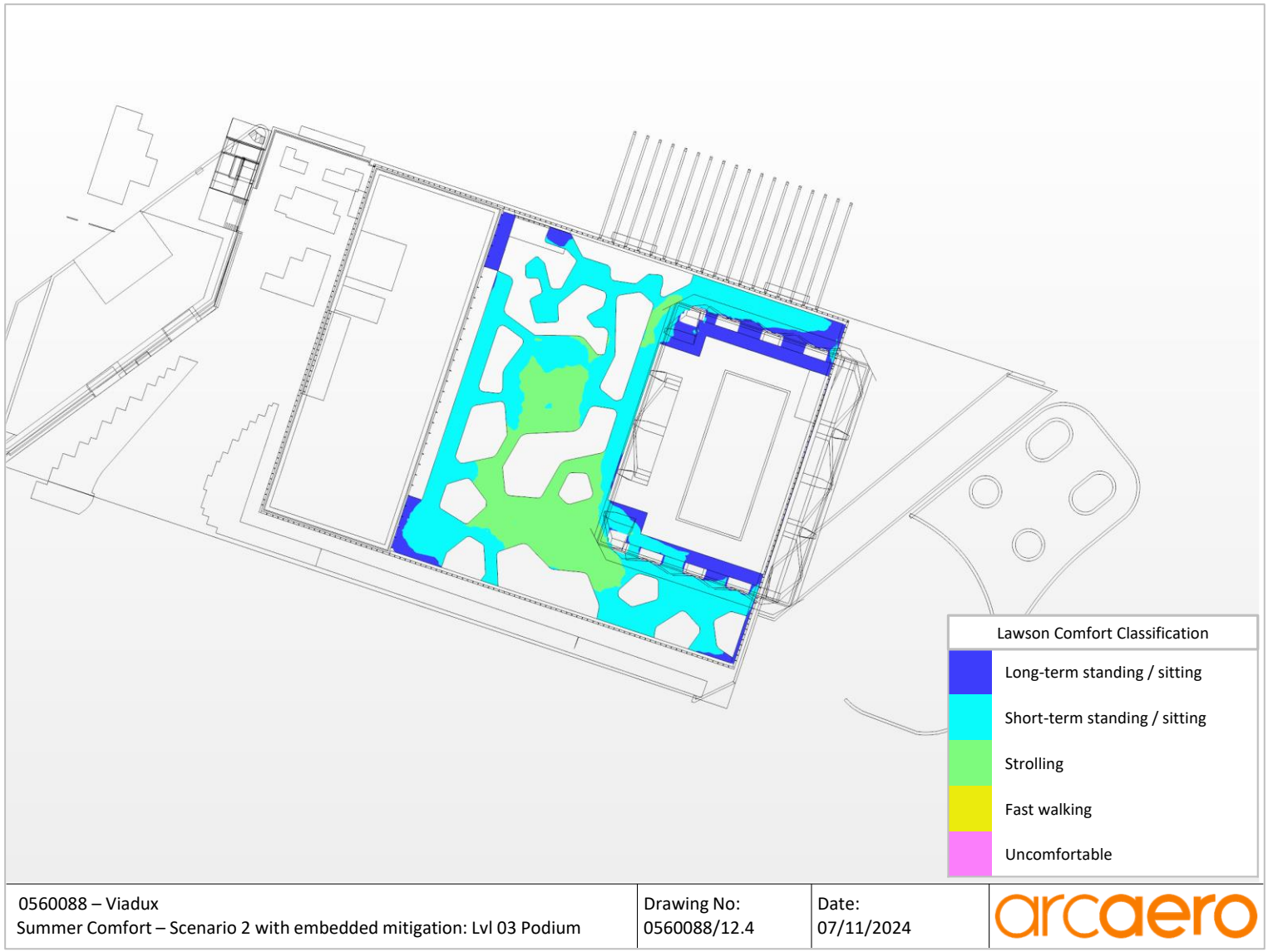
0560088 – Viadux Worst Seasonal Comfort – Scenario 2: Ground	Drawing No: 0560088/12.2	Date: 07/11/2024	arcaero

Figure 12.3 - Pedestrian wind conditions, Scenario 2: Existing Baseline with Viadux Plot 2a & Plot 2b with mitigation,, summer



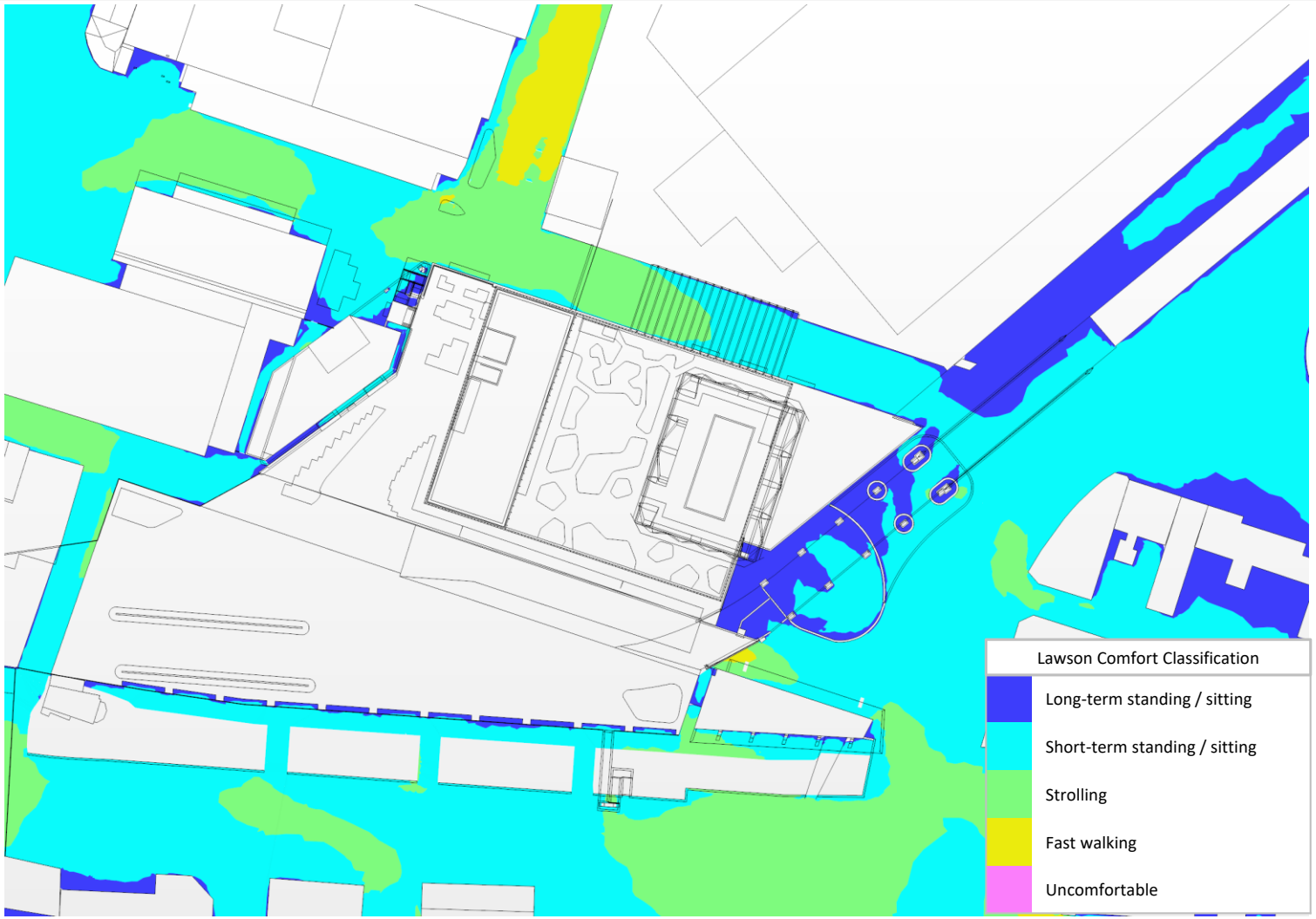
0560088 – Viadux Summer Comfort – Scenario 2: Ground	Drawing No: 0560088/12.3	Date: 07/11/2024	arcaero

Figure 12.4 - Pedestrian wind conditions , Scenario 2: Existing Baseline with Viadux Plot 2a & Plot 2b with mitigation, summer



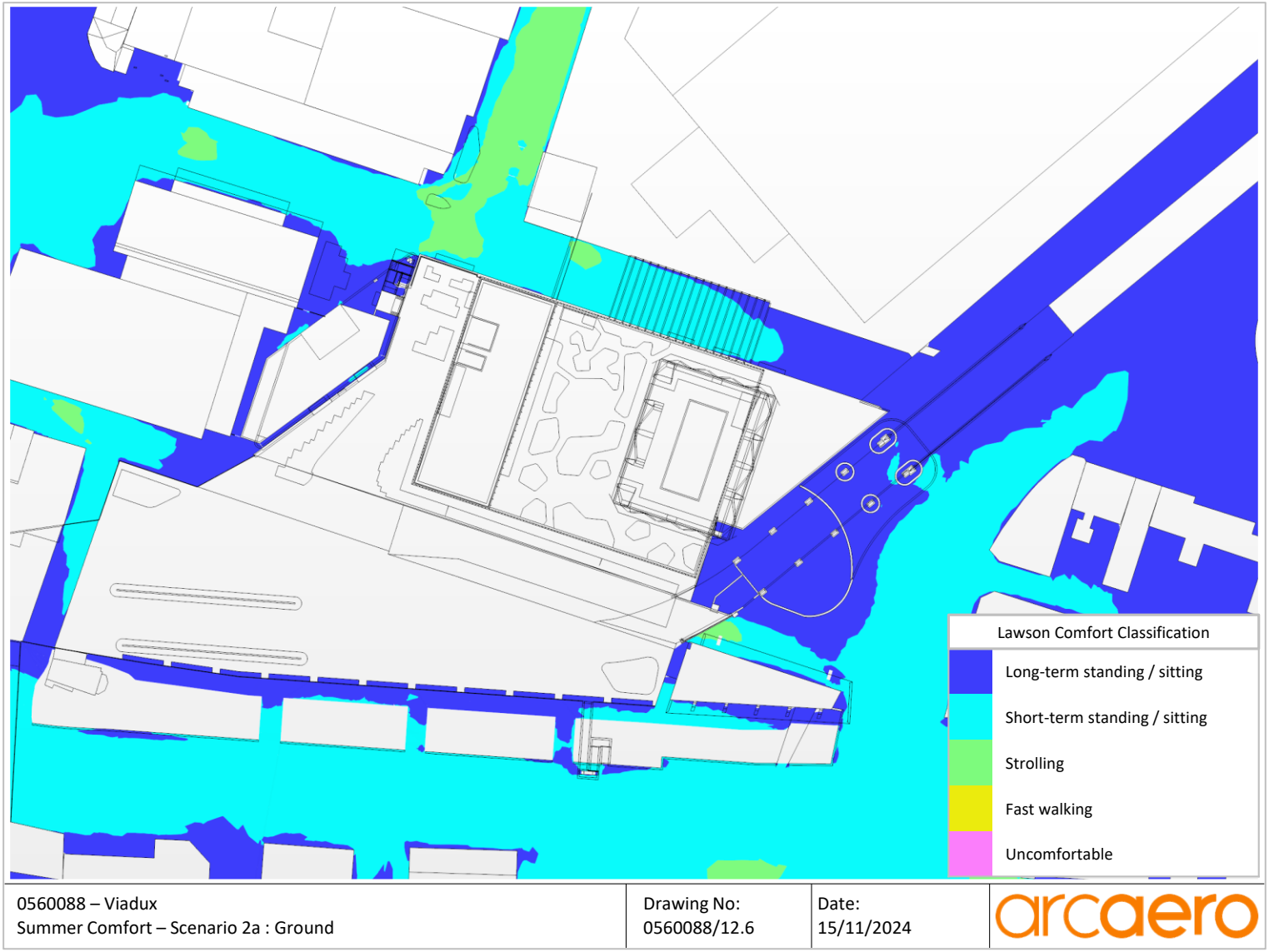
0560088 – Viadux Summer Comfort – Scenario 2 with embedded mitigation: Lvl 03 Podium	Drawing No: 0560088/12.4	Date: 07/11/2024	arcaero

Figure 12.5 - Pedestrian wind conditions, Scenario 2a: Existing Baseline with Viadux Plot 2a & Plot 2b plus cumulative with mitigation, worst’



0560088 – Viadux Worst Seasonal Comfort – Scenario 2a : Ground	Drawing No: 0560088/12.5	Date: 15/11/2024	arcaero

Figure 12.6 - Pedestrian wind conditions, Scenario 2a: Existing Baseline with Viadux Plot 2a & Plot 2b plus cumulative with mitigation, summer



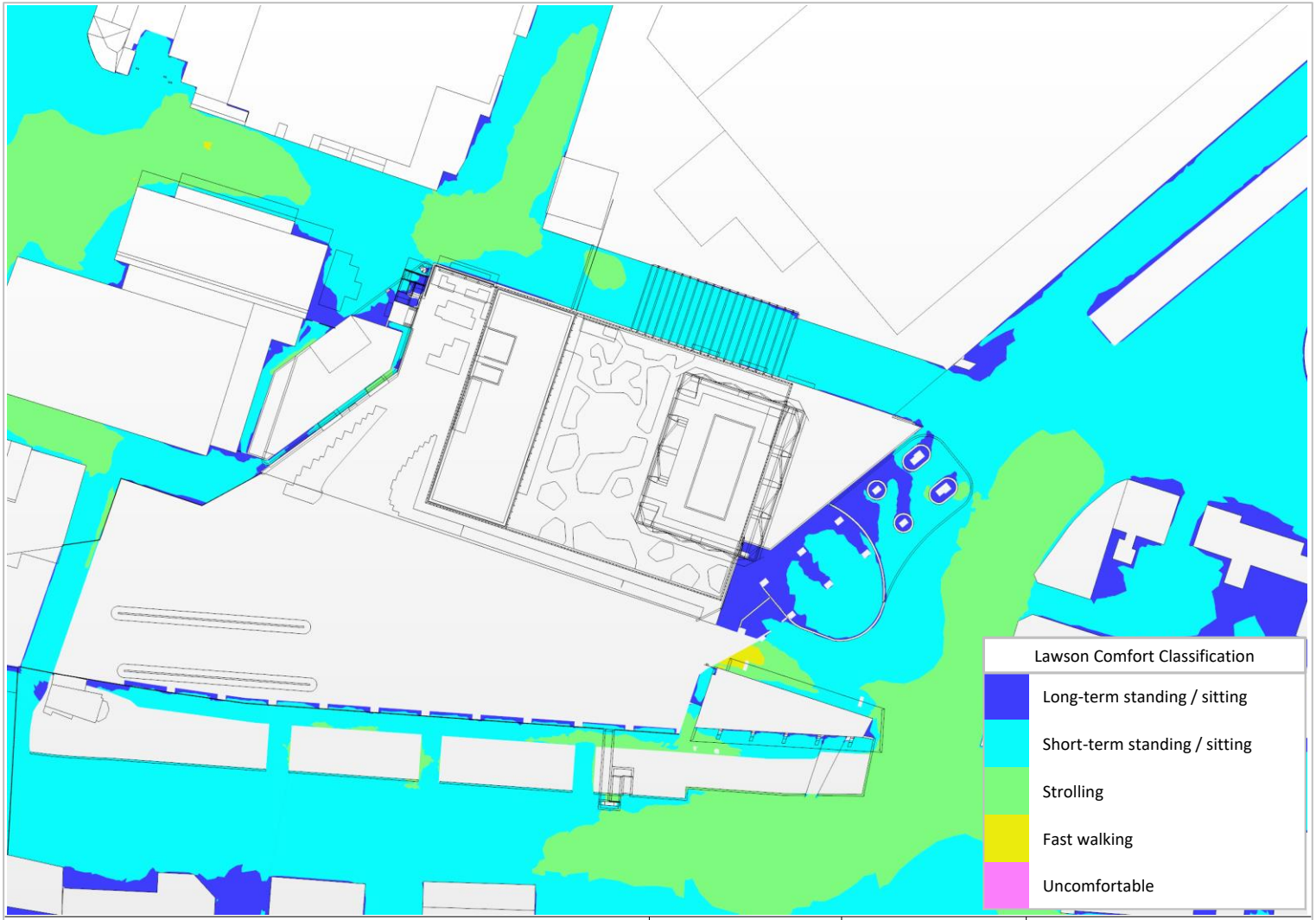
0560088 – Viadux Summer Comfort – Scenario 2a : Ground	Drawing No: 0560088/12.6	Date: 15/11/2024	arcaero

Figure 12.7 - Pedestrian wind conditions, Scenario 2b: Existing Baseline with Viadux Plot 2a & Plot 2b plus cumulative with mitigation, summer



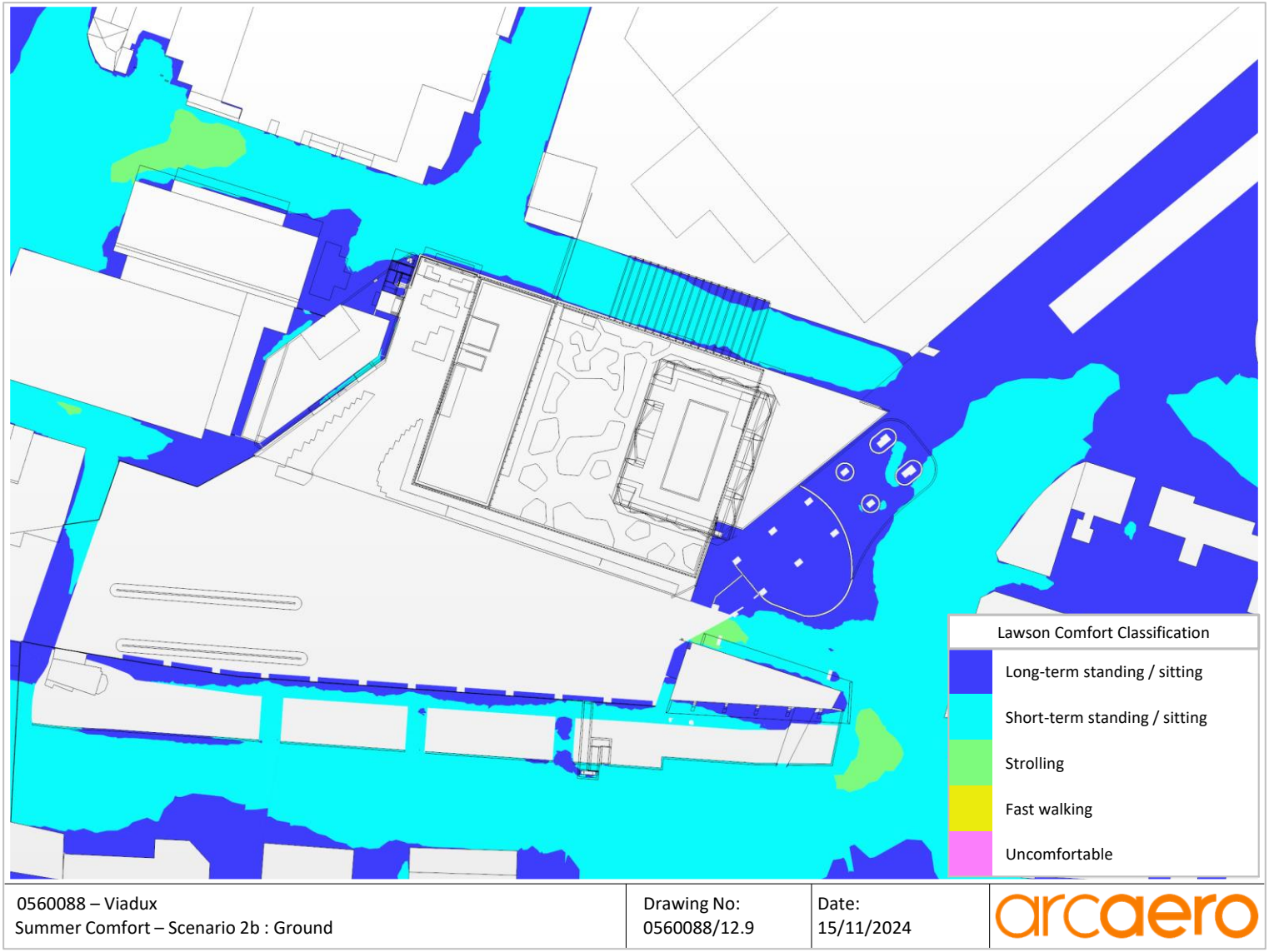
0560088 – Viadux Summer Comfort – Scenario 2a : Level 03 Podium	Drawing No: 0560088/12.7	Date: 15/11/2024	arcaero

Figure 12.8 - Pedestrian wind conditions, Scenario 2b: Existing Baseline with Viadux Plot 2a & Plot 2b with all mitigation measures, 'worst' season



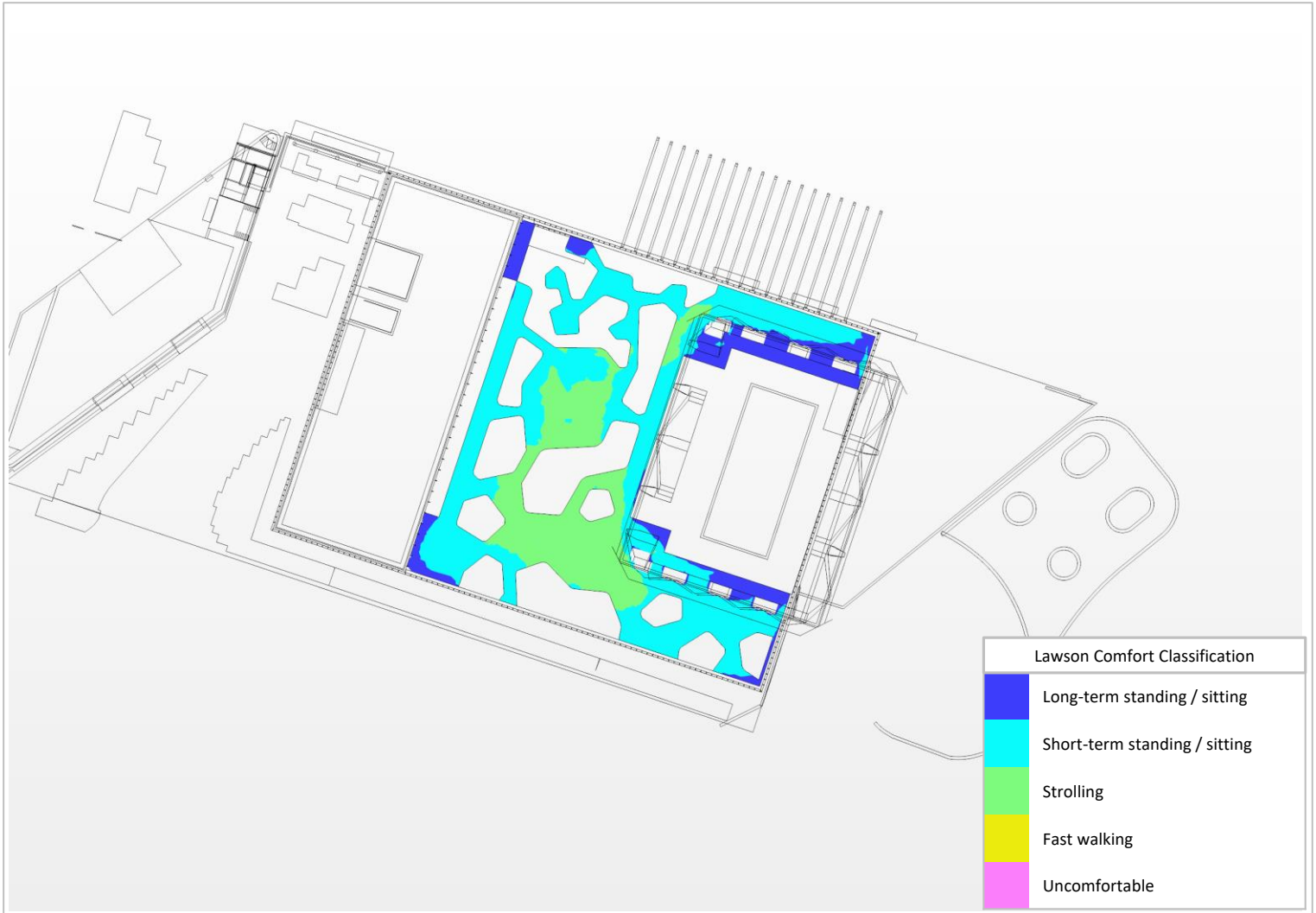
0560088 – Viadux Worst Seasonal Comfort – Scenario 2b : Ground	Drawing No: 0560088/12.8	Date: 15/11/2024	arcaero

Figure 12.9 - Pedestrian wind conditions, Scenario 2b: Existing Baseline with Viadux Plot 2a & Plot 2b with all mitigation measures, summer



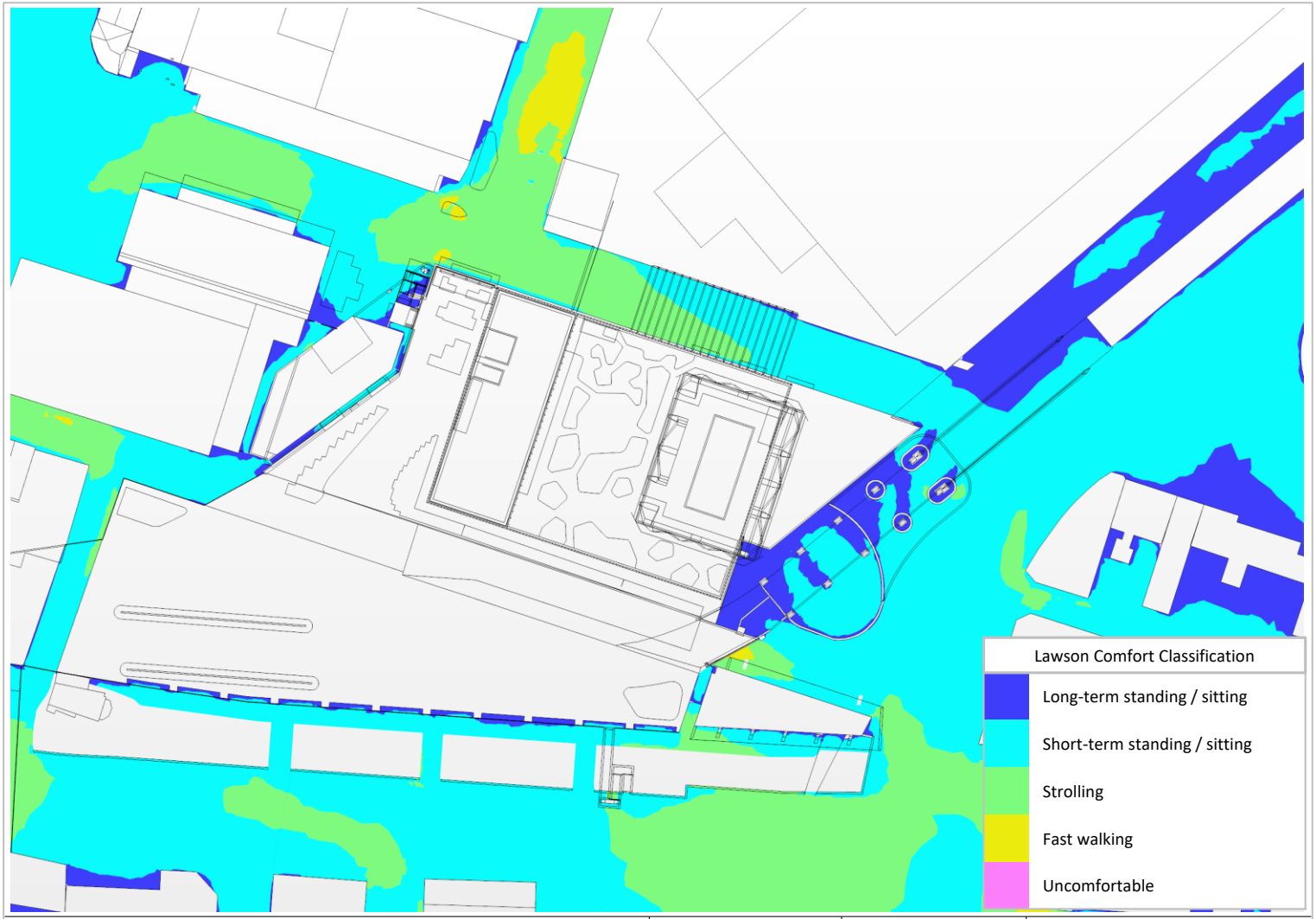
0560088 – Viadux Summer Comfort – Scenario 2b : Ground	Drawing No: 0560088/12.9	Date: 15/11/2024	arcaero

Figure 12.10 - Pedestrian wind conditions, Scenario 2b: Existing Baseline with Viadux Plot 2a & Plot 2b with all mitigation measures, summer



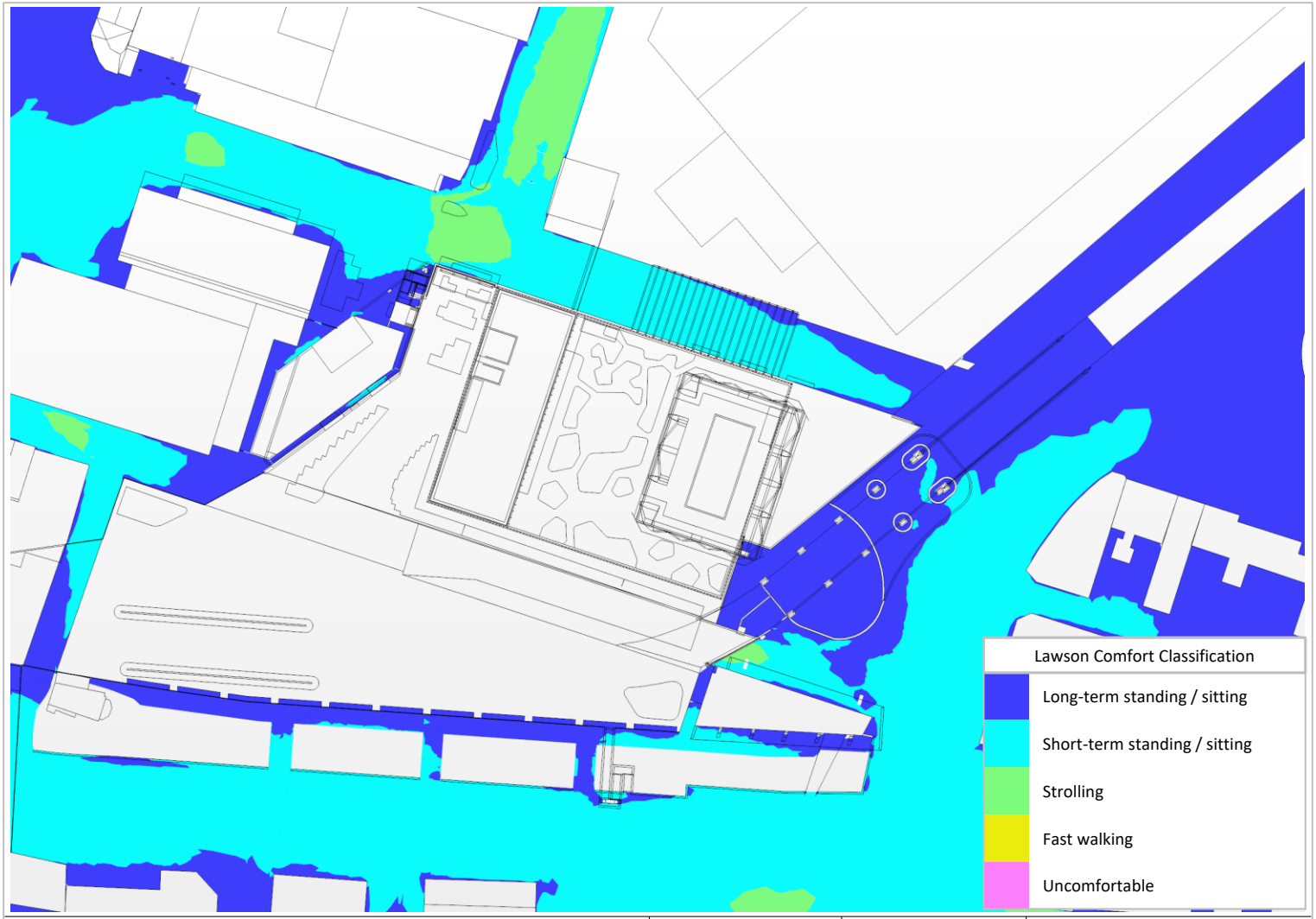
0560088 – Viadux Summer Comfort – Scenario 2b : Level 03 Podium	Drawing No: 0560088/12.10	Date: 15/11/2024	arcaero

Figure 12.11 - Pedestrian wind conditions, Scenario 2c: Existing Baseline with Viadux Plot 2a & Plot 2b plus cumulative with all mitigation measures, 'worst'



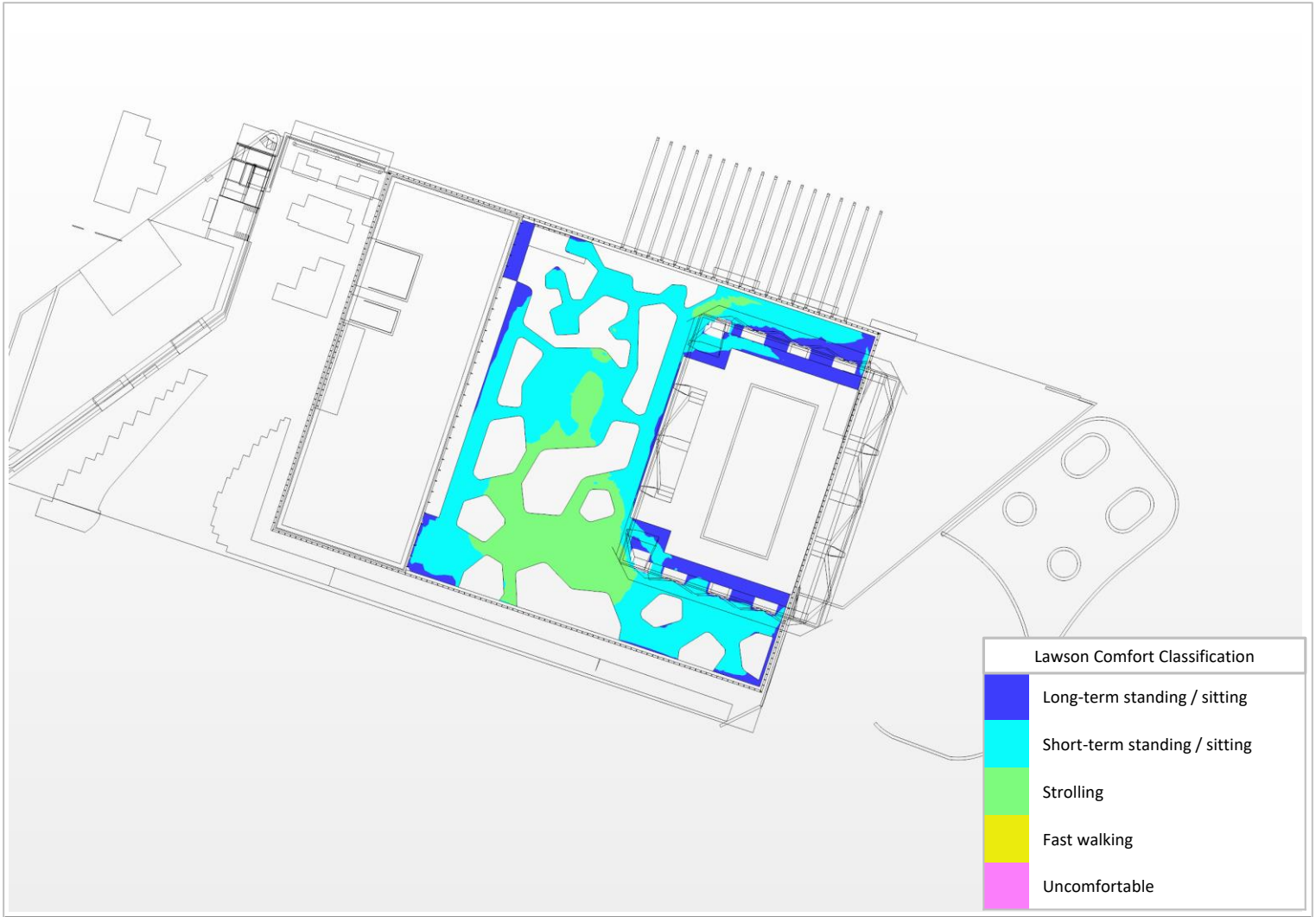
0560088 – Viadux Worst Seasonal Comfort – Scenario 2c : Ground	Drawing No: 0560088/12.11	Date: 15/11/2024	arcaero

Figure 12.12 - Pedestrian wind conditions, Scenario 2c: Existing Baseline with Viadux Plot 2a & Plot 2b plus cumulative with all mitigation, summer



0560088 – Viadux Summer Comfort – Scenario 2c : Ground	Drawing No: 0560088/12.12	Date: 15/11/2024	arcaero

Figure 12.13 - Pedestrian wind conditions, Scenario 2c: Existing Baseline with Viadux Plot 2a & Plot 2b plus cumulative with all mitigation, summer



0560088 – Viadux Summer Comfort – Scenario 2c : Level 03 Podium	Drawing No: 0560088/12.13	Date: 15/11/2024	arcaero

13. Climate Change

Introduction

13.1 This Chapter of the ES has been prepared by Ridge and Partners LLP and asseses the impact of the Proposed Development on climate change and the climate change resilience of the Proposed Development.

13.2 This Chapter is accompanied by the following appendices:

- Energy Strategy Report
- EUI Prediction Technical Note
- Embodied Carbon Technical Note

The authors of this Chapter have the following qualifications and experience.

	Lead Author	Reviewer
Name	Susie Sidley	Sarah Chipchase
Company	Ridge & Partners	Ridge & Partners
Qualifications/Accreditations relevant to technical area	BSc Environmental Science MA Environment & Business Chartered Environmentalist (CEnv)	BSc Geography MSc EIA, Auditing & EMS
Does the practitioner hold any IEMA qualification?	Yes- Full Member of IEMA	Yes – IEMA Practitioner
Company hold IEMA QMark?	No	
Years technical experience (in technical area)	19	22
Number of EIA's delivered to date	5	/

13.3 The chapter describes the methods used to assess the impacts, the baseline conditions currently existing at the site and surroundings, the potential direct and indirect impacts of the development arising in relation to climate change, in particular, the impact of the

Proposed Development on climate change (i.e. the nature and magnitude of greenhouse gas emissions) as well as the vulnerability of the Proposed Development itself to climate change, the mitigation measures required to prevent, reduce, or offset the impacts and the residual impacts.

13.4 When discussing 'carbon' in relation to climate change, this is a term used to cover all greenhouse gas emissions and is measured in terms of CO2 equivalent (CO2eq).

Assumptions and Limitations

13.5 This section sets out the assumptions made in the assessment including potential limitations to the information used.

13.6 The assessment is based on a 60-year life span for the proposed development in accordance with RICS Whole Life Carbon guidance.

13.7 The assessment of construction stage CO2eq emissions has been based on assumptions to give a best estimate of the scheme's impact at this stage. The actual quantity of CO2eq emissions is likely to be different to this as will vary depending on the final construction materials, construction methods etc. , however the conclusions drawn in this report are likely to remain the same.

13.8 Assumptions were made to further supplement the information provided by the design team. These are based on reasonable industry standards and on our experience with similar building projects. These assumptions were verified with the design team / client team and are listed below.

13.9 Due to the early stage of modelling, a project cost plan was not made available to verify that 95% of the cost of each major element (e.g., substructure, superstructure) is included in the modelling, in line with RICS 'Whole Life Carbon' guidance. However, the information provided by the design team has covered the full scope of works for Plots 2a and 2b and no 'in scope' items have been knowingly excluded from the model.

13.10 Transport impacts (Module A4) have been included in line with the RICS 'Whole Life Carbon' guidance. No specific product specific transport details have been included.

13.11 Construction impacts (Module A5) have been included in line with assumed fuel usage and waste production values across the full construction period of the Proposed Development as follows:

- Site Waste: 6.5t per 100m2 gross internal area based on BRE good practice site waste guidance (BREEAM New Construction v6, credit Wst 01).

- Site Energy Use: 23.58kWh; 1.12l diesel and 0.05l petrol all per m2 gross floor area (based research conducted on construction site operations in temperate climatic regions, provided by One Click LCA software).

13.12 For concrete specifications, information provided by Renaissance Ltd for the likely strength, reinforcement and cement replacement rates have been used.

13.13 For the external facades, Environmental Product Declarations (EPDs) from Kawneer curtain walling have been used as these have been indicated to be the likely product and manufacturer for the scheme.

13.14 At this stage, high level allowances for mechanical & electrical installations have been made based on information provided by the design team, using 'typical' apartment and hotel building services package as reference to extrapolate across the whole design.

13.15 Information provided by the design team has been used to account for finishes, sanitaryware, fittings and furnishings across the scheme. Non-fixed fittings, furnishings and equipment have been excluded from the assessment scope.

13.16 Where no Environmental Product Declarations information or specific product references have been provided, generic UK EPDs have been selected matching the closest description to the materials detailed on the documents provided, with assumed recycled contents aligning with RICS 'Whole Life Carbon' Guidance.

13.17 Module B1 (Emissions in Use) has been accounted for using values for refrigerant charge provided by the design team. R32 and R1234ze have been included as the operational refrigerant types and annual / end-of life have been assumed as 2% and 1% respectively for package systems, and 6% and 3% respectively for VRF systems, in line with TM65 guidance.

13.18 Modules B2 (Maintenance) and B3 (Repair) have been assumed at 10kgCO2eq/m2 GIFA and 2.5kgCO2eq/m2 GIFA respectively, in accordance with GLA Whole Life carbon assessment methodology (London Plan Guidance: Whole Life Carbon Assessments).

13.19 Module B4 (Replacement) has been incorporated in the form of default product service lives for each material, based on RICS Whole Life Carbon guidance. For example, unitised curtainwalling systems and internal finishes have an assumed expected lifespan of 35 years and 10 years respectively.

13.20 Module C1 (Deconstruction / Demolition) has been assumed based on UK average demolition impacts relative to gross floor area, as provided by RICS / One Click LCA software.

13.21 Modules C2-C4 (Waste Transportation, Waste Processing & Waste Disposal) are assumed based on end-of-life processing chains relative to each material, as provided by One Click LCA software.

13.22 Operational regulated CO2eq emissions have been calculated using the SAP and BRUKL calculations. Actual emissions are likely to be different to the estimations provided, depending on both detailed design and operational use of the buildings. It is not possible to fully understand, at this time, how energy use and emissions will vary, but it has been assumed that energy use will remain the same, year on year, throughout the assessment period. Unregulated energy use has been estimated based on industry benchmarks but could vary substantially when the proposed development is operational. It is not possible to accurately predict this energy use at this stage in design.

13.23 The assessment of the impacts of climate change on the Proposed Development are based on a number of assumptions about the future effects of climate change. The climate change predictions used within the climate resilience assessment are based on the most recent UK Climate Projections published in 2018 (UKCP18) developed by the UK Climate Impacts Programme (UKCIP). These are based on the assumption of a high emissions scenario (worst case).

Relevant Legislation, Policy and Guidance

Legislation

Climate Change Act 2008

13.24 The Climate Change Act 2008 committed the UK to an 80% reduction in carbon emissions relative to the levels in 1990, to be achieved by 2050. In June 2019, secondary legislation was passed that extended that target to require that the UK reduce all greenhouse gas emissions to net zero by 2050 relative to 1990 levels. In April 2021 the Government confirmed its intention to ratify 'The Sixth Carbon Budget' which effectively requires a 78% reduction in UK territorial emissions between 1990 and 2035.

Policy

National Planning Policy

13.25 Section 14 of the National Planning Policy Framework (NPPF) specifically addresses the challenge of climate change. It states that: '…New development should be planned for in ways that:

(a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and

(b) can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the government's policy for national technical standard Local Plan and supplementary guidance...'

Places for Everyone Joint Development Plan

13.26 The Places for Everyone Joint Development Plan (2024) is the document for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan. With respect to climate change and sustainability considerations, the following policies are included within the Places for Everyone Joint Development Plan.

Policy JP-S2: Carbon and Energy

13.27 This policy states that 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:

- Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy, heating and cooling;
- Promoting the use of life cycle cost and carbon assessment tools to ensure the long-term impacts from development can be captured;
- Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities;
- Increasing the range of nature-based solutions including carbon sequestration through the restoration of peat-based habitats, woodland management, tree-planting and natural flood management techniques;

13.28 There is an expectation that new development will, unless it can be demonstrated that it is not practicable or financially viable;

Be net zero carbon which applies:

- from adoption– to regulated operational carbon emissions;
- from 2028 - to all emissions 'in construction'.

13.29 From 2025 development should also calculate and minimise carbon emissions from unregulated emissions alongside regulated emissions. Development proposals should set out how this has been achieved in an energy statement in accordance with the energy hierarchy, which in order of importance seeks to:

a. Minimise energy demand;
b. Maximise energy efficiency;
c. Use renewable energy;
d. Use low carbon energy; and
e. Utilise other energy sources.

13.30 From 2025 any residual carbon emissions that cannot be fully mitigated on-site should be offset, in agreement with the relevant local planning authority through a financial contribution to a carbon offset fund. As an interim measure, development should be consistent with the 2022 Part L Building Regulations unless superseded by changes to building regulations and/or national or local planning policies.

13.31 Development will be expected to incorporate adequate electric vehicle charging points, in line with Part S of the Building Regulations, unless superseded by relevant Local Plan policies, to future proof for the likely long-term demand, taking account of the potential maximum energy demand for the site;

13.32 Where practicable, development will prioritise connection to a renewable energy/heating/cooling network in the first instance or a low carbon energy/heating/cooling network that is adaptable to non-fossil fuels at a later date;

13.33 Residential developments will be expected to achieve energy demand reductions in terms of space heat demand; hot water energy demand and the delivery of on-site renewable energy generation.

13.34 For renewable energy generation priority should be given to PV installation where technically feasible, alternative technologies will be appropriate where the equivalent generation is evidenced.

13.35 Applications should include a detailed energy statement to demonstrate via site relevant evidence how the development has sought to maximize reductions in carbon emissions in line with relevant policy targets, including the minimisation of overheating risks and appropriate measures for post occupancy evaluation.

13.36 Whole life cycle emissions should be considered where possible. Districts may set out specific carbon emission reduction and energy demand targets within Local Plans.

Policy JP-S4: Flood Risk and the Water Environment

13.37 This policy states that Greater Manchester is located within a complex hydrological network that extends into surrounding districts and beyond. This means that individual areas cannot be viewed in isolation, as rainfall and activities in one place can have significant impacts on the water environment in other locations.

Climate change is expected to significantly increase peak river flows and surface water run-off as a result of more intense rain events, potentially placing many more properties at risk in the future unless flood defences, drainage and run-off management are improved. A coordinated catchment-wide approach to all types of flood risk will be required to address these challenges and minimise potential harm to people and property, including actions upstream of Greater Manchester.

13.38 Sustainable Drainage System (SuDS) schemes can provide appropriate solutions to addressing both flood risk and water quality issues and are mandatory for major development unless clear evidence indicates that they would be inappropriate. Development proposals should achieve greenfield run-off rates where possible, depending on site conditions. Alternative surface water discharge rates can be set out in district local plans to reflect local circumstances and evidence. In addition to the general need to improve water quality, the Environment Agency has defined source protection zones for groundwater sources such as wells, boreholes and springs used for public drinking water supply. The control of potentially contaminating activities is particularly important in these locations.

13.39 It is important that water is conserved and efficiently used as much as possible to help build resilience to periods of drought; avoid over abstraction; reduce carbon emissions from water treatment and disposal; and protect river and wetland habitats from degradation. All new homes have to meet mandatory national standard set out in Building Regulations (of 125 litres/person/day). Where there is a clear local need, the government's Housing Optional Technical Standards paragraph 013 and 014 set out that local authorities may also consider tighter water efficiency requirements for new homes (110 litres a day) to help manage water demand.

Policy JP-P1 Sustainable Places

13.40 This policy states that the aim to become one of the most liveable city regions in the world, consisting of a series of beautiful, healthy and varied places, each having key attributes that all development, wherever appropriate, should be consistent with. The list of attributes includes:

- Resilient, capable of dealing with major environmental events
- Adaptable, able to respond easily to varied and changing needs and technologies
- Durable, being built to last and using robust materials that reflect local character, weather well and are easily maintained
- Resource-efficient with:

- low carbon footprint
- Efficient use of land;
- Minimised use of new materials;
- High levels of recycling

Manchester Core Strategy

13.41 The Manchester Core Strategy (2012) is the Adopted Development Plan for Manchester City Council. With respect to climate change and sustainability considerations, the following policies are included within the Manchester Local Plan Core Strategy (2012). Relevant extracts are provided below.

Policy EN4: Reducing CO2 Emissions by Enabling Low & Zero Carbon Development

13.42 This policy requires development to 'follow the principle of the Energy Hierarchy, being designed:

- to reduce the need for energy through design features that provide passive heating, natural lighting and cooling.
- to reduce the need for energy through energy efficient features such as improved insulation and glazing
- to meet residual energy requirements through the use of low or zero carbon energy generating technologies'

13.43 It also sets out the following actions:

- '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.
- The use of building materials with low embodied carbon in new development & refurbishment schemes.'

Policy EN5: Strategic Areas for low and zero carbon decentralised energy infrastructure

13.44 This policy sets a requirement for key developments to consider being part of or providing an anchor to a new local energy network.

13.45 Within specific strategic areas (including the Oxford Street corridor) new development, regeneration and retrofit projects, will be expected to take place in the context of more detailed proposals for decentralised low and zero carbon energy infrastructure in the form of energy proposals plans. The Council will work with all relevant stakeholders, which may include developers, landowners, residents, community groups, private sector partners, utilities companies, neighbouring authorities, and other public sector bodies, as appropriate, to bring forward such plans.

13.46 Where investment or development is being undertaken into or adjacent to a public building/asset or district heating network, full consideration shall be given to the potential role that these can have in providing an anchor load within a decentralised energy network or in creating opportunities for CO2 reduction funded by contributions.

Policy EN6: Target Framework for CO2 reductions from low or zero carbon energy supplies

13.47 This policy sets a requirement for non-residential developments of over 1,000m2 to achieve a minimum performance target as shown in the table below unless this can be shown not to be viable.

13.48 The policy states that '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'.

Table 13.0.1 Minimum required % CO2 improvement for Policy EN6

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

Policy EN 8 Adaptation to Climate Change

13.49 This policy requires all new development 'to be adaptable to climate change in terms of the design, layout, siting & function of both buildings & associated external spaces. In achieving developments which are adaptable to climate change developers should have regard to the following, this is not an exhaustive list:

- Minimisation of flood risk by appropriate siting, drainage, and treatment of surface areas to ensure rainwater permeability

- Reduction in urban heat island effect through the use of Green Infrastructure such as green roofs, green walls, increased tree cover and waterways
- The need to control overheating of buildings through passive design
- The opportunity to provide linked and diverse green space to enhance natural habitats which will assist species adaptation

13.50 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'.

Policy EN 14 Flood Risk

13.51 This policy states that:

- 'In line with the risk-based sequential approach contained within PPS25, development should be directed away from sites at the greatest risk of flooding, and towards sites with little or no risk of flooding; this should take account of all sources of flooding identified in the Manchester-Salford-Trafford Strategic Flood Risk Assessment (SFRA).
- In addition to the requirements for site-specific Flood Risk Assessments (FRAs) set out in PPS25, an appropriate FRA will also be required for all development proposals, including changes of use, on sites greater than 0.5ha within Critical Drainage Areas (CDAs) and Canal Hazard Zones identified in the SFRA.
- All new development should minimise surface water run-off, including through Sustainable Drainage Systems (SUDS) and the appropriate use of Green Infrastructure.
- Developers should have regard to the surface water run-off rates in the SFRA User Guide. In CDAs, evidence to justify the surface water run-off approach / rates will be required.
- The City of Manchester contains many sections of rivers which are culverted or 'hidden'; where these are indicated in the SFRA beneath the proposed development site, further investigation will be required and the development proposal should take this into account; where feasible and appropriate development should seek to open up culverted/hidden rivers to reduce the associated flood risk and danger of collapse, taking advantage of opportunities to enhance biodiversity and Green Infrastructure.'

Guidance

IEMA (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance (2nd Edition)

13.52 This document is the key guidance for assessing the impact of a project on climate change. It reflects the 2019 amendment to the UK's legally binding Climate Change Act 2008 in response to the Paris Agreement, setting a new and challenging target to reduce UK GHG emissions to net zero by 2050, accounting for residual emissions which are offset. The guidance confirms that all emissions contribute to climate change, however specifically in the EIA context it provides relative significance descriptions to assist assessments. It sets out levels of significance which are not solely based on whether a project emits GHG emissions alone, but how

the project makes a relative contribution towards achieving a science-based 1.5°C aligned transition towards net zero.

IEMA (2020) EIA Guide to: Climate Change Resilience & Adaptation

13.53 This document provides guidance for considering the vulnerability of a project to climate change (climate change resilience). It provides a framework for the effective consideration of climate change resilience and adaptation in the EIA process.

RIBA (2021) RIBA 2030 Climate Challenge v2

13.54 The Royal Institute of British Architects (RIBA) have developed the RIBA 2030 Climate Challenge which sets out voluntary performance targets which set out a challenging path to achieve the reductions needed so that the UK building stock can achieve net zero carbon by 2050. The 2030 Climate Challenge have been developed by the RIBA consultation with experts across the industry. The targets consider the latest recommendations from the Green Construction Board and are aligned with other built environment professional bodies.

13.55 The RIBA 2030 Climate Challenge targets for residential buildings are shown in Table 13.0.2 below.

Table 13.0.2 RIBA 2030 Climate Challenge CO2eq targets for residential buildings

RIBA Sustainable Outcomes Metrics	Business as Usual	2025 Targets	2030 Targets
Operational Energy kWh/m2/y	120kWh/m2/y	<60kWh/m2/y	<35kWh/m2/y
Embodied Carbon kgCO2e/m2	1200kgCO2e/m2	<800kgCO2e/m2	<625 kgCO2e/m2

Assessment Methodology and Significance Criteria

Scenarios Tested

13.56 The baseline for the assessment is Scenario 1 (Site as is today). Scenario 1 is considered as the baseline (do nothing) as this represents the current situation (i.e. zero emissions) and will therefore enable a clear indication of the climate change impacts of the Proposed Development.

13.57 The assessment has considered Scenario 2 (Baseline + Viadux Plot 2a + Viadux Plot 2b) as this will enable an undertaking of the worst possible scenario in terms of carbon emissions.

13.58 Scenario 2a (Baseline* + Viadux Plot 2a + Viadux Plot 2b + cumulative) has not been assessed. The assessment of cumulative effects in conjunction with other developments in the area

presents a challenge from a climate change standpoint. All carbon emissions contribute to climate change and therefore all sources of these emissions result in cumulative effects, regardless of location.

13.59 It is unreasonable for the purposes of a planning application to quantify all sources of emissions from other third-party developments for the following reasons:

- The emissions from other developments fall under Scope 3[1], which do not form part of the assessment under the methodology outlined.
- Large technical data requirements from other developments which are not accessible.
- A significant interlinking scope of assessment that would exceed that expected of planning application for any one development.
- It is not feasible to undertake a high-level chemical assessment to analyse likely synergistic impacts between different emissions from varying developments.
- Complicated, unpredictable chemical reactions driven by atmospheric, climatic, and behavioural factors beyond the applicant's control.

13.60 For the Climate Change Resilience assessment, no inter-project cumulative effects are anticipated on the basis that climate change adaptation effects and impacts are specific to the development. While climate change will impact other developments, it is not within the scope of this work to assess that.

The Study Area

13.61 The study area for the assessment of the impact on climate change is the boundary of the Proposed Development but also encompasses emissions arising outside of this boundary, including the embodied emissions associated with construction materials, and the emissions associated with the transportation of materials and workers to site and removal of waste from the site.

13.62 The study area for the climate change resilience assessment is the Proposed Development itself.

Source of Effect

13.63 In accordance with the EIA regulations this chapter will address:

- The impact of the Proposed Development on climate change, in line with IEMA (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance
- The vulnerability of the Proposed Development to climate change (climate change resilience) in line with IEMA (2020) EIA Guide to: Climate Change Resilience & Adaptation

[1]Note- Scope 3 encompasses indirect carbon emissions

Data Sources

13.64 Given the current stage of the project, there is insufficient detail (e.g. Bill of Quantities) to undertake a full Whole Life Carbon (WLC) assessment to accurately determine the GHG emissions associated with the Proposed Development. However, CO2eq emissions has been estimated using high level Life Cycle Assessment (LCA) modelling using estimated materials and assumptions in line with typical benchmarks, initial energy modelling and use of predicted travel data from the transport assessment. In line with IEMA Guidance (2022) a reasonable worst-case approach has been undertaken.

13.65 The following information has been used to inform the assessment:

- Operational Energy Calculations (SAP) as detailed in the EUI Prediction Technical Note
- Embodied Carbon Calculation using One-Click LCA software as detailed in the Embodied Carbon Technical Note
- Transport Assessment

Significance Criteria

Impact of the Proposed Development on climate change

13.66 IEMA guidance has been used as a basis for assessing the significance of both construction and operational impacts. This guidance states that: 'The crux of significance'… 'is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050.'

13.67 Significance should therefore be measured against how the Proposed Development's whole life GHG emissions align with the UK's net zero carbon compatible trajectory.

Receptors

13.68 The receptor for assessment of the impact of the Proposed Development on climate change is the global climate. The receptor is considered to be of high sensitivity.

Magnitude

13.69 Magnitude will be determined in accordance with Table 13.3 which is based on the IEMA (2022) Guide and references the RIBA 2030 Climate Challenge v2 (2021).

Table 13.3 Impact on climate change - determining magnitude

Magnitude of Impact	Criteria for assessing impact
Major Adverse	The project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero. For example, the project's GHG emissions are in line with the 'Business as Usual' thresholds set out within the RIBA 2030 Climate Challenge.
Moderate Adverse	The project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero. For example, the project's GHG emissions are in line with the '2025' targets set out within the RIBA 2030 Climate Challenge.
Minor Adverse	The project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero. For example, the project's GHG emissions are in line with the '2030' targets set out within the RIBA 2030 Climate Challenge.
Negligible	The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions. For example, the project's GHG emissions exceed the '2030' targets set out within the RIBA 2030 Climate Challenge.

Significance

13.70 The significance of an environmental impact is determined by the interaction of magnitude and sensitivity, whereby the impacts can be positive or negative. The Impact Significance Matrix is set out in Table 13.4.

Table 13.4 Impact on climate change - significance matrix

	Sensitivity		
Magnitude	High	Moderate	Low
Major	Major Adverse/Beneficial	Major - Moderate Adverse -Beneficial	Moderate - Minor Adverse -Beneficial
Moderate	Major Adverse/Beneficial	Moderate Adverse – Beneficial	Minor Adverse/Beneficial
Minor	Minor Adverse/Beneficial	Minor Adverse/ Beneficial	Negligible
Negligible	Negligible	Negligible	Negligible

Climate Change Resilience Assessment

13.71 To assess the vulnerability of the Proposed Development to climate change, a climate change resilience assessment in line with the Environmental Impact Assessment Guide to: Climate Change

Resilience & Adaptation (IEMA, 2020) has been undertaken using the following approach.

Receptors

13.72 Receptor groups will be identified and their sensitivity will be determined based on the susceptibility of the receptor (e.g. ability to be affected by a change – low, medium or high) and the vulnerability of the receptor (i.e. potential exposure to a change – low, medium or high).

- Low susceptibility: receptor has the ability to withstand/not be altered much by the projected changes to the existing/prevailing climatic factors (e.g. retain much of its original function and form).
- Moderate susceptibility: receptor has some limited ability to withstand/not be altered by the projected changes to the existing/prevailing climatic conditions.
- High susceptibility: receptor has no ability to withstand/not be substantially altered by the projected changes to the existing/prevailing climatic factors.
- Low vulnerability: Climatic factors have little influence on the receptors.
- Moderate vulnerability: receptor is dependent on some climatic factors but able to tolerate a range of conditions.
- High vulnerability: receptor is directly dependent on existing/prevailing climatic factors and reliant on these specific existing climate conditions continuing in future or only able to tolerate a very limited variation in climate conditions.

13.73 Table 13.5 identified how the sensitivity of receptors is determined.

Table 13.5 Climate resilience - sensitivity of receptors

	1 (Low vulnerability)	2 (Moderate vulnerability)	3 (High vulnerability)
1 (Low susceptibility	1 (Low sensitivity)	2 (Low sensitivity)	3 (Moderate sensitivity)
2 (Medium susceptibility)	2 (Low sensitivity)	4 (Moderate sensitivity)	6 (High sensitivity)
3 (High susceptibility)	3 (Moderate sensitivity)	6 (High sensitivity)	9 (High sensitivity)

Magnitude

13.74 Magnitude will be based on a combination of likelihood (the chance of the effect occurring over the lifespan of the Proposed Development if the risk is not mitigated) and consequence (which will reflect the geographical extent of the effect or the number of receptors affected, the complexity of the effect, degree of harm to those affected and the duration, frequency and reversibility of effect).

- Low likelihood: The event may occur once or on limited occasions during the lifetime of the development.

- Moderate likelihood: The event may occur several times during the lifetime of the development.
- High likelihood: The event will occur on multiple occasions during the lifetime of the development.
- Low consequence: Minor disruption to business operations / no risk to building occupants / no damage to buildings / infrastructure.
- Moderate consequence: Some disruption to building operations / slight risk to building occupants / slight damage to buildings / infrastructure.
- High consequence: Major disruption to business operations / risk to building occupants / significant damage to buildings / infrastructure.

13.75 Magnitude will be determined in accordance with Table 13.6.

Table 13.6 Climate resilience - determining magnitude

	1 (Low consequence)	2 (Moderate consequence)	3 (High consequence)
1 (Low likelihood)	1 (Minor magnitude)	2 (Minor magnitude)	3 (Moderate magnitude)
2 (Moderate likelihood)	2 (Minor magnitude)	4 (Moderate magnitude)	6 (Major magnitude)
3 (High likelihood)	3 (Moderate magnitude)	6 (Major magnitude)	9 (Major magnitude)

Significance:

13.76 The significance of an environmental impact is determined by the interaction of magnitude and sensitivity, whereby the impacts can be positive or negative. The impact Significance Matrix is set out in Table13.7.

Table13.7 Climate resilience - determining significance

Magnitude	High	Sensitivity Moderate	Low
Major	Major Adverse/Beneficial	Major - Moderate Adverse -Beneficial	Moderate - Minor Adverse -Beneficial
Moderate	Major Adverse/Beneficial	Moderate Adverse – Beneficial	Minor Adverse/Beneficial
Minor	Minor Adverse/Beneficial	Minor Adverse/Beneficial	Negligible
Negligible	Negligible	Negligible	Negligible

Baseline Conditions

Impact of the Proposed Development on climate change

13.77 In relation to the impact of the Proposed Development on climate change, i.e. CO2eq emissions, the baseline is a scenario whereby the Proposed Development does not proceed and the site remains as it is. As the site is vacant there are no significant GHG emissions associated with the site in the baseline scenario. It is proposed that Scenario 1 (Existing baseline as the site is today) is used for this assessment. If the development does not proceed, it is assumed

that the site would remain undeveloped and therefore there would be no change in CO2eq emissions associated with the site.

Climate change resilience

Current climate

13.78 The existing baseline for the climate change resilience assessment is the current climate in the location of the Proposed Development. Historic climate data obtained from the Met Office website (accessed November 2024) recorded by the closest meteorological station to the Proposed Development (Woodford Station) for the 30-year climate periods of 1981-2010 and 1991-2020 is summarised in Table 13.8 and shows an increase in the average annual maximum daily temperature.

Table 13.8 Historic climate data for Woodford Station

Climate Period	1981-2010		1991-2020	
Climatic factor	Month	Figure	Month	Figure
Average annual maximum daily temperature (°C)	-	13.2°C	-	13.6°C
Warmest month on average (°C)	July	20.2°C	July	20.7°C
Coldest month on average (°C)	January	6.9°C	January	7.1°C
Mean annual rainfall levels (mm)	-	867.05mm	-	868.40mm
Wettest month on average (mm)	October	98.83mm	December	96.98mm
Driest month on average (mm)	February	51.46mm	March	52.53mm

13.79 The Met Office baseline climate averages for the NW England and N Wales District (Met Office website, accessed November 2024) identify gradual warming between 1961 and 2010. Information on mean maximum annual temperatures (°C) and average annual rainfall (mm) is summarised in Table13.9.

Table13.9 Historic climate data for the NW England and N Wales District

Climate Period	Mean maximum annual temperatures (°C)	Mean annual rainfall (mm)
1961-1990	11.75°C	1260.08mm
1971-2000	12.04°C	1274.77mm
1981-2010	12.35°C	1304.57mm
1991-2020	12.66°C	1337.87mm

13.80 The Met Office website (accessed November 2024) confirms that past severe weather events in the last 5 years have included record breaking heatwaves, severe flooding, severe winter weather with significant snowfalls, and storm and high wind events.

Future climate

13.81 UK Climate Projections published in 2018 (UKCP18) have been developed by the UK Climate Impacts Programme (UKCIP) to

provide projections for future climate scenarios and trends. Table 13.10 below provides a summary of predications for summer and winter changes by the 2070s (Met Office, 2019).

Table 13.10 Future climate estimates under a high emissions scenario (England)

Summer rainfall change	Winter precipitation change	Summer temperature change	Winter temperature change
57% drier to 3% wetter	2% drier to 33% wetter	1.1 °C warmer to 5.8 °C warmer	0.7 °C warmer to 4.2 °C warmer

Identification and Evaluation of Likely Significant Effects

Construction Phase

Impact on Climate Change

13.82 Construction of the Proposed Development will result in CO2eq emissions associated with construction transport (i.e. HGV movements and the transportation of the workforce) and emissions associated with the use of energy on site for construction activities.

13.83 Construction works will also result in carbon emissions associated with the embodied carbon within construction materials. Embodied carbon is the total greenhouse gas emissions generated to produce a built asset. This includes emissions caused by extraction, manufacture/processing, transportation and assembly of every product and element in an asset. It may also include the maintenance, replacement, deconstruction, disposal and end-of-life aspects of the materials and systems that make up the asset (UK Green Building Council, 2017).

13.84 Ridge and Partners LLP have undertaken an Embodied Carbon study for the Proposed Development. The study covers Plots 2A and 2B. The modelling results are based on Stage 2 design information and assumed material quantities where necessary to provide a best estimate of the scheme's impact at this stage.

13.85 In line with IEMA Guidance, mitigation for reducing the embodied carbon emissions have already been incorporated into the design of the Proposed Development. This includes:

- Basing the design on the principles of adopting the most efficient structural design with minimum material usage as this typically results in the most cost effective and lowest embodied carbon solution.
- Cement replacement to the Raft Foundations and Lower Structural Columns based on information provided by Renaissance Ltd.

13.86 All available information was collected from the team to form the most accurate picture of the proposed scheme as possible, however it is acknowledged that some elements for the Proposed Development rely on more detailed information being developed by the team during the upcoming design stages. The headline results are reported in Table 13.11.

Table 13.11 Embodied CO2eq emissions

Embodied Carbon (Modules A1-A5, B1-B4 & C1-C4)	
tCO2eq	kgCO2eq/m2 GIFA
76,779	836

13.87 Interrogating the reported carbon totals further, Figure 13.1**Error! Reference source not found.** sets out the embodied carbon impacts for the scheme across the study period's 60-year lifetime (Modules A1-A5, B1-B4 & C1-C4) for each building element. This demonstrates that the concrete frames are the most significant material impact across the scheme by some margin, with 32% of the total embodied carbon impact of the scheme being attributed to reinforced concrete columns, core walls and floor slabs.

13.88 This is due to the significant coverage of these elements and the carbon intensity of cement production (which is used within the concrete). Likewise, the significant coverage of external wall glazing and building services result in significant contributions to the embodied carbon total.

To put the above results into context, the Proposed Development is within 5% the RIBA 2025 Target for residential buildings (800kgCO2eq/m2). This therefore equates to a Moderate Adverse Effect.

Operational Phase

Impact on Climate Change

13.89 The operation of the Proposed Development will result in CO2eq emissions associated with energy used within the buildings and CO2eq emissions associated with the transport of people to and from the buildings.

Operational Energy

13.90 The operation of the Proposed Development will result in carbon emissions associated with energy usage for heating, cooling, ventilation, lighting, and electrical equipment, which will therefore result in an increase in emissions compared to the baseline scenario. There will also be carbon emissions associated with unregulated energy, e.g. plug-in equipment such as white goods and small power.

13.91 An Energy Strategy Report has been prepared by Ridge. This sets out the embedded mitigation measures which are already included within the Proposed Development to maximise the energy efficiency of the Proposed Development in accordance with the Energy Hierarchy.

13.92 Measures incorporated into the design include:

- Passive Design Measures:
- Use of U values and air permeability rates that exceed minimum Building Regulation Standards 2021
- Natural / Mixed Mode Ventilation
- Natural Daylight
- Energy Efficiency Measures:
- Mechanical Ventilation Heat Recovery
- LED Lighting
- High efficiency/Low specific fan power (SFP's) ventilation fans
- Demand Operated Systems
- Variable Speed operation of mechanical plant
- Power Management
- BMS
- Renewable and Low Carbon Technologies:
- Air to water source heat pumps

13.93 The measures listed above have been incorporated to minimise energy consumption and exceed the requirements of the Building Regulations Part L 2021 (adopted 2022).

13.94 Energy Use Intensity (EUI) is the benchmark used within the RIBA 2030 Climate Challenge. Given the stage of design, a detailed calculation of EUI has not been undertaken. Instead, the EUI has been estimated using SAP and BRUKL calculations which have been undertaken to demonstrate compliance with Part L 2021.

13.95 For the hotel element of Plot 2A, the BRUKL can be used to establish an indicative EUI figure based on Part L methodology. The resultant summary table from the BRUKL certificate (Table 13.12) illustrates the predicted energy use for Regulated (Heating, Cooling, Auxiliary, Lighting & Hot Water) and Unregulated (equipment) energy. However, the RIBA 2030 Challenge does not set a target for hotel developments. Therefore, it is not possible to benchmark this element. However, as the hotel element is performing better than Building Regulations standards, an effect of Moderate Adverse is considered appropriate.

Table 13.12 Energy Consumption by End Use for the Hotel Element of Plot 2A, taken from the BRUKL document

Energy Consumption by End Use [kWh/m^2]		
	Actual	**Notional**
Heating	4.93	8.17
Cooling	4.11	1.12
Auxiliary	13.07	15.49
Lighting	9	12.05
Hot water	33.83	40.91
Equipment*	80.62	80.62
TOTAL**	**64.93**	**77.74**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

13.96 The total predicted EUI for the hotel is therefore 145.56 kWh/m2/yr (the regulated energy (33.83kWh/m2/yr), plus the unregulated energy (80.62 kWh/m2/yr)

13.97 For the residential element of Plot 2A and 2B the EUI has been estimated using the sample SAP calculations which have been completed for sample apartments. The SAP calculations provide a primary energy figure which accounts for predicted heating, hot water, systems and lighting but excludes unregulated energy. The Ridge & Partners Building Physics Team has made a reasonable assumption of a suitable unregulated energy (small power) figure for Plots 2A and 2B based on the RIBA 2030 Climate Challenge residential target energy proportions and UK Government data from 2019 on existing new residential buildings.

13.98 The RIBA 2030 Climate Challenge indicates that unregulated energy accounts for around 45% of the overall energy usage in low energy residential buildings as shown in Figure 13.13Error! Reference source not found. .

Table 13.13 Energy Consumption in New Domestic Buildings in England and Wales (2015-2017)

EPC Rating	First Year of Consumption	Avg. Energy Consumption per m² (kWh/m²)	Avg. Electricity Consumption per m² (kWh/m²)	Avg. Gas Consumption per m² (kWh/m²)	Number of Properties
A	2015	117	34	83	1,225
A	2016	113	32	81	1,710
A	2017	113	29	84	1,453
B	2015	127	35	92	69,066
B	2016	124	33	91	89,915
B	2017	122	31	90	98,584

13.99 Table 13.13 shows the electricity consumption of EPC ratings A & B based on Government data, with an average figure coming out at 32.75kwh/m2/yr. As this figure does include lighting as well as unregulated energy, this would outline a worst-case scenario. 32.75kwh/m2/yr was considered against the SAP calculations as the initial unregulated energy figure however this illustrated a small power ratio between 45.5-52.9%. This unregulated energy figure prorated to 45% for each SAP sample provides an average unregulated energy estimate of 29.46kWh/m2/yr. With consideration that the Proposed Development is currently under design five years on from the gathered government data, this should provide a robust estimate.

13.100 The mean primary energy consumption across the three sample dwellings is 32.73kWh/m2/yr, using 29.46kWh/m2/yr as small power, this predicts an EUI for the building at 62.19kWh/m2/yr.

13.101 .The EUI figure for Plots 2a and 2b is within 5% of the 2025 target for domestic buildings as set out within the RIBA 2030 Challenge (60kWh/m2/yr). This therefore equates to a Moderate Adverse Effect.

Operational Transport

13.102 The Proposed Development is ‘car-free’ and no car parking spaces are proposed. All trips generated are for servicing, access or taxis. The Transport Assessment confirms that 85% of all trips are estimated to occur by sustainable modes of travel. Furthermore, the Site occupies a highly sustainable location, accessible by a range of sustainable travel modes, and well-placed to facilitate access on foot to a wide variety of everyday facilities, amenities, employment locations, leisure destinations and transport hubs.

13.103 Given the location of the site within Manchester City Centre and the high levels of accessibility the Transport Assessment predicts that most trips to and from the Site by residents will be on foot. Furthermore, the proposed retail uses are assumed to trade off the residents and office workers associated with the proposed development are not expected to generate vehicle activity independent of that, except for servicing and waste functions. While there will be some operational CO2eq emissions associated with taxis and deliveries, these are considered to be negligible.

13.104 Therefore, the operation of the Proposed Development will result in non-significant CO2eq emissions associated with operational transport. Given the Proposed Development is 'car free' it is in line with a trajectory towards net zero carbon emissions. It is therefore predicted that there will be a negligible impact on climate change in terms of operational transport.

Impact of Climate Change on Proposed Development

13.105 Given the relatively short timescale for the construction phase and its temporary nature, it is not considered that there will be any significant effects associated with the construction phase in relation to the climate change resilience assessment. This assessment considers the operation of the completed development only.

13.106 Mitigation measures for reducing the potential impact of climate change on the development have been incorporated into the design. These are as follows:

- Building positioned towards northern end of site with appropriate falls. Ground to be reprofiled with gullies, channel drains, and permeable surfaces used.
- Provision of Blue Roof System to provide attenuation and restrict the surface water outflow from the roof into the below ground drainage network below.
- Drainage system to reduce discharge by at least 70% and designed with a 45% climate change allowance.
- Design of building and roof mitigated against the risk of high winds and all doors to be on restrictive stays to prevent them slamming shut unintentionally from wind.
- Cooling plant selection based on projected future temperatures. Provision of 'Peak Loop Cooling' in all of the corner apartments in the form of a heat pump MVHR unit.
- Heating plant selection based on projected temperatures. Adequate preheating to limit thermal lag on occupation.
- Include use of waste heat on air-based equipment to raise operating temperatures.
- The whole external fabric is designed as a weathertight structure. Roof and external wall materials will be guaranteed to perform for a minimum of 25 years.
- Low flush volume WCs and low flow rate taps will be specified to minimise water demand.
- Install a major leak detection system to identify leaks.
- Shut off valves will be installed on the water supply to WC areas which will stop the water supply to these areas when they are not in use, thereby minimising the impact of any minor water leaks in these areas.
- Pulsed output water meters will be installed on the water supply to each building so that occupants can monitor their water usage.
- The roofs will be fully designed for snow loads.
- Selection of hardy plants for the landscaping scheme.
- Fully investigate ground conditions and ensure the structure and main slab components are designed to accommodate ground conditions.

13.107 Table 13.0.1 identifies the potential impacts associated with climate change, the receptors affected (and the sensitivity of those receptors), the magnitude of the impact (likelihood*consequence

of impact) and the overall significance (based on mitigation already incorporated).

Table 13.4 Climate Change Resilience Assessment

Hazard	Impact	Embedded Mitigation	Receptor	Likeli-hood	Conseq-uence	Magnitu-de	Significa-nce
Increased flooding	Rising Flood levels can cause inundation of basements and ground floor accommodation. See the FRA.	Building positioned towards northern end of site with appropriate falls. Ground to be reprofiled with gullies, channel drains, and permeable surfaces used. Drainage system to reduce discharge by at least 70% and designed with a 45% climate change allowance.	Buildings and infrastructure (Moderate sensitivity)	1	3	Moderate	Moderate
Increased likelihood of storms (including high winds)	High winds can result in a risk of structural damage to buildings and reduction of mechanical ventilation capacity.	Structural engineers to ensure design of buildings and roofs mitigated against the risk of high winds. Intake and exhaust positions protected from direct wind impact.	Buildings and infrastructure (Moderate sensitivity)	1	3	Moderate	Moderate
	Risk to the safety of building occupants from doors slamming.	Use of anti-door slam products.	Building occupants (Moderate sensitivity)	1	3	Moderate	Moderate
More extreme heat and cold events, and greater	Extremes of temperature may result in building services being unable to maintain	Cooling & heating plant selection based on projected future temperatures. Facility for cooling capacity increase	Building occupants (Moderate sensitivity)	2	2	Moderate	Moderate

Hazard	Impact	Embedded Mitigation	Receptor	Likeli-hood	Conseq-uence	Magnitu-de	Significa-nce
temperatur e variation	thermal comfort levels.	to be included in infrastructure. Adequate preheating to limit thermal lag on occupation					
	Extreme cold events may lead to plant failure due to freezing or defrost cycles	Plant selection to be based on projected temperatures. Include use of waste heat on air-based equipment to raise operating temperatures.	Buildings and infrastructure (Moderate sensitivity)	1	2	Minor	Minor
	Landscape planting may be affected.	Planting designed to thrive across extremes of temperature and, precipitation events	Planting (Moderate sensitivity)	1	2	Minor	Minor
Wetter winters (including increased moisture and driving rain)	Increased moisture and rain may cause damage to building fabric and services.	External fabric to be designed as a weathertight structure. Roof and external wall materials will be guaranteed to perform for a minimum of 25 years. Intake and exhaust positions will be protected from water ingress.	Buildings and infrastructure (Moderate sensitivity)	2	2	Moderate	Moderate
	Increased rate of run off risks of system inundation leading to localised flooding. See the FRA.	Building positioned towards northern end of site with appropriate falls. Ground to be reprofiled with gullies, channel drains, and permeable surfaces used. Drainage system to reduce discharge by at least 70% and designed with a	Buildings and infrastructure (Moderate sensitivity)	1	3	Moderate	Moderate

Hazard	Impact	Embedded Mitigation	Receptor	Likeli-hood	Conseq-uence	Magnitu-de	Significa-nce
		45% climate change allowance					
More drought events (including reduced summer rainfall)	Reduced rainfall may decrease the amount of water available for development.	Water supplies and storage to include allowance for more potable water consumption. Low water use sanitary fittings specified where appropriate to minimise water demand. Pulsed output water meters to be installed on the water supply so that occupants can monitor their water usage.	Building occupants (Moderate sensitivity)	1	2	Minor	Minor
	Drying soils could result in structural damage to buildings.	Structural engineers to ensure design of foundations is mitigated against the risk ground shrinkage.	Buildings and infrastructure (Moderate sensitivity)	1	3	Moderate	Moderate
	Landscape planting may be affected.	Planting designed to thrive across extremes of temperature and precipitation events.	Planting (Moderate sensitivity)	1	2	Minor	Minor
Warmer summers and increased solar radiation	Increased temperatures may result in building services being unable to maintain thermal comfort levels.	Cooling plant selection to be based on projected future temperatures. Facility for cooling capacity increase to be included in infrastructure.	Building occupants (Moderate sensitivity)	2	2	Moderate	Moderate
	Solar radiation may reduce the durability of roof and external wall materials.	Roof and external wall materials to be guaranteed to perform for a minimum of 25 years.	Buildings and infrastructure (Moderate sensitivity)	2	2	Moderate	Moderate
	Drying soils could result in structural	Structural engineers to ensure design of	Buildings and infrastructure	1	3	Moderate	Moderate

Hazard	Impact	Embedded Mitigation	Receptor	Likeli-hood	Conseq-uence	Magnitu-de	Significa-nce
	damage to buildings.	foundations is mitigated against the risk of ground shrinkage	(Moderate sensitivity)				
	Landscape planting may be affected.	Planting designed to thrive across extremes of temperature and, precipitation events	Planting (Moderate sensitivity)	1	2	Minor	Minor
More precipitation e.g. rain and snow	Increased rate of run off risks of system inundation leading to localised flooding. The site is wholly within Flood Zone 1 which has a 'low' probability of fluvial flooding. The Environment Agency flood maps shows that much of the site has very low risk of surface water flooding. See the FRA.	Building positioned towards northern end of site with appropriate falls. Ground to be reprofiled with gullies, channel drains, and permeable surfaces used. Drainage system to reduce discharge by at least 70% and designed with a 45% climate change allowance	Buildings and infrastructure (Moderate sensitivity)	1	3	Moderate	Moderate
	Damage to building fabric and services	Roofs fully designed for snow loads and to avoid ponding. Intake and exhaust positions will be protected from water ingress.	Buildings and infrastructure (Moderate sensitivity)	1	3	Moderate	Moderate
Subsidence or ground movement	Subsidence / ground movement could result in structural damage to buildings	Structural engineers to ensure design of foundations is mitigated against the risk ground movement	Buildings and infrastructure (Moderate sensitivity)	1	3	Moderate	Moderate

13.108 The Climate Change Resilience Assessment identifies that climate change is likely to result in some hazards that may impact upon the development, but that mitigation has been incorporated which will reduce the likelihood, and thus significance of these.

Cumulative Effects

13.109 Regarding Type 1 cumulative effects, there are a number of potential interactions between the future effects of climate change and other ES topics, for example, in relation to Flood Risk and Transport. Where necessary, reference has been made to the relevant chapter / supporting documentation.

13.110 In relation to climate change resilience, no Type 2 cumulative effects are anticipated on the basis that climate change impacts are specific to the development and will not result in impacts to neighbouring development.

13.111 In relation to the impact of the Proposed Development on climate change, cumulative effects have not been assessed. All CO2eq emissions contribute to climate change and therefore it could be argued that all sources of these emissions result in cumulative effects. It is unreasonable for the purposes of a planning application to quantify all sources of emissions from other third-party developments for the following reasons:

- The emissions from other developments fall under Scope 3[2], which do not form part of the assessment under the methodology outlined.
- Large technical data requirements from other developments which are not accessible.
- A significant interlinking scope of assessment that would exceed that expected of planning application for any one development.
- It is not feasible to undertake a high-level chemical assessment to analyse likely synergistic impacts between different emissions from varying developments.
- Complicated, unpredictable chemical reactions driven by atmospheric, climatic, and behavioural factors beyond the applicant's control.

Mitigation Measures

Construction Phase

13.112 As part of the Embodied Carbon Study, mitigation measures for further reducing the construction stage carbon emissions have already been identified and embedded into the design.

13.113 Therefore, no further mitigation is required because adequate mitigation measures are already in place.

Operational Phase

Operational Energy-Related Emissions

[2]Note- Scope 3 encompasses indirect carbon emissions

13.114 As part of the Energy Strategy Report, mitigation measures for reducing the operational carbon emissions have already been identified and embedded into the design.

13.115 Therefore, no further mitigation is required because adequate mitigation measures are already in place.

Climate Change Adaptation

13.116 Embedded mitigation measures have already been incorporated into the design of the development to ensure it is climate change resilient.

13.117 Therefore, no further mitigation is required because adequate mitigation measures are already in place.

Residual Effects

Construction Phase

13.118 In line with best practice guidance, mitigation measures for reducing operational energy have already been incorporated into the design of the scheme, therefore residual effects are as per those previously identified.

Table 13.5 Summary of Significant Effects - Construction Phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Embodied CO2eq emissions	Global Climate	Use of cement replacement Efficient structural design Reduction of construction site impacts (e.g. waste reduction, reducing transport distances)	Building Design Construction Environmental Management Plan (CEMP) and Construction Resource Management Plan.	Moderate Adverse Permanent Significant

Operational Phase

Impact of the Proposed Development on Climate Change

13.119 In line with best practice guidance, mitigation measures for reducing operational energy have already been incorporated into

the design of the scheme, therefore residual effects are as per those previously identified.

Table 13.6 Summary of Significant Effects on Climate Change - Operational Phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Operational CO2eq emissions	Global Climate	Implementation of Energy Strategy	Building Design	Moderate Adverse Permanent Significant

Impact of Climate Change on the Proposed Development

13.120 In line with best practice guidance, mitigation measures for minimising hazards that may impact upon the Proposed Development as a result of climate change have already been incorporated into the design.

Table 13.7 Summary of Significant Effects of Climate Change on the Proposed Development - Operational Phase

Potential Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permenant)
Rising Flood Levels / increased rate of run-off causing inundation	Buildings and Infrastructure	Building positioned towards northern end of site with appropriate falls. Ground to be reprofiled with gullies, channel drains, and permeable surfaces used. Drainage system to reduce discharge by at least 70% and designed with a 45% climate change allowance	Building design	Moderate Adverse Permanent
High winds resulting in a risk of structural damage and reduction in mechanical ventilation capacity	Buildings and Infrastructure	Design of building and roof to mitigate against impact of high winds. Intake and exhaust positions protected from direct wind impact.	Building design	Moderate Adverse Permanent
Risk to the safety of building occupants	Building Occupants	Use of anti-door slam products.	Building design	Moderate Adverse Permanent

Potential Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permenant)
from doors slamming.				
Extremes of temperature may result in building services being unable to maintain thermal comfort levels.	Building Occupants	Cooling & heating plant selection based on projected future temperatures. Facility for cooling capacity increase to be included in infrastructure. Adequate preheating to limit thermal lag on occupation	Building design	Moderate Adverse Permanent
Extreme cold events may lead to plant failure due to freezing or defrost cycles	Buildings and Infrastructure	Plant selection to be based on projected temperatures. Include use of waste heat on air-based equipment to raise operating temperatures.	Building design	Minor Adverse Permanent
Landscape planting may be affected by extreme temperatures, drought and precipitation	Planting	Planting designed to thrive across extremes of temperature and precipitation events. Landscape management.	Landscape design	Minor Adverse Permanent
Damage to building fabric and services due to increased moisture and precipitation	Buildings and Infrastructure	External fabric to be designed as a weathertight structure. Roof and external wall materials will be guaranteed to perform for a minimum of 25 years. Intake and exhaust positions will be protected from water ingress. Roofs fully designed for snow loads and to avoid ponding.	Building design	Moderate Adverse Permanent
Reduced rainfall may decrease the amount of water available for the development.	Building occupants	Water supplies and storage to include allowance for more potable water consumption. Low water use sanitary fittings specified where appropriate to minimise water demand. Pulsed output water meters to be installed on the water supply so that occupants can monitor their water usage.	Building design	Minor Adverse Permanent
Drying soils / subsidence / ground movement could	Buildings and Infrastructure	Structural engineers to ensure design of foundations is mitigated	Building design	Moderate Adverse Permanent

Potential Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permenant)
result in structural damage to buildings.		against the risk ground shrinkage.		

Monitoring

13.121 No monitoring is recommended.

Reference List

13.122 This ES Chapter has been prepared in reference to the following:

- BRE (2023) BREEAM UK New Construction Guidance v6.1
- IEMA (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance (2nd Edition)
- IEMA (2020) EIA Guide to: Climate Change Resilience & Adaptation
- London Plan Guidance: Whole Life Carbon Assessments
- The Met Office (2019) UK Climate Projections: Headline Findings ukcp18-headline-findings-2.pdf (metoffice.gov.uk)
- Met Office website (accessed September 2023) UK Climate Averages. https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/
- Met Office website (accessed September 2023) Past Weather Events. https://www.metoffice.gov.uk/weather/learn-about/past-uk-weather-events
- SLR (2024) Transport Assessment, Viadux Phase 2
- Renaissance (2023) Flood Risk Assessment, Viadux Phase 2
- Renaissance (2023) Drainage Strategy, Viadux Phase 2A
- Renaissance (2023) Drainage Strategy, Viadux Phase 2B
- Ridge & Partners (2024) Energy Strategy Report , Viadux Phase 2
- Ridge & Partners (2024) EUI Prediction, Viadux Phase 2
- Ridge & Partners (2024) Embodied Carbon Technical Note
- Royal Institute of British Architects (RIBA) (2021). RIBA 2030 Climate Challenge Version 2.
- Royal Institution of Chartered Surveyors (RICS) (2017) Whole life carbon assessment for the built environment.
- UK Green Building Council (2017) Embodied Carbon: Developing a Client Brief.
- UK Green Building Council (2019). Net Zero Carbon Buildings.
- UK Government - Energy consumption in new domestic buildings 2015 – 2017 (England and Wales) December 2019

Figure 13.1 []

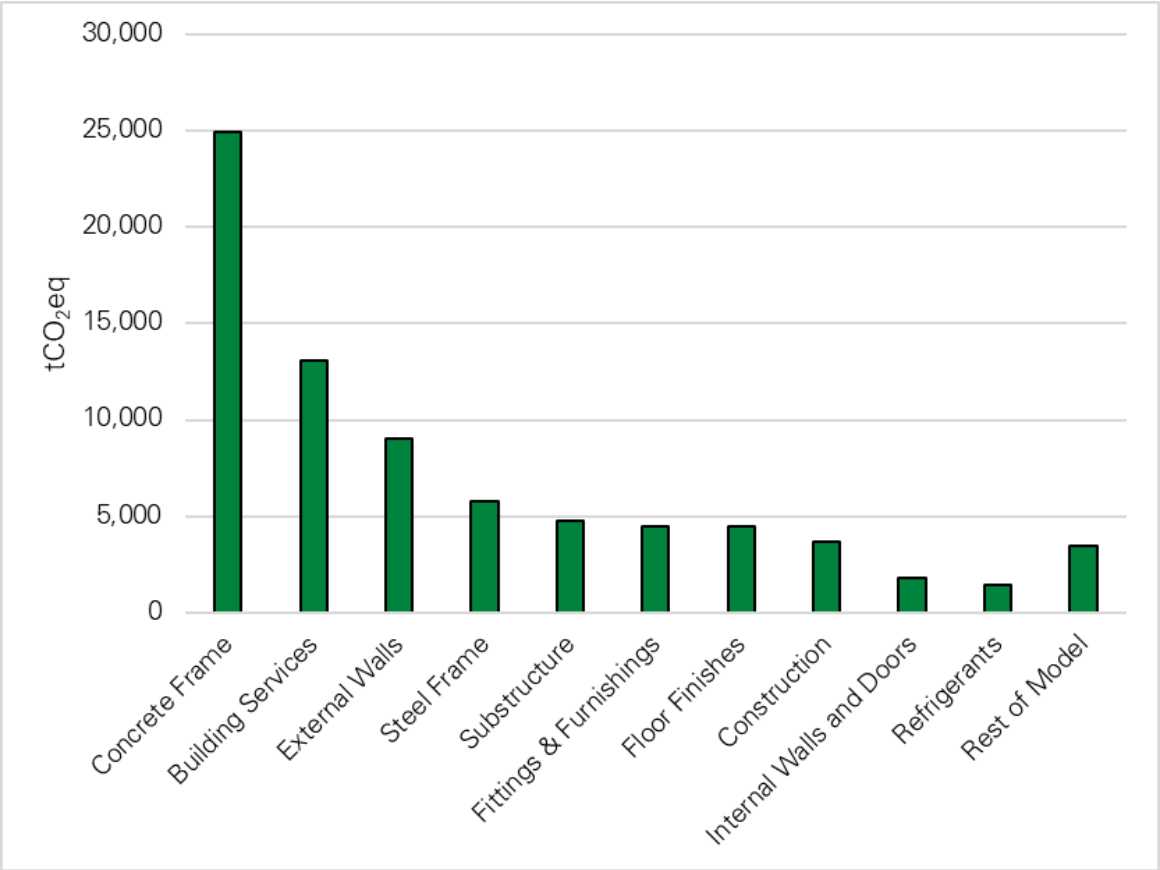


Figure 13.1 Embodied CO2eq by key elemental impacts

Not to Scale	Date: 08.11.24

Figure 13.2 []

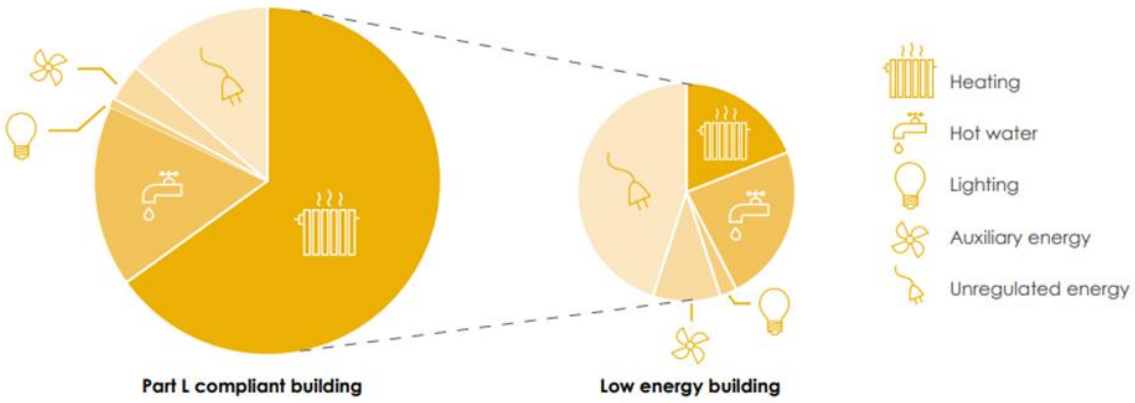


Figure 13.2 RIBA 2030 Climate Challenge Residential Energy Breakdown

Not to Scale	Date: 08.11.24

14. Human Health

Introduction

14.1 This Chapter of the ES has been prepared by Enfusion and assesses the likely impacts of the Proposed Development upon human health for 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.

14.2 The author of the chapter has qualifications BSc MSC CEnv FIEMA with over 25 year's experience of assessing plans and projects for their impacts on the environment, including effects on human health and wellbeing. She has prepared health chapters for other Environmental Statements supporting various development project proposals in Manchester and other urban locations. She is a co-author of the practical guide - *The EIA Handbook* (ICE Publishing, Third Edition, November 2019).

	Lead Author	Reviewer
Name	Barbara Carroll	
Company	Enfusion Ltd	
Qualifications/Accreditations relevant to technical area	BSc MSc CEnv FIEMA	
Does the practitioner hold any IEMA qualification?	Fellow FIEMA	
Company hold IEMA QMark?	No	
Years technical experience (in technical area)	>25 years	
Number of EIA's delivered to date	>75 (various inputs - specialist, review & coordination)	

Assumptions and Limitations

14.3 This Health Chapter considers the findings relevant to human health of each technical impact assessment scoped into the Environmental Statement – Townscape & Visual Impact (Chapter 6); Heritage (Chapter 7): Air Quality (Chapter 8); Noise & Vibration (Chapter 9); Daylight, Sunlight & Overshadowing (Chapter 10); Solar Glare (Chapter 11); Wind Microclimate (Chapter 12); Climate Change (Chapter 13); and Socioeconomics (Chapter 15) – and, as such, any key assumptions or limitations associated with each technical impact assessment are addressed within the individual chapters. The overall approach for collating, assessing, and reporting impacts on human health and well-being is considered to be appropriate and proportionate such that there are no limitations. The assessment, set out in this ES Chapter, is desk-based and with professional judgment using published information.

Legislative and Policy Context, Guidance

National Planning Policy

National Planning Policy Framework (2023)

14.4 The NPPF acknowledges the importance of considering health impacts during the planning process and covers many issues that are directly related to the determinants of health. The NPPF identifies the three overarching objectives – economic, social, and environmental – that are *interdependent and need to be pursued in mutually supportive ways* in order to achieve sustainable development (paragraph 8). The social objective should support "*strong, vibrant and healthy communities… by creating a high quality built environment, with accessible local services that reflect the community's needs and support its health, social and cultural well-being.'*

14.5 Chapter 8 covers promoting healthy and safe communities, acknowledging that planning policies and decisions should aim to achieve healthy, inclusive, and safe places which:

> "a) *promote social interaction, including opportunities for meetings between people who might not otherwise come into contact with each other – for example through mixed-use developments, strong neighbourhood centres, street layouts that allow for easy pedestrian and cycle connections within and between neighbourhoods, and active street frontages*.
>
> "b) *are safe and accessible, so that crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion – for example through the use of clear and legible pedestrian routes, and high quality public space, which encourage the active and continual use of public areas*; and
>
> "c) *enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling*." (paragraph 96).c

14.6 Social, recreational, and cultural facilities and services should '*support the delivery of local strategies to improve health, social and cultural wellbeing for all sections of the community* (paragraph 93). *It is important that sufficient choice of school places is available to meet the needs of existing and new communities* (paragraph 95). Public safety should be promoted and "*take into account wider security and defence requirements"* (paragraph 97).

14.7 *"Access to a network of high quality open spaces and opportunities for sport and physical activity is important for the health and wellbeing of communities"* (paragraph 98). Sustainable transport should be promoted and this "*can help improve air quality and public health"* (paragraph 105). "*An effective use of land should be promoted in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions"* (paragraph 119). "*Developments should create places that are safe, inclusive, and accessible and which promote health and wellbeing*…" (paragraph 130). "*New development must be appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health*…" (paragraph 185).

Public Health England (PHE) Strategy 2020-2025 (2019)

14.8 Sets out how PHE intends to protect and improve the public's health and reduce inequalities during 2020 to 2025. The Strategy recognises that the longer term, societal drivers of change represent the principal challenge facing the public's health. However, there are opportunities now, including "*place-based approaches"*. The ten priorities include *healthier diets, healthier weight*; *cleaner air;* and *better mental health"* with the aim to incorporate the reduction of health inequalities into each of the ten priorities. The purpose of PHE is to protect and improve the nation's health and reduce health inequalities. This is guided by aims – "*to keep people safe; to prevent poor health; to narrow the health gap; and the support a strong economy"*.

Sub-Regional Planning Policy

Places for Everyone – Joint Development Plan (Greater Manchester Councils Adoption March 2024)

14.9 The Vision for Greater Manchester (GM) includes to make Greater Manchester as "*a place where people live healthy lives"*; and Strategic Objectives include No 10 "*to promote the health and wellbeing of communities".* The overall draft Strategy and many of the policies in the plan support improvements in health and wellbeing, and reductions in health inequalities, such as by "*promoting a successful economy; increasing supply of high quality and affordable homes; enabling people to adopt healthier lifestyles*; and *reducing risks to human health".* The JDP recognises that addressing health inequalities will require a diverse range of coordinated measures. The JDP supports improvements in health and wellbeing including through promoting a successful economy, enabling people to adopt healthier lifestyles, and reducing the risks to human health

Local Planning Policy

Manchester City Council (MCC) Core Strategy (adopted 2012)

14.10 MCC's Core Strategy is the key document in Manchester's Local Development Plan. It is founded on a Vision to 2027 that includes "*an increased and sustainable healthy population…*". Policies relevant to health are as follows:

- Policy SP1 Spatial Principles includes requirement that development should make a positive contribution to neighbourhoods including "*making a positive contribution to the health, safety and wellbeing of residents*'
- Policy EC1 Employment and Economic Growth in Manchester requires development proposals to make the best possible use of a site in terms of efficient use of space and including application of best practice in security design.
- Policy EN4 seeks to reduce CO_2 emission and reduce fuel poverty by enabling low and zero carbon development.
- Policy EN8 Adaptation to Climate Change includes requirements to minimise flood risk and reduce urban overheating.
- Policy EN9 Green Infrastructure provides guidance on provision of new, and improvements to, the quality and accessibility of existing green infrastructure assets.
- Policies EN10 and EN11 safeguard and create new open space, sport and recreation facilities.
- Health is further protected through Policies EN14 Flood Risk, EN16 Air Quality, EN17 Water Quality, and EN18 Contaminated Land & Ground Stability
- Policy T1 Sustainable Transport requires "*delivery of a sustainable, high quality, integrated transport system to encourage modal shift away from car travel… and to prepare for carbon free modes of transport".*
- Policy T2 will actively manage the pattern of development to ensure that there are accessible areas of opportunity and need.
- Policy T3 supports proposals that contribute to an economically and environmentally sustainable transport network through strategic integration of strategic transport projects. Progression towards sustainable transport will promote healthier living and well-being.
- Policy *DM1 Development Management requires that all development should have regard to specific issues including "Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation*"; Accessibility: *buildings and neighbourhoods fully accessible to disabled people, access to new development by sustainable transport modes*"; "*Community safety & crime prevention*"; and "*Design for Health.*

Our Manchester Strategy, Forward to 2025

14.11 The Strategy sets out the future envisaged for the city and the priorities were reset following wide consultation during 2020. Communities want to see a renewed focus on 6 themes, including *Health – tackling physical and mental inequalities and ensuring fair access to integrated services*.

Manchester's Building Back Fairer (Marmot) Framework (2022-2027)

14.12 The Framework sets out the interactivities between the eight identified themes and the four ways that community groups and trusted organisations need to be involved. The eight themes are: Communities & power; Early years, children & young people; Poverty, income & debt; Work & employment; Prevention of ill health & preventable deaths; Homes & housing; Places, transport & climate change; and Systematic & structural racism & discrimination.

Great Northern, Manchester Central & Castlefield Quay Strategic Development Framework (Manchester City Council 2017)

14.13 The key focus is to regenerate the area so that it fulfils its potential as a cultural, business and residential destination through a fully integrated and consistent approach.

Other Relevant Policy, Strategy & Guidance

Public Health England (PHE) Spatial Planning for Health (2017)

14.14 Provides evidence of links between spatial planning and health, focusing on five key built environment topics – neighbourhood design, housing, healthier food, natural and sustainable environment, and transport.

Public Health England (PHE) Health Impact Assessment in Spatial Planning (2020)

14.15 Provides a guide for local authority public health and planning teams setting out process and practice with regard to the wider determinants of health and wellbeing for plan-making and the planning application process. It identifies eight categories of health and wellbeing outcomes in planning: reduce health inequalities; improve mental health & wellbeing; improve diet & weight; improve musculoskeletal health; improve respiratory health; improve cardiovascular health; protect environmental health; and provide access to health & care infrastructure and services. The guide is mostly associated with the plan-making and associated strategic environmental assessment processes. However, it does include an annex on integrating HIA in EIA and it does confirm the importance of a "*proportionate and justified approach".*

Institute of Environmental Management and Assessment (IEMA) Effective Scoping of Human Health in EIA; Determining Significance for Human Health in EIA (November 2022)

14.16 Provides a framework that supports a proportionate approach that can apply to all scales and sectors of EIA. It confirms that a wider determinants approach should be taken by EIA scoping. An EIA health chapter is required when other EIA technical topics have been scoped in to assess likely significant effects on human receptors, or there is a likely significant change for the health of a group of individuals due to the proposed project and in a wider determinant of health not covered by other technical EIA topics.

Assessment Methodology and Significance Criteria

14.17 The assessment method and significance criteria are as set out in the Scoping Report (December 2023) and as agreed with MCC.

14.18 *Shaping Neighbourhoods: For Local Health and Global Sustainability* (2003, 2010 & 2021) sets out the complexities of planning for health due to the multiple determinants and the need for cross-sectoral understanding and collaboration. This guide established a health map demonstrating the linkages between the global ecosystem, the natural and built environments, the local economy with communities, people, and their lifestyles. It explains the likely interactions between different sectors and seeks a common language for spatial planning and public health practitioners.

14.19 The complexities of investigating health impacts are recognised by Public Health England (PHE) and the Wider Determinants of Health tool is an ongoing project that provides resources for categories of factors that affect health, as follows: built and natural environment; work and the labour market; vulnerability; income; crime; education.

14.20 The London Healthy Urban Development Unit (HUDU) '*Healthy Urban Planning Checklist*' (2017) provides a useful checklist that was developed for London but is applicable to development proposals in urban city centres elsewhere in the UK. The checklist aims to promote healthy urban planning by ensuring that the health and wellbeing implications of local plans and major planning applications are consistently taken into account, through providing a set of themes and planning issues that can be used to assess development proposals. It can be used to help screen possible health impacts for a health impact assessment. Changes in certain determinants caused by development projects may affect the health and wellbeing of existing and new residents. The checklist is divided into four themes – healthy housing; active travel; healthy environment; and vibrant neighbourhoods. This HUDU checklist recognises that health and wellbeing can be affected by multiple determinants as shown in Figure 14.1.

14.21 The HUDU has further developed the checklist into a rapid HIA tool (London HUDU, 2019) that uses existing evidence to quickly assess the impacts of a development plan or proposal and recommend measures to address any negative impacts and maximise benefits. The tool is based on eleven topics or broad determinants of health and wellbeing focused on the built environment and issues influenced by planning decisions.

14.22 For the purposes of this Human Health (HH) assessment, we have applied the HUDU checklist and eleven topics to the Proposed Development in order to help determine the scope of the assessment by identifying the relevant topics. Applicable criteria/questions for each of the scoped topics were considered at the assessment stage in order to assess potential health impacts and the need for any mitigation or enhancement. Existing information and evidence were used, and impact assessment undertaken using professional judgment.

14.23 Housing design and affordability are key factors – provision of good quality and affordable residential development is known to have positive effects on health and wellbeing. The Proposed Development includes an affordable housing block.

14.24 Access to health and social care services and other social infrastructure is directly important for health. This health assessment considers the proximity, accessibility, and capacity (where possible) of health and medical centres and dentists in the vicinity of the proposed development. It considers the proximity and accessibility of gyms, leisure centres, sports/recreational and cultural facilities nearby since such activities are important contributors to health and wellbeing. Searches were made through web-based sources and using Google Maps to measure approximate distances by walking and/or public transport from the centre of the proposed development area to the facility.

14.25 Access to open space and nature is a key factor. The proximity of open and green spaces, together with walking/cycling routes is investigated since access to open space and healthy modes of transport also contributes to healthier lifestyles and wellbeing.

14.26 Air quality, noise and neighbourhood amenity are important factors for health and wellbeing. Summary findings from the technical studies for air quality and noise in the EIA are considered and their implications for health and wellbeing incorporated into this HH assessment. The interaction with heritage or the historic environment can be a positive factor in supporting individual and community wellbeing – summary overall findings will be considered with regard to human wellbeing. Daylight, sunlight and overshadowing can be important factors for individual health and wellbeing; summary findings from the technical assessment with any implications for health will be incorporated into this HH assessment.

14.27 Accessibility and active travel are well established as factors in health and wellbeing. Summary findings from the technical studies for transport and informing the air quality assessment are considered and their implications for health and wellbeing incorporated into this health impact assessment.

14.28 Crime reduction and community safety is a key factor in health and wellbeing of communities and this health impact assessment considers those elements of the development proposals that contribute to safety.

14.29 Access to healthy food is a direct factor in health and consideration is given to accessibility to a range of food stores with a mix of affordable shops. Provision of allotments or community gardens for growing food is beyond the scope of the development proposal.

14.30 Access to work and training is known to affect health and wellbeing. The Proposed Development is in the city centre and close to significant employment opportunities.

14.31 Social cohesion and inclusive design are key factors for health and wellbeing. This health assessment considers the implications of the design and project proposals in this respect, including whether the Proposed Development connects with existing communities – avoiding physical barriers and enabling spaces that encourage social interaction.

14.32 Minimising use of resources and addressing the effects of climate change are key factors in considering environmental sustainability and a healthy environment – and consequently, health and wellbeing for people and communities. Risks associated with ground contamination have been determined to be very low and were scoped out of the EIA and therefore are not considered to be significant for health and wellbeing. Risks associated with water resources and flooding have been determined to be low, scoped out of the EIA and therefore are not considered to be significant for health and wellbeing. Risks for health and wellbeing associated with extreme weather conditions and climate change are considered within this health assessment. Effects from daylight, sunlight & overshadowing, and the wind microclimate in such a central environment were assessed and summary findings incorporated into this HH assessment.

14.33 Overall, the HH in EIA aims to consider impacts associated with the construction and the occupational phases. It considers embedded mitigation provided through the design of the project – such as layout, and building standards, together with specific mitigation for potential negative effects – such as the commitment to a Construction Environmental Management Plan (CEMP) to control and minimise any effects associated with nuisance noise and dust during construction.

14.34 This HH chapter considers the direct implications for health such as the provision of residential accommodation, hotel and employment/retail space. Also, direct effects such as those arising through pollution, air quality, climate change, and safety risks, as well as accessibility to healthcare facilities and sustainable transport (public, cycling and walking) for healthy living. It further considers the wider implications for health and well-being, such as disturbance/nuisance, provision and accessibility to green infrastructure/open space, amenity, cultural, leisure, and recreational facilities.

14.35 The summary findings of the Socio-Economic (Chapter 15), Townscape/Visual Impact (Chapter 6) and Heritage (Chapter 7) studies are integrated into the implications for the four themes for healthy urban living since these topics are key contributors to improvements in health and wellbeing. The key findings of the socioeconomics assessment relevant to health are considered – residential; employment; provision of and access to health services and facilities; provision of access to open and green space; and crime.

14.36 The key findings from the Air Quality (Chapter 8); Noise & Vibration (Chapter 9); Daylight, Sunlight & Overshadowing (Chapter 10); Solar Glare (Chapter 11); Wind Microclimate (Chapter 12); and Climate Change (Chapter 13); assessments are considered in order to integrate within this HH chapter the key impacts associated with any pollution and future climate change effects that can affect human health and wellbeing.

14.37 Each technical impact assessment is subject to its own standards, regulations, and methods of assessment. The key findings from each are considered and integrated into the four themes of - Healthy Housing; Active Travel; Heathy Environment; and Vibrant Neighbourhoods; also within the five environmental themes suggested by the IEMA guidance: behaviours; social; economic; biophysical; and institutional/built. Thus, any likely significant impacts for human health and their interactions are clearly presented in a separate chapter within the ES.

14.38 This chapter on health is not a Health Needs Assessment and does not attempt to quantify health care contributions. It should also be noted that certain health issues are not scoped into the EIA due to their coverage within other permitting or risk management processes. For example, health & safety, emergency planning, and

building requirements are addressed by other relevant regulation and this does not require further consideration beyond noting that it helps mitigate community healthcare implications.

14.39 The geographical scope is determined by receptor groups that are likely to be significantly affected by the Proposed Development. The scope of the HH Chapter is in part dependent upon the study areas and potential receptors identified in the other technical assessments (air quality, solar glare, climate change, daylight/sunlight, noise, wind, and socio-economic). Thus, the study area comprises the Proposed Development site with local surrounds and the wider study area of Manchester City – as applicable to each of the factors relevant to human health and wellbeing for the proposed project. The scope of the HH chapter is as outlined above and is undertaken in consideration of the Proposed Development as part of a wider strategic development area.

14.40 Receptors were identified, as follows: construction workers; existing residents, businesses, communities around the site, and including any sensitive receptors such as hospitals, nurseries, schools, care homes identified by the technical assessments; future residents and visitors of the site; and pedestrians in the vicinity of the site.

14.41 The Institute of Environmental Management & Assessment (IEMA) paper on Health in EIA (2017) explains the complexities associated with defining significance for population and human health. This guidance notes that there is an absence of specific significance criteria or defined thresholds for determining significance for population and health in UK EIA practice. Given the multitude of factors that contribute to an individual's health outcomes, it is difficult to draw a quantified conclusion regarding the contribution of a particular development to an increase or decrease in the number of additional cases of a particular physical or mental health outcome.

14.42 The recent IEMA guidance (November 2022) suggests categories and wider determinants of health, and those relevant to the Proposed Development were identified, as follows:

Table 14. 1 EIA Wider Determinants of Health

Category	Wider Determinants of Health
Health related behaviours	Physical activity; diet & nutrition
Social environment	Housing; relocation; open space, leisure & play; transport modes & access; community safety; community identity & resilience; social participation, interaction & support
Economic environment	Education & training; employment & income
Bio-physical environment	Climate change mitigation & adaptation; air quality ; land quality ; noise & vibration; radiation
Institutional & built environment	Health & social care facilities; built environment; wider societal infrastructure & resources

14.43 The guide also sets out a generic human health magnitude criteria and significance criteria, as follows:

Table 14. 2 Human Health Magnitude Criteria

Category	Indicative Criteria (narrative based on professional judgment for magnitude change of population or sub-population
High	high exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/ injury outcomes; majority of population affected; permanent change; substantial service quality implications
Medium	low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications
Low	very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications

Negligible	negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication

Table 14.3 Human Health Significance Matrix

Magnitude	Sensitivity				
		High	Medium	Low	Very Low
	High	Major	Major/Moderate	Moderate/Minor	Minor/Negligible
	Medium	Major/Moderate	Moderate	Minor	Minor/Negligible
	Low	Moderate/Minor	Minor	Minor	Negligible
	Negligible	Minor /Negligible	Minor/Negligible	Negligible	Negligible

14.44 Therefore, a significant effect is reported in this assessment where, based on professional judgment, the Proposed Development is likely to contribute to a material change in health outcomes associated with the health issue being assessed and, in determining this, the following questions have been considered:

- Have significant effects been identified in other assessments undertaken as part of the EIA that are linked to human health (i.e. are environmental or health standards threatened)?
- Are vulnerable groups affected?
- Is the effect reversible or irreversible?
- Does the effect occur over the short (less than one year), medium (one to five years) or long (over five years) term?
- Is the effect permanent or temporary?
- Does it increase or decrease with time?
- Is the effect at an individual, community or population level?
- Are mitigating measures available and is it reasonable to require these?

14.45 Effects that are described as 'minor' or 'negligible' are determined to be 'Not Significant' and effects that are described as 'moderate' or 'major' are determined to be 'Significant'. This takes into account the sensitivities of receptors (high, moderate, low) and as set out previously in Table 2.4 in the EIA Methodology (Chapter 2). The criteria and categories of significance applied in this human health impact assessment are, as follows:

- Major Adverse/Beneficial – important considerations at local or district scale; if adverse, are potential concerns to the project and may become key factors in the decision-making process; changes due to the project have a substantial effect on ability to deliver current health policy and/or ability to narrow health inequalities; changes due to the project could result in a regulatory or statutory threshold being crossed
- Moderate Adverse/Beneficial – modest important local effects that, if adverse, may be key issues for decision-making; changes due to the project have an influential effect on ability to deliver current health policy and/or ability to narrow health inequalities; changes due to the project could result in a regulatory or statutory threshold being approached
- Minor Adverse/Beneficial – Slight, short, or highly localised effects that, if adverse, are unlikely to be important in the decision-making process; changes due to the project have a marginal effect on ability to deliver current health policy and/or ability to narrow health inequalities
- Negligible – no appreciable effects on health factors

14.46 Standardised sectoral thresholds and significance criteria have been used for each of the relevant technical factors that contribute to health and well-being, according to recognised guidance, standards, and assessment methods for visual impact & heritage; air quality; noise & vibration; daylight, sunlight, & overshadowing; solar glare; wind microclimate; climate change; and socioeconomics. Then, the overall likely significant effects on human health have been determined in a qualitative way using professional judgment.

Scenarios Tested

14.47 The human health assessment considers the scenarios of the completed project, as follows:

Scenario 1: (Existing Baseline) = Site as is today i.e. Phase 1 tower as currently built with the various amendmentsalongside the developments identified as baseline developments

Scenario 2: Baseline* + Viadux Plot 2a + Viadux Plot 2b

Scenario 2a: Baseline* + Viadux Plot 2a + Viadux Plot 2b + cumulative

The Study Area

14.48 Each technical topic relevant to health and wellbeing defines its own study area according to appropriate regulations, standards and guidance. Overall, the HH assessment considers the site and surrounding area.

Baseline Conditions

14.49 The Proposed Development is for Viadux Plot 2a and Plot 2b. The site is currently vacant. Within the centre of the site, but excluded from the application boundary is the Viadux Phase 1 tower. The Site and the surrounding area have a rich history with valued heritage assets as detailed in the Heritage Chapter (Chapter 7) . The Site is entirely located within Flood Zone 1 and is therefore at a low probability of flooding. The Site comprises a mult-layered plot above street level, on top of the Grade II Castlefield Viaduct, a portion of which falls within the defined site boundary. A large portion of this area (west side) is currently being developed with Viadux Phase 1, including the arches at street level. A small portion of the land just east of Plot 2b is currently being developed with a new pedestrian stair access to the Deansgate Metrolink stop. Overall, the Human Health assessment considers Scenarios 2 & 2a.

14.50 The baseline informing the assessment draws upon local health and wellbeing information and priorities, such as those set out in the Manchester City Joint Strategic Needs Assessment (JSNA 2022), published local authority health profiles through Office for Health Improvement & Disparities OHID (previously PHE, 2018-2021), and as reported by Manchester City Council, for example, through the MCC Intelligence Hub. The key baseline from the other technical topics is considered, including risks to health/wellbeing such as from air quality, noise, water resources, and risks associated with the effects of climate change. The key baseline information from the townscape and socio-economic studies has been considered. It has not been necessary for this assessment to undertake primary research or surveys and this desk-based approach using published information and professional judgment provides an appropriate level of detail.

14.51 Population: There are approximately 18,800 people living in Deansgate ward according to the ONS Census population estimates. Assuming that all residents would be new to the area (worst-case assumption) then the baseline developments could uplift the study area baseline population from 18,800 to around just under 25,000. According to OHID (previously PHE) data (2018-2020), life expectancy at birth for Manchester is 75.5 (males) & 79.9 (females) compared with 79.4 (males) & 83.1 (females) averaged for England. Provisional estimates of life expectancy at birth show the impact of the Covid-19 pandemic. The size of the fall in life expectancy in Manchester is more than that seen in England overall, widening inequalities in life expectancies between Manchester and the national average. Physically active adults (2019-20) are recorded at 62.4% for Manchester, lower than that averaged for England at 66.4%. Percentage of adults classified as overweight or obese are recorded at 61.0%, slightly lower than the 62.8% averaged for England. The excess winter deaths index (2019-20) at 18.3% was slightly higher than the averaged value of 17.4% for England.

14.52 The Manchester State of the City Report (2022) reports on progress with various matters including reducing health inequalities. It reports that people with higher levels of wellbeing have lower rates of illness, recover more quickly (and for longer), and generally have better physical and mental health. Individuals in Manchester have overall poorer scores on self-reported life satisfaction than England as a whole. In 2019/20, 5.4% of adults in Manchester had a low life-satisfaction score compared with 4.7% of adults across England as a whole – a difference of 0.7 percentage points. In 2021, 13.3% of respondents in Manchester said they had a long-term mental health problem compared with 11% of respondents across England as a whole. Infant deaths (deaths to children aged under one year of age) are an indicator of the general health of the entire population. They reflect the relationship between causes of infant mortality and other determinants of population health, such as economic, social, and environmental conditions. The infant mortality rate in Manchester has improved substantially in recent years. Between the periods 2001–03 and 2011–13, the rate fell by 87%.

14.53 Physical inactivity is the fourth-leading risk factor for global mortality. Data from the Sport England Active Lives Adult Survey for 2020/21 shows that the proportion of adults aged 19 and over in Manchester classed as 'inactive' has fallen slightly from 26.5% in 2019/20 to 24.6% in 2020/21. In contrast, the proportion of adults across England as a whole classed as 'inactive' has increased over the same time period (from 22.9% in 2019/20 to 23.4% in 2020/21). However, the proportion of adults in Manchester classed as 'inactive' remains higher than the England average.

14.54 The Proposed Development is located in Deansgate Ward. According to MCC Intelligence Hub information using Ward profiles, the Deansgate Ward has very good health (2011 self-assessment from residents of the state of their general health), within the medium range for the City. Emergency hospital admissions for all causes are low at 36.3, compared with other Wards, and at the lowest of the range 36.3-186.7 for all Wards – indicating less poor health. The Index of Multiple deprivation (IMD) is an overall relative measure of deprivation constructed by combining seven domains of deprivation – Income; Employment; Education; Skills & Training; Health & Disability; Crime; Barriers to Housing Services and Living Environment. The Deansgate Ward has a IMD score (2019) of 24.14, (the least deprived is in the range 15.5-31.1 with 48.4-62.7 indicating the most deprived) indicating that Deansgate is one of the least deprived Wards in the City.

14.55 The Deansgate Ward also shows good health when other indicators are considered. The number of estimated households in fuel poverty (2020) was 604 which is within the lowest range for the City. The number of residents claiming benefits (Feb 2022) is the lowest in the City at 1,009 for a range of 1,009-8,254 for all Wards. Incidence of all cancer (2014-18) is 72.5 and at the lower end of the range 70.8-142.1 for MCC. The total reported street crimes for 2018 was 14,172, similar to adjacent Wards, and at the higher end of the range from 1,343 – 16,552 for all Wards.

14.56 Housing: Housing data from the 2021 Census shows that there are around 8,950 dwellings in the Deansgate ward. Manchester has a 10 year housing target of delivering 36,000 homes by 2032, according to the GMCA housing strategy.

14.57 Employment & Economy: Total employment within the Deansgate Ward in central Manchester stood at just over 100,000 in 2022, accounting for 23% of Manchester's total employment (432,000). Though high at the district level, the claimant count is far lower (1.1%) at a more localised level (Deansgate and Piccadilly wards). Similarly, Manchester's unemployment rate (5.5%) is higher compared to Greater Manchester (4.4%), regionally (3.9%) and nationally (3.8%). The employment generated by baseline developments (Scenario 1) has the potential to increase total district level employment to around 438,000. Manchester supports economic output (measured by Gross Value Added - GVA) of approximately £28 billion, with an average GVA contribution per full time equivalent (FTE) of approximately £81,000 per annum. Local authority revenue plays an important role in the delivery of essential local services and delivery nationwide is under increasing strain.

14.58 Healthcare Facilities: There are six GP practices operating within the neighbourhood/local level of within 1 mile of the Site. Three of these operate out of the recently built New Jackson Street Medical Centre, which is the first GP medical centre to open in the city centre since 2009. These six practices are currently operating at an average of 2,833 patients to every FTE GP. This is substantially above the HUDU of 1,800 patients per FTE GP. However, the Deansgate and Piccadilly ward populations comprise almost entirely of people aged 16-64 (95%) of which the vast majority are under the age of 40 (92% aged between 16-39). On the reasonable assumption that a more elderly patient profile is likely to generate higher demand for primary healthcare services, it is therefore more likely that practices operating locally can sustainably support higher patient to GP ratios. Furthermore, a new build medical centre has recently been developed at the ground and first floor of the Elizabeth Tower residential development (New Jackson Medical Centre) and this will provide additional provision. There are eleven dental practices within around 1 mile radius of the Site. GM Healthwatch (2021) highlighted the current capacity of NHS dentists as insufficient to meet demand. There are 3 care/retirement homes within the vicinity – about 0.4 miles distance. The nearest hospitals are approximately 1.5 miles distance from the Site.

14.59 Educational Facilities: There are no primary schools located within the Deansgate Ward. The closest schools (all within 1 mile walking distance from the Site) are located to the south in Hulme Ward. Within a 2 mile walking distance there are 25 primary schools. Primary schools closest to the Site are operating close to capacity. However, additional capacity will be provided through the new Crown Street Primary School located 0.4 miles from the Proposed Development which opened in September 2024. There are 8 nurseries within 1 mile walking distance of the Proposed Development. There are 7 secondary schools located within a 2 mile walking distance of the Site. These consist of schools located within Manchester and Salford districts.

14.60 Crime: The total reported street crimes for 2018 was 14,172, similar to adjacent Wards, and at the higher end of the range from 1,343 – 16,552 reported within Manchester.

14.61 Open Space, Recreation & Amenity: There a number of open/amenity spaces in proximity to the Site including Hulme Park (4.88ha), All Saints Park (0.75ha), Castlefield Urban Heritage Park (0.81ha), St John's Gardens (0.5ha), Sackville Gardens (0.8ha) and Barrack Street Park (3ha). Over 10 hectares of new public amenity space was either

delivered or underconstruction as part of new developments in the city centre by the end of 2022. Of the baseline developments identified (Scenario 1), several include some form of public realm or amenity space provision. These will deliver new, high quality public realm that will also improve connectivity between public spaces within the local area (Deansgate Ward) and across the wider city centre. There are also recent developments in children's play space. Being a city centre site there are numerous leisure and culturtal facilities within close proximity to the Site, including cinemas, cafes, bars/pubs and restaurants. There are various gyms and leisure/sports centres – 10 gyms and 4 swimming pools within one mile of the Site – and the Site is near to the Rochdale Canal towpath that can link to a wider network for walking and cycling.

14.62 Townscape & Visual Impact; Heritage: The Site is located adjacent to the city centre's Civic Quarter and Central Business District within the Petersfield townscape character area. Petersfield is characterised by its blend of historic listed buildings, modern architecture and high quality cultural and leisure facilities; the area is home to Manchester Central. The elevated Metrolink line and viaduct form a significant north-south barrier between the centre and its surroundings. Although partially developed with Phase 1, the Site forms a void within the urban grain which adversely impacts on townscape character at what is a key arrival point into the city centre. The surrounding area is primarily commercial and retail lead with some hotel and residential functions. Pedestrian permeability and connectivity between the Site and the surrounding context is currently adversely affected by the barrier effect of the viaduct. Building heights within the site context have increased significantly, with well defined clusters of tall buildings defining the city skyline; the Beetham Tower is a key landmark in Manchester city centre. The heritage assessment identified 104 listed buildings and ten Conservation Areas in the 500m study area. The LPA did not identify any non-designated heritage assets that they consider should be scoped in for assessment.

14.63 Air Quality: As with the majority of Manchester City Centre, the Site is located within the Greater Manchester Air Quality Management Area (AQMA). Local air quality at the Site is and will be affected by local traffic flows. With regard to the GM Air Quality Plan, there are 'at-risk' and 'over the legal limit' road links in the vicinity of the Site. There are a number of railway lines, and including the electrified Metrolink, near the Site but railway emissions are not considered to be a signifcant source of local air pollution.

14.64 Noise & Vibration: The general noise environment at and around the Site is principally determined by road traffic on Albion Street and Great Bridgewater Street and by tram movements on the Metrolink line that passes through and to the south/east of the Site. Ambient noise levels on top of the Viadux (east side) were also influenced by occasional service vehicle movements associated with the Manchester Central Convention Complex (MCCC). Typical maximum noise levels to the south and east of the Site are generated by tram movements and from service vehicles associated with the Manchester Central Convention Complex. Typical maximum noise levels at the northwest of the Site are generated by vehicle movements along Great Bridgewater Street. Music noise egress from the rear elevation of bars at 'Deansgate Locks' contributes to the night-time noise climate to the south of the Site. There may also be music egress from events at the (MCCC).; Surveys were undertaken to establish the baseline noise environment during the day and the night at eight residential areas identified for potential sensitivity to noise and vibration.

14.65 Daylight, Sunlight & Overshadowing: The Site is currently undeveloped and is located in a city centre, dense urban location.

14.66 Solar Glare: The existing Site is currently a split-level car park such that there is limited opportunity for instances of solar glare to be experienced.

14.67 Wind Microclimate: The microclimate of any development is the distinctive climate of a small-scale area. The weather variables in a microclimate, such as wind, may be different to the conditions prevailing over the area as a whole. The baseline considered the surrounding context and committed developments, comprising the Site plus buildings and spaces within a 600m radius of the centre of the Site. The studies consider safety of pedestrians as well as typical activities such as walking, waiting and outdoor sitting. There are several areas within the Site and immediate surrounds which fail to meet the wind criteria for safety, although elsewhere all locations do meet with the safety criteria. Overall, existing wind conditions are expected to be suitable for existing uses.

14.68 Climate Change: Greenhouse gas (GHG) emissions occur constantly and widely as a result of human and natural activity. As the site is currently vacant, there are no significant GHG emissions associated with the site in the baseline scenario.

Identification and Evaluation of Likely Significant Effects; Mitigation Measures

14.69 The Proposed Development includes three elements, as follows:

- Plot 2a – Residential Development consisting of ground +75 (76 Storey) with 452 apartments above a 160 bedroom hotel with restaurant, bar, events/function spaces and meeting rooms

- Plot 2b – Residential Development consisting of ground with flexible commercial units, secure cycle parking spaces, and public realm enhancemnts on Great Bridgewater Street +22 (23 Storey) with 133 affordable apartments

14.70 Housing: Assuming that all residents would be new to the area (worst-case assumption) then the baseline developments could uplift the study area baseline population from 18,800 to around just under 25,000; an additional 3,003 persons are predicted to be housed from the Proposed Development. Provision of good quality housing is known to have positive effects on human health and wellbeing – estimated to be Moderate Beneficial in this city centre location and also contributing to the vibrancy of the local neighbourhoods. Plot 2b includes provision of 133 affordable apartments and these will contribute positive effects towards healthy housing and affordability. Affordability is a key factor in provision of a range of housing types responding to local needs and associated health and wellbeing.

14.71 Employment & Economy: During the construction phase a variety of jobs would be supported – on and off-Site – estimated to be approximately 330 FTEs per annum and including a broad range of job types and occupations. However, the estimated small increase in jobs is not expected to stimulate a noticeable change in the baseline conditions and effects are temporary, short term and Minor Beneficial (Not Significant). The Proposed Development will make a positive contribution to district level employment levels as a result of the hotel with 160 FTEs estimated, and for the retail, restaurant and bar uses – estimated to be up to 102 FTEs and with effects as Negligible. Local authority revenue increase through increase in population io estimated to be Minor Beneficial (Not Significant).

14.72 Healthcare Facilities:Given the demographic profile of the existing local resident population it is also noted that residents living at the Proposed Development and nearby baseline developments are likely to generate a generally lower level of demand for primary healthcare services. Effects are considered to be Negligible.

14.73 Educational Facilities: The demographic cohort typically would not lead to high levels of demand for pupil places. However, the continued attractiveness of the city centre as a place to live and work and ongoing residential growth is expected to result in additional demand for early years and later primary school places as more residents choose to remain in the area when starting a family. Effects are predicted to be Negligible (Not Significant). The change with regard to secondary education is estimated to be Negligible.

14.74 Crime: There is likely to be less risk of crime since there will be new occupied buildings with security measures rather than a vacant site.

14.75 Open Space, Recreation & Amenity: An uplift in resident population will increase demand and usage of nearby open space and recreation facilities. However, the Proposed Development will bring forward new internal and external amenity space and there is a wide array of leisure and amenity facilities located within the assessment area, such that overall the impacts are considered to be Negligible.

14.76 Townscape & Visual Impact: During the construction phase, sources of townscape and visual effects include site set up and compound, boundary fencing, site clearance, groundworks, access, and contractor parking, plant and equipment. Measures to control construction impacts will be incorporated into a Construction Environmental Management Plan (CEMP) and are likely to include positioning of compounds and stockpiles to limit impacts, high quality site hoarding, and good site management, maintenance and housekeeping. Only four of the 28 key viewpoints identified were found to have likely significant effects of Moderate Adverse and will be temporary. During the operational phase, there are predicted to be significant beneficial effects on six of the viewpoints, with

other effects ranging through moderate adverse to neutral. Theresidual effects upon, townscape character, land use, building heights, and movement & linkages are predicted to be Moderate Beneficial;, and to the site character are predicted to be Major Beneficial.

14.77 At the operational l phase, potential townscape and visual effects include changes to characters (townscape and Site), building heights, movement and linkages, public realm, and character and amenity of views. Primary mitigation measures have been embedded into the location and design of the Proposed Development through an iterative process involving environmental assessment and consultation.

14.78 Heritage: During the construction phase, there are some impacts (physical and visual) on designated heritage assets and most are temporary but one relates to some degree of adverse direct heritage impact. to the Listed Viaduct However, the Proposed Development offers a considerable improvement on the consented 2017 scheme (115871/FO/2017) as it includes embedded mitigation to avoid loss of arches abutments and limit risk of damage to the existing viaduct structure. The overarching impact thus remains Minor Adverse and Not Significant. Overall, the heritage impact assessment identified that the completed and operational phase of the Proposed Development will result in varying degrees of beneficial and adverse impacts (physical and visual) on the built environment within the identified study area – with corresponding impacts likely for the wellbeing associated with the built heritage.

14.79 Air Quality: During the construction phase, there is the potential for dust soiling and risk to human health and wellbeing from dust associated with earthworks, construction material and track out during movement of construction vehicles. The surrounding area has a significant density of sensitive receptors, which have wide range of sensitivities to dust soiling and potential health effects. Detailed mitigation measures will be set out in the Construction Environmental Management Plan (CEMP) to control and reduce vehicle emissions and dust through various procedures and practices to Negligible and temporary. During the operational phase, there are no signifcant effects predicted and no detailed assessment was coped into the ES. It is likely that measures included in the associated Travel Plan would also aid improvemenet in air quality.

14.81 Noise & Vibration: During the construction phase, four of the eight receptors are considered to be sensitive to noise. Predicted impacts range from Moderate-Major Adverse and Minor Adverse to Negligible-Minor as Plot 2b is developed. Although construction vehicles would have the potential to generate noise, this estimated number of vehicles would represent a very small proportion of the day-to-day road traffic movements and effects are Negligible. The impact of construction vibration on existing sensitive receptors is generally expected to be of a Negligible adverse significance for all receptors, occasionally increasing to a Minor adverse significance for receptor B (Beetham Tower) and receptor D (Viadux Phase 1). Potntial noise and vibration effects will be reduced through implementation of the CEMP to Negligible and Negligble-Minor, and all temporary.

14.82 During the operational phase, there is the potential for noise from the building services plant and changes to road traffic. The Proposed Development includes a commercial retail unit, Plot , that will have the potential to generate noise from its operations. The noise from internal operations of the Proposed Developed is predicted to be Negligible. Changes to local traffic volumes will be minor and therefore, changes to noise arising from traffic, including servicing vehciels, will be Negligible. The sensitive areas of the Proposed Development that could be affected by existing environmental and entertainment noise levels are the proposed living room and bedrooms of the proposed apartments within Plot 2a and 2b. Modelling was used to determine a range of acoustic specifications for the complete curtain walling system to the proposed habitable rooms to achieve the internal noise criteria, in relation to both environmental (tram and road traffic) and entertainment noise, such that the potential for adverse noise effects has been mitigated through the embedded design. Structure-borne noise levels and vibration from trams/trains are predicted to be within the proposed limits in all areas. With the mitigation measures of acoustic design specifications for the Proposed Development, potential noise and vibration effects are reduced to Negligible.

14.83 Daylight/Sunlight & Overshadowing: The studies identified 29 receptors for their proximity to the Site and with regard to daylight and sunlight. The surrounding receptors may have a lower sensitivity to change in an urban location than those located in suburban, less dense areas. The Site is underdeveloped given the dense, urban location, and the surrounding receptors are therefore receiving higher levels of daylight and sunlight than would typically be expected in a city centre location. Since the potential daylight and sunlight effects relating to

construction works will vary through time until the completed Proposed Development represents the worst-case assessment. Therefore, construction effects are not considered further. For the operational phase, impacts on daylight and sunlight to the surrounding properties are **Negligible to Minor Adverse** which is **Not Significant**.

14.84 **Solar Glare**: The façade treatment for the Proposed Development includes large areas of glazing that could reflect sunlight within a driver's field of view at sensitive locations. Sensitive receptors are considered to be road users at junctions and train/tram drivers on tracks within the surrounding area. At each of the identified sensitive road locations and for rail drivers at visible signals or at representative intervals, viewpoints were assessed. Fifteen viewpoints were identified at road juncitons, two viewpoints on tram tracks, and three viewpoints on rail tracks. Solar glare assessment is undertaken on the worst-case scenario.

14.85 An iterative review process was undertaken at an early stage of project design to incorporate mitigation measures within the detailed façade design to ensure that the embedded mitigation reduced the risk of solar glare as much as practicable. Thus, the assessments were undertaken on a scheme that has been fine-tuned to address potential solar glare risks. The façade design has sought to limit the area of reflections and their intensity. During the demolition works, effects will be **Negligible**. At the operational phase, a total of nine road locations and four tram/rail lines have at least one viewpoint which sees the potential for solar glare within 30° of a drivers' line of sight but great than 10°. At these 13 locations, the effect is considered to be **permanent**, **Minor Adverse** and **Not Significant**. Significant Adverse effects were predicted to occur for a driver at five road locations and one tram line. Given the location of the site and scale of the development, potential for reflections from the Proposed Development are unavoidable. It should be noted that the assessment considers a scenario whereby the sun shines on every day of the year. Low Visible Light Reflectance glazing on certain façade areas reduces the risk to the lowest achievable intensity and residual effects are **Minor Adverse Not Significant** for 3 locations, **Minor-Moderate/Moderate Adverse Significant** for two locations.

14.86 **Wind Microclimate**: The assessment included wind tunnel testing so that the wind conditions at the Site, together with meterological information, could be considered in accordance with the widely accepted Lawson Criteria for safety and comfort. After wind tunnel testing was completed, further mitigation measures were explored through modelling. During the demolition and construction phase, any potential for wind to inconvenience passers-by and any risk to workers would be addressed through the CEMP and residual effects are **Negligible**. During the operational phase, most areas meet with the safety and comfort criteria. Some 21 locations were investigated further through modelling and consideration of mitigation measures, including provision of walls and 50% porous gates, and updated landscaping plans – these mitigation measures result in the potential likely effects to be **Negligible** and **Not Significant**. . There is one area that fails to meet the wind criteria for safety – at Great Bridgewater Street – and represents a major adverse effect, however, further testing and mitigation measures will be developed through detailed design. Elsewhere, all locations within the Site and immediate surrounds meet the safety criteria. Overall, existing wind conditions are expected to be suitable for existing uses.

14.87 **Climate Change**: The technical studies investigated the risk assessment of the impacts on climate change on the proposed development over its projected life cycle (assumed to be 60 years). The assessment considered structural stability and robustness; weather proofing and detailing; material durability; and the direct health and safety of building occupants. The studies investigated the likely effects of increasing temperatures, intense rainfall events, flooding, snow and wind on the building and the public realm. Mitigation measures were developed as integral to the project design to reduce the significance of potential risks of adverse effects. Best practice guidance recommends that the Proposed Development is assessed against whether its greenhouse gas emissions align with the UK's path towards net carbon by 2050.

14.88 Potential singifcant effects of climate change on the Proposed Development include rising flood levels, high winds and ventilation capacity, extremes of temperature affecting building services, damage to building fabric and services due to increased moisture, reduced amount of water available for development, drying soils/ground movement could result in structural damage, and adverse effects on landscape planting. For the construction phase, initial modelling of the embodied carbon emissions indicates a likely **Moderate Adverse** effects on climate change. For the operational phase, initital calculations for energy emissions indicate a **Moderate Adverse** effect, whilst transport emissions are anticipated to have a **Negligible** effect.

Cumulative Effects

Temporary during Construction Phase

14.90 Each separate technical topic has considered the relevant effects for health and wellbeing that could be cumulative with other nearby development projects. Each development project is designed and constructed with ways of working that are approved according to regulatory requirements that aim to protect human health and wellbeing. The implementation of such mitigation measures to reduce impacts to acceptable levels is ensured through the Construction Health & Safety Plan (HSP) and Environmental Management Plan (CEMP), and such Plans are applied to the construction of each development project.

14.91 During the approximately sixyear construction time period, there are the possibilities for cumulative adverse impacts on air quality - dust soiling from activities and emissions from transport; transport disturbance; and loss of amenity for pedestrians and motorists. However, cumulative effects were identified to be Negligible through implementation of the CEMP. The cumulative effects for noise and vibration have been assessed and found to be Negligible to Minor Adverse and Not Significant. There will be Moderate Beneficial effects for temporary construction employment.

Operational Phase

14.92 Cumulative effects for employment and the local economy will be Moderate Beneficial. Cumulative effects will be Negligible with regards to healthcare, education, and open/amenity space. The Proposed Development will give rise to a range of moderate adverse impacts upon the settings of Listed Buildings within a 500m radius, including the Albert Square and St Peter's Square Conservation Area. This will give rise to a collective high level of less than substantial harm, which is required to be weighted against the public benefits of the scheme in accordance with para.208 of the NPPF. There are seven areas within the Site and immediate surrounds that are somewhat windy, particularly in the winter months. In general, wind conditions within the Site are suitable for strolling or better in the worst-season, and are thus suitable for thoroughfare and cycleway use. With mitigation measures including walls and porous gates, effects are reduced to Negligible.

Residual Effects

14.93 Post-mitigation residual effects are summarised in the tables 14.5-14.6, as follows:

Table 14.5 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase. *Significant Receptors listed as identified from each technical chapter and as relevant according to those presented in paragraph x.42 previously – workers, residents & visitors (nearby & site), and pedestrians – during construction and operational phases.*

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation **Residual Effect** – Significance and Duration (i.e., Temporary/Permanent)
Construction Phase				
Socioeconomics: Employment	Workers & local economy	N/A	N/A	Negligible
Visual - viewpoints	4 of 28 viewpoints	None	N/A	Moderate Adverse, Temporary
Air Quality: dust	Workers, nearby residents	Screening & practices to reduce nuisance dust	CEMP	Negligible
Noise	Local residents	Screening & noise controls	CEMP	Negligible – Minor Adverse, Temporary

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation **Residual Effect** – Significance and Duration (i.e., Temporary/Permanent)
Noise - traffic	Local residents	Traffic management	CEMP	Negligible
Vibration	Local residents	Communication & monitoring	CEMP	Negligible-Minor; Temporary
Wind Microclimate	Passers by	Screening & practices to reduce nuisance wind	CEMP	Negligible

Table 14.6 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation **Residual Effect** – Significance and Duration (i.e., Temporary/Permanent)
Operational Phase				
Socioeconomics: Employment	Workers & local economy	N/A	N/A	Negligible
Socioeconomics: LA income	MCC rates & tax	N/A	N/A	Minor Beneficial (Not Significant)
Socioeconomics: Healthcare	Residents	N/A	N/A	Negligible
Socioeconomics: educational	Residents	N/A	N/A	Minor Adverse – Negligible (Not Significant)
Socioeconomics: Open Space & amenity	Residents & visitors	N/A	N/A	Negligible
Housing	Residents	N/A	N/A	Moderate Beneficial
Crime	Residents & Visitors	N/A	N/A	Minor Beneficial (Not Significant)
Townscape – character, urban grain, land use, movement	Residents & visitors	None needed	N/A	Moderate Beneficial Significant
Site character	Residents & visitors	None needed	N/A	Major Beneficial
Visual - viewpoints	1 of 28 viewpoints	None needed	N/A	Moderate Adverse
Heritage	Residents, Visitors - Listed Buildings & Conservation Areas	Embedded in design	N/A	Various but overall - Minor Adverse
Noise – commercial unit	Local residents	Noise limits in lease agreement	Tenant lease agreement	Negligible
Noise- building services plant	Local residents	None needed	N/A	Negligble

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation **Residual Effect** – Significance and Duration (i.e., Temporary/Permanent)
Noise- traffic change	Local residents	None needed	N/A	Negligible
Daylight & sunlight	Surrounding properties	None needed	N/A	Negligible to Minor Adverse – Not Significant
Solar Glare:	15 locations – road users; train/tram drivers	Embedded in design, no further mitigation needed	N/A	Minor Adverse Not Significant
Solar Glare:	5 road locations	Glazing specifications should be low reflectance to areas of elevations specified	Planning condition	Minor-Moderate Adverse Signficant
Wind Microclimate	Some 21 areas in surrounds	Updated landscaping; provision of walls & 50% porous gates	Planning condition	Negligible
Climate Change	Buildings & infrastructure; residents & visitors	Building & landscape design & management details	Planning condition	May reduce Moderate Adverse

Monitoring

14.89 No monitoring is considered necessary with regard to human health and wellbeing effects.

Reference List

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

National Planning Policy Framework (NPPF, updated 2019, revised 2021 7 updated 2023)
https://www.gov.uk/government/publications/national-planning-policy-framework--2

Public Health England (PHE) Strategy (2019) *Public Health England (2019) Strategy 2020-2025*

https://www.gov.uk/government/publications/national-planning-policy-framework--2

Public Health England (PHE) Strategy (2019) https://www.gov.uk/government/publications/phe-strategy-2020-to-2025

Manchester City Council (MCC) Core Strategy (adopted 2012)
https://secure.manchester.gov.uk/info/200074/planning/3301/core_strategy

Manchester's Building Back Fairer (Marmot) Framework (2022-2027)
https://democracy.manchester.gov.uk/documents/s34506/104318%20Marmot%20Report_Building%20Back%20Fairer%20in0Manchester_V8.pdf

Manchester City Council (MCC 2017) https://www.manchester.gov.uk/

Places for Everyone – Joint Development Plan (Greater Manchester Councils Publication Draft, 2021)
https://www.greatermanchester-ca.gov.uk/what-we-do/planning-and-housing/places-for-everyone/the-plan/

Manchester City Council (MCC) Manchester State of the City Report (2020)
https://www.manchester.gov.uk/info/200088/statistics_and_intelligence/8083/state_of_the_city_report_2020

Our Manchester Strategy, Forward to 2025
https://www.manchester.gov.uk/info/100004/the_council_and_democracy/8148/our_manchester_strategy-_forward_to_2025

Public Health England (PHE) Spatial Planning for Health (2017) *Public Health England (2017) Spatial Planning for Health: an evidence resource for planning designing healthier* places

Public Health England (PHE) Health Impact Assessment in Spatial Planning (2020)
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/929230/HIA_in_Planning_Guide_Sept2020.pdf
The Manchester Strategy - Our Manchester (2016) https://www.manchester.gov.uk/mcrstrategy

IEMA *Cave, B. Fothergill, J., Pyper, R. Gibson, G. and Saunders, P. (2017) Health in Environmental Impact Assessment: A Primer for a Proportionate Approach. Ben Cave Associates Ltd, IEMA and the Faculty of Public Health. Lincoln, England*
www.iema.net https://www.iema.net/resources/reading-room/2017/05/01/get-primed-for-health-in-eia

Shaping Neighbourhoods: For Local Health and Global Sustainability (2010) *Barton H, Grant M & Guise R (3rd edition 2021) Taylor & Francis Ltd, England*

Wider Determinants of Health Public Health England (PHE) https://fingertips.phe.org.uk/profile/wider-determinants

The London Healthy Urban Development Unit (HUDU) '*Healthy Urban Planning Checklist'* (2017)

The London Healthy Urban Development Unit (HUDU) '*Rapid Health Impact Assessment (HIA) Tool* (2019)

https://www.healthyurbandevelopment.nhs.uk/our-services/delivering-healthy-urban-development/health-impact-assessment/

Institute of Environmental Management and Assessment (IEMA) Effective Scoping of Human Health in Environmental Impact Assessment; Determining Significance for Human Health in Environmental Impact Assessment (November 2022)
https://www.iema.net/

Manchester City Joint Strategic Needs Assessment (JSNA 2021)
https://www.manchester.gov.uk/info/500230/joint_strategic_needs_assessment

Office for Health Improvement & Disparities OHID (previously PHE) Local Authority Health Profiles
https://fingertips.phe.org.uk/profile/health-profiles/data

Office for National Statistics (ONS) for health and life expectancies (2018-2020)
https://www.ons.gov.uk/peoplepopulationandcommunity

Manchester City Council

https://secure.manchester.gov.uk/info/200088/statistics_and_intelligence/2178/health_and_wellbeing

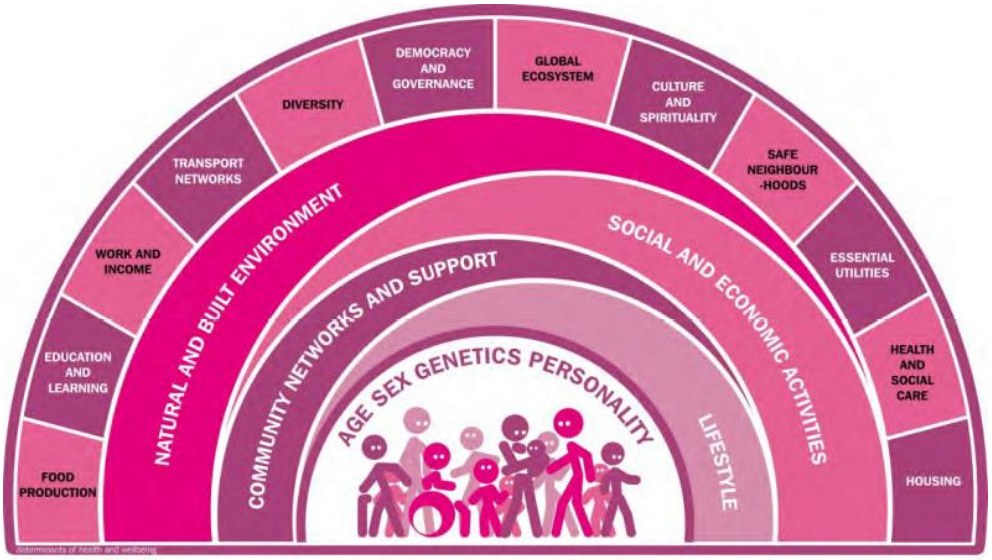
Manchester City Council https://secure.manchester.gov.uk/info/200088/statistics_and_intelligence/438/population/2

Manchester City Council (2022)
https://www.manchester.gov.uk/info/200088/statistics_and_intelligence/8551/state_of_the_city_report

Historic England Wellbeing (2021, updated 2023)

https://historicengland.org.uk/research/current/social-and-economic-research/wellbeing/

Figure 14.1



The Determinants of Health and Wellbeing (London HUDU, developed from Barton & Grant 2007)

Not to Scale	Date: December 2023

15. Socio-Economic

Introduction

15.1. This Chapter of the ES has been prepared by ekosgen and assesses likely Socio-Economic impacts of the Proposed Development upon the Site and surrounding area during construction and operational phases. 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.

15.2. The authors of this Chapter are Zoe Crampton and Will Christiansen. Zoe Crampton has an honours degree in Geography (BA Hons) from the University of Birmingham, and over 20 years' experience in advising on socio-economic matters, having completed over 50 socio-economic ES chapters for a wide range of residential, commercial and mixed-use projects. Will Christiansen has a Masters degree in Real Estate (MSc) and honours degree in Geography (BSc) from Northumbria University and Durham University, respectively. Will has 7 years' experience advising on socio-economic matters and has prepared approximately 25 socio-economic ES chapters. ekosgen (part of GC Insight) is a leading economic development consultancy, with expertise in social and economic impact assessment. Since the company's establishment in 2002, it has provided socio-economic advice to support planning applications for a wide range of development schemes in Manchester and further afield.

	Lead Author	Reviewer
Name	Will Christiansen	Zoe Crampton
Company	ekosgen	ekosgen
Qualifications/Accreditations relevant to technical area	BSc Hons Geography, MSc Real Estate Member of the Institute of Economic Development (MIED)	BA (Hons) Geography Member of the Institute of Economic Development (MIED)
Does the practitioner hold any IEMA qualification?	No	No
Company hold IEMA QMark?	No	
Years technical experience (in technical area)	7	20+
Number of EIA's delivered to date	25+	50+

Assumptions and Limitations

15.3. There are not recognised criteria for the assessment of socio-economic impacts, and therefore ekosgen, drawing on their expertise, knowledge of overarching guidance and experience of working in the subject area, have taken a structured approach to quantifying and assessing the scale and nature of potential impacts relative to baseline conditions. In cases where impacts could not be quantified, a qualitative judgement has been made, drawing on professional experience.

15.4. The most up to date data from official published sources has been used, however there are some limitations in the baseline data. Where this is the case, ekosgen have gathered data most closely aligning to the chosen study/impact area and clearly stated what geography the data collected refers to.

Relevant Legislation, Policy and Guidance

Policy

National Policy

15.5. In 2023, the UK Government published the revised version of the National Planning Policy Framework (NPPF). The NPPF provides a summary of all the Government's planning policies for England and how they should be applied. It is acknowledged that a revised consultation draft of the NPPF was published shortly after the election of a new government in July 2024. This is not yet national policy and so this section focuses on the 2023 version.

15.6. Paragraph 8 states that achieving sustainable development means that the planning system has 3 objectives, which are interdependent and need to be pursued in mutually supportive ways:

- An economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;
- A social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and
- An environmental objective – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

15.7. The "Building a strong, competitive economy" chapter provides insight into the expectations of developments. In paragraphs 81-85, the document states that the Government is committed to securing economic growth in order to create jobs and prosperity, building on the country's inherent strengths, and to meeting the twin challenges of global competition and a low carbon future.

15.8. Paragraph 62 states that within this context, the size and type of housing needed for different groups of people (e.g. students, young professionals, families, disabled people) should be assessed and reflected in planning policies.

15.9. Paragraph 93 notes that planning policies should ensure an integrated approach to considering the location of housing, economic uses and community facilities and services, as well as plan positively for the provision and use of shared space, community facilities, (such as local shops, meeting places, sports venues, cultural buildings, public houses and places of worship) and other local services to enhance the sustainability of community and residential environments.

Sub-Regional Policy

15.10. Places for Everyone is the long-term plan of nine Greater Manchester districts (all Greater Manchester districts except for Stockport) for jobs, new homes and sustainable growth.

The plan sets out a strategic policy framework for the nine districts and helps these areas to meet their local housing and employment needs by identifying land and infrastructure. The plan outlines the role of the city centre as the most significant economic location in the country outside of London and the need for it to be strengthened significantly.

15.11. There is a strong focus in this Plan on directing new housing towards previously developed sites within existing urban areas. This will help to address existing derelict and underutilised sites, as well as reducing the need to release greenfield and Green Belt land for development. Previously developed sites are often in relatively sustainable locations, close to facilities and served by existing infrastructure, and hence their reuse for housing can support wider objectives. Policy JP-H 4 'Density of New Housing' will ensure that the most is made of such sites, particularly in more accessible locations, further reducing the need for additional land release.

15.12. The Greater Manchester Housing Strategy (2019) identifies safe, decent and affordable housing with homes to fit the needs of current and future citizens as its priority. The Mayor's Town Centre Challenge has focused attention and brought different stakeholders and communities together to plot a new future for town centres across Greater Manchester. Increased town centre living is a common theme – meaning there is a need to make town and district centres attractive places to live. Using brownfield sites in and beyond town centres for housing is a vital part of the Places for Everyone strategy.

15.13. The Greater Manchester Local Industrial Strategy (2019) describes the city-region's economy as robust, diverse and growing. The Strategy states that the city region will take an integrated place-based approach to bringing forward strategic regeneration proposals in town centres and strategic sites, which integrate investment in land remediation, housing transport and other infrastructure to create sustainable employment locations.

Local Policy

15.14. The Manchester Core Strategy (2012) outlines the overall strategic direction for planning for Manchester over the plan period from 2012 to 2027 and aligns with national policies. The policies of the Core Strategy establish where major development and other forms of investment should be located in order to be sustainable, meet local needs and take full advantage of opportunities. A key spatial principle of the Core Strategy is that the regional centre of Manchester will be the focus for economic and commercial development, retail, leisure and cultural activity, alongside high-quality city living.

15.15. The Manchester Housing Strategy (2022) notes that the city has experienced rapid population growth and although more homes are being built in the city centre than at any time since the 2008 economic downturn there is a continued demand for new homes. The Strategy commits to building 32,000 new homes by 2032, 10,000 of which affordable homes and 3,000 within the city centre. The Strategy also states a commitment to deliver at least 80% of all homes built by 2032 on brownfield sites, located close to public transport.

15.16. Manchester's new Economic Strategy 'Investing In Success' (2023) states that although 22,350 new homes were built between 2011 and 2021, Manchester's economic success has made it a popular place to live, putting immense pressure on the housing market. The cost of housing has increased significantly faster than average wages, citing a substantial rise (+243%) in the median house price in Manchester over a 20 year period. Investing in Success also alludes to the housing affordability challenges that renters face, noting a large rental value differential between city centre and non-city centre locations. The strategy notes that although the housing strategy has committed to building 32,000 new homes by 2032, there is also a need for the rest of Greater Manchester to build housing in more

'better connected' locations to meet future demand, and meet their priority of achieving inclusive economic growth.

Assessment Methodology and Significance Criteria

Scenarios Tested

15.17. This Chapter assesses the following scenarios:

- Scenario 1: (Existing Baseline) Site as is today i.e. Phase 1 tower as currently built alongside the developments identified as baseline developments;
- Scenario 2: Baseline + Viadux plot 2a + Viadux plot 2b;
- Scenario 2a: Baseline + Viadux plot 2a + Viadux plot 2b + cumulative.

15.18. Scenario 1 represents the existing baseline and so this is addressed in 'Baseline Conditions' helping to inform the sensitivity of socio-economic receptors. For the purposes of clarity, all baseline developments identified in Chapter 2 are considered relevant in the assessment of socio-economic effects and are taken into account when assessing the sensitivity of socio-economic receptors.

15.19. Scenario 2 is addressed within the 'Identification and Evaluation of Likely Significant Effects' section whereas Scenario 2a is addressed within the 'Cumulative Effects' section. Scenario 2a considers the cumulative effects of the identified committed developments, all of which are considered relevant in the assessment of socio-economic effects.

The Study Area

15.20. The anticipated effects of the Proposed Development are set out in more detail in Table 15.1. The likely effects influence the geography over which the study area is considered. The effects of the Proposed Development are considered across the following geographies:

- Local level – the definition of the local study area varies depending on the effect being assessed and any associated need to use bespoke catchments and/ or administrative spatial scales as set out within relevant local and regional policies (see Table 15.1 and Figure 15.1). This can include the ward level administrative boundaries as well as a relevant walking distances or distance radii from the Site.
- District – Manchester City Council (MCC) is identified as the administrative area in which the Proposed Development is located and the area in which housing and employment targets are set. For some receptors, the appropriate study area is the district level.
- Sub-regional – Greater Manchester is predominantly considered when assessing temporary construction employment effects of the Proposed Development. For some receptors, the appropriate study area is the sub-regional level.

Table 15.1 - Geographical study areas

Effect	Study area	Justification
Change in temporary employment during the construction stage	Sub-regional (Greater Manchester)	Construction labour is likely to be drawn from a wide geography across Greater Manchester.

Effect	Study area	Justification
Change in direct operational employment	District (MCC)	Employment/economy targets are set at district level.
Change in economic performance (GVA and spend)	District (MCC)	Employment/economy targets are set at district level.
Change in annual fiscal contributions in the form of business rates and council tax contributions	District (MCC)	Revenue from council tax is collected at a local authority level. Business rates revenue is collected nationally with a proportion retained by the local authority.
Change in demand for healthcare facilities (GP services and dentists) as a result of the uplift in population	One mile from the Site	Based on Healthy Urban Development Unit (HUDU) guidance indicating that impact on GP capacity should be assessed within one mile catchment from any Proposed Development.
Change in demand for early years and primary school places arising from the uplift in population	Two mile walking distance from the Site and ward level for childcare provision	Information/data regarding primary pupil planning areas is not available in the public domain. The Department for Education statutory walking distance of 2 miles (for children up to age of 8) is used as a guide. Childcare sufficiency in Manchester is considered at the ward level.
Change in demand for secondary school places arising from the uplift in population	Three mile walking distance from the Site	Information/data regarding secondary pupil planning areas is not available in the public domain. The Department for Education statutory walking distance of 3 miles (for children aged of 8-16) is used as a guide.
Change in demand for the use of the existing open space and amenity space and children's play space within close proximity to the Site.	Deansgate ward	Benchmarks for both quality and quantity of open / amenity space provision are typically provided at the district level. In the absence of up to date, locally set benchmarks for the provision of accessible open/green space, the Fields in Trust 6 acre (2.4 ha) per 1,000 population benchmark is applied at a Ward level geography. This reflects the areas of open and amenity space and leisure facilities that residents of the Proposed Development would typically use on a day-to-day basis.

15.21. In addition, national level data is also included within the baseline assessment, where relevant, to provide additional context and to help determine the sensitivity of baseline conditions in other geographies.

Source of Effect

The EIA Scoping Report (Appendix 2.1) provides more detail on the scope of this Chapter, including any effects which have been scoped out. Socio-economic effects are likely during both the

construction and operational phases of the Proposed Development. Table 15.2 describes the likely socio-economic effects from the Proposed Development and their relevant receptors.

Table 15.2- Likely Effects and Relevant Receptors

Effect	Description	Receptor
Change in temporary employment during the construction stage	The construction of the Proposed Development will create temporary employment within the construction sector.	Individuals seeking construction employment
Change in direct operational employment	The operation of the Proposed Development could generate direct, on-Site employment as well as further indirect and induced employment within the local economy.	Individuals seeking employment
Change in economic performance (GVA and spend)	The economic output and local spending impacts of employment generated as a result of the Proposed Development	The local economy
Change in annual fiscal contributions in the form of business rates and council tax contributions	The revenue to the local authority generated by the Proposed Development through residential uses (council tax) and commercial uses (business rates)	Manchester City Council total business rates and council tax revenue
Change in demand for healthcare facilities (GP services and dentists) as a result of the uplift in population	An increase in resident population could affect the balance of supply of the provision of local primary healthcare services such as GPs and dentists	Primary healthcare facilities
Change in demand for early years and primary school places arising from the uplift in population	An increase in resident population could yield pupils of school age who may affect the balance of supply of the provision of local early years childcare and primary schools	Early years and primary education facilities
Change in demand for secondary school places arising from the uplift in population	An increase in resident population could yield pupils of secondary school age who may affect the balance of supply of the provision of local secondary schools	Secondary education facilities
Change in demand for the use of the existing open	An increase in resident population could affect the	Users of open space and children's play space

Effect	Description	Receptor
space and amenity space and children's play space within close proximity to the Site.	balance of supply of the provision of open /amenity space and children's playspace.	

Significance Criteria

Receptors and Receptor Sensitivity

15.22. The sensitivity of each receptor, outlined in Table 15.3, is evaluated as being high, medium, low, or negligible based on a review of the baseline position of each receptor, and where relevant, its performance against other benchmark areas. Where relevant, the importance of the receptor in local and regional policy terms is also considered in defining its sensitivity.

Table 15.3- Definition of Sensitivity of Receptor

Sensitivity	Definition
High	Evidence of direct and significant socio-economic concern relating to the receptor. May be given a high priority in local, regional and/ or national economic and regeneration policy.
Medium	Some evidence of socio-economic concern linked to receptor, which may be indirect. Change relating to receptor has medium priority in local, regional and/ or national economic and regeneration policy.
Low	There is little evidence of socio-economic concern relating to receptor. Receptor is given a low priority in local, regional and/ or national economic and regeneration policy.
Negligible	Very low importance with little or no priority even at the local scale.

Magnitude of Impact

15.23. The magnitude of impact experienced by each receptor is determined by considering the change from (future) baseline conditions, both before and (if required) after mitigation. The criteria used for the assessment of the magnitude of socio-economic impacts (both beneficial and adverse) are outlined in Table 15.4.

Table 15.4 - Definition of Magnitude of Impact

Magnitude	Definition
Major	Loss of resources and/ or integrity of resource; severe damage to key characteristics, features, or elements.
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality.
Moderate	Loss of resource, but not adversely affecting its integrity; partial loss of and/ or damage to key characteristics, features, or elements.
	Benefit to and/ or addition of key characteristics, features, or elements; improvement of attribute quality.
Minor	Some measurable change in attributes, quality, or vulnerability; minor loss of and/ or alteration to one (or more) key characteristics, features or elements.
	Minor benefit to and/ or addition of one (or more) key characteristics, features, or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.

Magnitude	Definition
Negligible	Very low importance with little or no priority even at the local scale.

Nature of the Effect

15.24. The nature of the effect is defined as either:

- Beneficial – an advantageous effect on the impact area; or
- Adverse – detrimental effects on the impact area; or
- Neutral – neither beneficial nor adverse.

Impact Significance

15.25. The significance of the effect is based on the matrix set out in Table 15.5. Effects assessed as moderate or major are considered significant in EIA terms. The matrix provides flexibility in assessing the significance of effects and allows for the application of professional judgment, where necessary, to determine whether an effect that straddles the minor-moderate threshold is assessed as being significant or not significant.

Table 15.5- Impact Significance Matrix

Magnitude	Sensitivity		
	High	Moderate	Low
Major	Major Adverse/Beneficial	Major - Moderate Adverse -Beneficial	Moderate - Minor Adverse -Beneficial
Moderate	Major - Moderate Adverse/Beneficial	Moderate - Minor Adverse – Beneficial	Minor Adverse/Beneficial
Minor	Moderate – Minor Adverse/Beneficial	Minor Adverse/Beneficial	Minor-Negligible
Negligible	Negligible	Negligible	Negligible

Baseline Conditions

Population

15.26. Population data indicates that there are approximately 18,800 people living in Deansgate ward according to the ONS Census population estimates. It is assumed that the population effects of residential developments identified within the existing baseline (Scenario 1) are not captured within the 2021 Census-derived figures presented above. Assuming that all residents would be new to the area (worst-case assumption) then the baseline developments could uplift the study area baseline population from 18,800 to around just under 26,000.[1]

15.27. There is a substantially higher proportion of working age (16-64) residents (95%) in the study area compared to Manchester (70%), the North West (62%) and England (63%).

Housing and Housing Targets

15.28. Housing data from the 2021 Census shows that there are around 8,950 dwellings in the Deansgate ward. This makes 3.8% of the total of households in the Manchester district

[1] This assumes a blanket assumption of 1.5 persons per home on average, given the city centre location.

(c.233,000). Manchester has a 10 year housing target of delivering 36,000 homes by 2032, 10,000 of which will be social and affordable housing. Greater Manchester plans to deliver 201,000 new homes over the period 2018-2037, according to the GMCA housing strategy.

Employment and Labour Market

15.29. The latest available employment data from the Business Register and Employment Survey indicate that total employment within the Deansgate ward in central Manchester stood at just over 100,000 in 2022, accounting for 23% of Manchester's total employment (432,000). Given the lag in employment data through the Business Register and Employment Survey, it has been assumed that the employment effects of baseline developments (Scenario 1) are not included within the figures presented above. The employment generated by baseline developments (Scenario 1) has the potential to increase total district level employment to around 436,000.[2]

15.30. In terms of employment structure at the district level, 36% of employment is within 'Professional, scientific and technical' (14%), 'Financial and insurance' (4.4%), 'Information and Communication' (5.8%) or 'Administrative and support services' (11.6%) - higher than the Greater Manchester (29%), regional (23%) and national (27%) averages. Other significant industries in Manchester include Retail (7%) and Accommodation and food services (9%), employing approximately 30,000 and 37,000 people, respectively.

15.31. At the Greater Manchester level, the construction sector supports approximately 71,000 jobs. Due to significant uncertainty in both the levels of capital investment and build period for the identified baseline developments (Scenario 1) the associated construction employment effects cannot be estimated. It is therefore assumed that the figure presented above represents the existing baseline position.

15.32. Manchester's claimant count as of August 2024 is significantly higher (7.3%) than that of the benchmark areas of Greater Manchester (5.7%), the North West (4.8%) and the national average (4.4%). Though high at the district level, the claimant count is far lower (1.2%) at a more localised level (Deansgate and Piccadilly wards). Similarly, Manchester's unemployment rate (6.8%) is higher compared to Greater Manchester (5.5%), regionally (4.6%) and nationally (4.0%).

Economic Output

15.33. Manchester supports economic output (measured by Gross Value Added - GVA) of approximately £32 billion, with an average GVA contribution per full time equivalent (FTE) of approximately £92,700 per annum. Assuming that the economic output associated with identified baseline developments (Scenario 1) is not accounted for in the above figures, the collective employment generation (identified above) has the potential to uplift total study area GVA by approximately £0.3 billion.

15.34. The Accommodation and food services sector in Manchester supports economic output of approximately £1.2 billion and an average GVA per FTE contribution of £49,100 per annum. The Retail sector supports economic output of c.£1.7 billion at an average GVA per FTE of £83,000 per annum. On the basis of the broad definition outlined above, the visitor economy supports economic output of c.£1.8 billion at an average GVA per FTE of £58,000 per annum.

15.35. The Greater Manchester construction sector supports economic output of approximately £5.4 billion. For every FTE construction job this equates to an average GVA contribution of

[2] High level assessment considering the quantum of employment-generating development across all baseline developments, the application of appropriate employment densities and the application of a general allowance for displacement (50%).

£88,300 per annum. This is higher than the all-sector average for Greater Manchester (£78,900).

Local Authority Revenue

15.36. Given current macroeconomic conditions, cost of living challenges and the local authority funding landscape, the delivery of essential Council services nationwide are come under increasing strain. In this context, local authority revenue plays an important role in the delivery of essential local services.

15.37. For the 2023/24 financial year, MCC collected nearly £214 million in council tax, after accounting for council tax support paid. MCC reports that council tax revenue is extremely important and enables the Council to deliver essential services. It is noted that the pandemic had a huge impact on residents' ability to pay council tax and that collection rates, whilst showing recent recovery, have not returned to pre-pandemic levels, meaning reduced levels of revenue for the city.

15.38. Since 2017, the Greater Manchester authorities have been part of a 100% business rates retention pilot scheme meaning that MCC retains all of the growth it receives in its business rates base. As of 2023/24, MCC collected c.£347 million in business rates. Alongside wider support measures implemented nationally to businesses affected by the pandemic (including business loans, furlough and the self-employed income scheme), the Council has administered business rates relief which has led to a short-term reduction in revenue through business rates in the post-pandemic period.

Healthcare

15.39. There are six GP practices located within 1 mile of the Site. Three of which operate out of the recently built New Jackson Street Medical Centre. The 'Vallance Medical' practice is included within this analysis, however, it operates across two sites: one at New Jackson Street Medical Centre and the other in Ardwick, located more than 1 mile from the Site. The data on patient population and GP staffing, however, does not disaggregate between these two sites.

15.40. The New Jackson Street Medical Centre is the first GP medical centre to open in the city centre since 2009. The Greater Manchester Integrated Care Partnership indicates that this facility will serve the needs of residents in this growing part of the city centre as well as expanding capacity and choice.

15.41. According to latest available data (August 2024), these six practices are currently operating at an average of 2,341 patients to every FTE GP. This is substantially above the HUDU of 1,800 patients per FTE GP. The two closest GPs 'The Docs Surgery' and 'City Health Centre' are operating at an average of 1,533 and 3,186 patients to every FTE GP, respectively. These data show that there is a large shortfall in the provision of GP services locally based on the application of recognised benchmarks. It should be noted that practices can operate sustainably at higher patient to GP ratios dependent upon specific staffing and funding models as well as taking into account the demographic profile of the patient population. As indicated above, the Deansgate and Piccadilly ward populations comprise almost entirely of people aged 16-64 (95%) of which the vast majority are under the age of 40 (92% or c.34,000 residents aged between 16-39). On the reasonable assumption that a more elderly patient profile is likely to generate higher demand for primary healthcare services, it is therefore more likely that practices operating locally can sustainably support higher patient to GP ratios.

Table 15.6 - GP provision

GP Provision	Within 1 mile of Site	Manchester Average

No. of GP practices	6	82
No. of GP FTEs	40.7	453.3
Registered Patients	95,306	740,775
Patients per FTE GP	2,341	1,634

15.42. In terms of local dental provision, there are 11 dentists within a 1 mile radius, the nearest of which is '207 Dental Care', located 0.3 miles away.

Education

15.43. In terms of local educational provision, there are no primary schools located within the Deansgate ward. The closest schools (all within 1 mile walking distance from the Site) are located to the south in Hulme ward. Within a 2 mile walking distance there are 2525 primary schools. For the three schools located closest to the Site, the latest roll and capacity data (School Census data from January 2024) indicate that these schools are operating at a 5.5% surplus of places (49 pupil places). This is above the Department for Education's 2% operating margin factored into its Basic Need funding calculations to help support parental choice, churn in the pupil population, and the general manageability of the system (Department for Education, 2023).

Table 15.7 - Primary School Provision

Name of Primary School	Walking distance from Site (approx.)	School capacity	Pupils on Roll	Surplus/Deficit
St Philips CofE Primary School	0.6 miles	210	206	4
St Wilfrid's RC Primary School	0.8 miles	210	224	-14
Rolls Crescent Primary School	1.0 miles	472	413	59
Total		892	843	49

15.44. The primary schools that are located within a 2 mile walking distance from the Site are located across Manchester and Salford local authorities. The latest data indicate that these schools are operating close to capacity (only 1.2% surplus places) and therefore do not allow for any operational flexibility margin.

15.45. Additional capacity will be provided through the development of a new Crown Street Primary School which opened in September 2024. Located 0.4 miles away from the Proposed Development, Crown Street Primary School will serve residents predominantly in the New Jackson, Deansgate Square and surrounding areas of the city centre. Initially, the school will provide 30 reception pupil places and 24 pre-school places, but at full capacity will accommodate 230 pupils from pre-school to Year 6 (equivalent to 1 form entry).

15.46. There are 8 nurseries within 1 mile walking distance of the Proposed Development, the nearest one being 'Bright Horizons Manchester Day Nursery and Preschool' which is 0.3 miles away and 'Paint Pots Manchester Day Nursery' which is 0.5 miles away. The latest Manchester Childcare Sufficiency Assessment (2023) indicates that the Deansgate ward has sufficient childcare provision for both 2 year olds and 3-4 year olds, as does Hulme. However, Piccadilly ward has sufficient provision for 2 year olds but not for 3-4 year olds. As noted above, the newly opened Crown Street Primary School in September 2024 will initially accommodate 24 pre-school places, boosting local early years capacity.

15.47. Secondary school place planning areas for Manchester are not known. In the absence of these, the analysis below presents the capacity data for schools within walking distance radii, before then presenting the aggregate picture at a district level, for context.

15.48. There are six secondary schools located within a 2 mile walking distance of the Site. These consist of schools located within Manchester and Salford districts. The latest roll and capacity data indicate that these schools are operating at a 6.2% surplus of places (409 pupil places).

Table 15.8- Secondary School Provision

Name of Secondary School	Walking distance from Site	School Capacity	Pupils on Roll	Surplus/Deficit
Trinity CofE High School	0.9 miles	1,500	1,510	-10
Manchester Academy High School	1.6 miles	1,170	1,086	84
Oasis Academy Media City	1.7 miles	1,150	1,020	130
Eden Boys Leadership Academy	1.9 miles	800	643	157
Eden Girls Leadership Academy	1.9 miles	800	637	163
Dean Trust Ardwick	2.0 miles	1200	1,315	-115
Total		6,620	6,211	409

15.49. There are 24 secondary schools within a 3 mile distance who collectively are operating at a surplus of 11.0%. These consist of schools located within Manchester, Salford and Trafford districts. At a whole district (Manchester) level, there are 7.6% surplus places. Therefore, all schools located closest to the Site (within 2 and 3 miles) are operating at a surplus and above the flexibility margin of 2% used by the Department for Education in its Basic Need funding calculations.

Open/Amenity Space and Play Space

15.50. Research undertaken as part of the Deloitte Crane Survey estimates that over 25 acres (over 10 hectares) of new public amenity space was either delivered or under construction as part of new developments within Manchester city centre by the end of 2022. This encompasses new 'pocket parks', pedestrianisation plans as well as a brand new parks being delivered, notably a new 6.5 acre public park at Mayfield which opened in September 2022.

15.51. Within the Site's immediate vicinity (Deansgate Ward) there are a number of open/ amenity spaces, including Hulme Park (4.88ha), All Saints Park (0.75ha), Castlefield Urban Heritage Park (0.81ha), St John's Gardens (0.5ha), Sackville Gardens (0.8ha) and Barrack Street Park (3ha). Despite this, the Deansgate ward has an average of 0.06 ha per 1,000 people of accessible green space per person. This level of provision is significantly below the benchmark of provision of 2.4 ha suggested by the Fields in Trust Green Space Index although not unexpected given the inner city location.

15.52. Besides areas formally identified as 'green space', there is a broad range of public amenity spaces within close proximity to the Site that enhance the experience of living and working within the area. To the Site's immediate north, recent developments within the St. John's and Spinningfields areas have brought forward new public spaces such as pocket parks, pedestrianisation projects and public squares (e.g. Lincoln Square). To the immediate south and west, new developments within the First Street and Great Jackson Street regeneration areas feature new public spaces that enhance provision for residents as well as improving the connectivity between public spaces within this portion of the city centre. Another notable project located close to the Site is the conversion of the Grade II-listed Castlefield Viaduct to create a 330 metre 'park in the sky'.

15.53. The current Manchester Blue and Green Infrastructure Strategy (2022) is in place to respond to commitments made in the City's Local Plan and Climate Change Action Plan. It

demonstrates the Council's commitment to Green Spaces, with plans to spend £12.5 million on a large-scale Capital Park Investment Programme between 2021-25.

15.54. Of the baseline developments identified (Scenario 1), several include some form of public realm or amenity space provision. These will deliver new, high quality public realm that will also improve connectivity between public spaces within the local area (Deansgate ward) and across the wider city centre. The Great Jackson Street strategic regeneration framework area includes proposals under development to create a new 0.5 ha public park as part of The Blade and Three60 development, linking into the public realm brought forward as part of the Deansgate Square development (0.4 ha 'riverside walk') and to other public spaces across the City Centre and south to Hulme Park.

15.55. Recent developments in children's play space include 'Little Northerners' located near Great Northern Warehouse. This consists of an external sandpit area and playhouse as well as indoor playroom including play kitchens, shops, climbing boxes, instruments and a castle.

Receptor Sensitivity

15.56. Table 15.9 summarises the sensitivity of each of the receptors identified in the baseline.

Table 15.9 - Receptor Sensitivity

Receptor	Sensitivity	Study Area	Justification
Individuals seeking construction employment	Moderate	Sub-regional (Greater Manchester)	A proportion of the temporary construction employment created as a result of construction activity could be expected to be filled by unemployed people (both skilled and unskilled) from across Greater Manchester. The unemployment rate and claimant rate for Greater Manchester is higher than the regional (North West) average.
Individuals seeking employment	High	District (MCC)	Local employment growth will contribute to the overall economic growth and prosperity of the city centre which is a strategic priority both at a MCC and Greater Manchester level. In Manchester, both the unemployment and claimant rates are higher than the Greater Manchester, regional and national rates.
Local economy	High	District (MCC)	Local economic growth will contribute to the overall economic growth and prosperity of the city centre which is a strategic priority both at a MCC and Greater Manchester level. Direct employment will result in GVA effects across the local economy. Local household spending will support additional employment with resulting GVA effects across the local economy.
Manchester City Council total business rates and council tax revenue	High	District (MCC)	Local authority revenue is essential in the delivery of local services and has experienced lower collection rates in recent years due to the impact of the COVID-19 pandemic.
Primary healthcare facilities	Low	1 mile from the Site	The current ratio of registered patients per FTE GP is above benchmark levels and expected to increase further as new housing

Receptor	Sensitivity	Study Area	Justification
			development comes forward. The demographic profile of the patient population (young) suggests that the local practices can operate sustainably at higher levels of patients per GP (and dentist). The recent development of New Jackson Street Medical Centre houses three GP practices and will increase capacity and choice in this part of the city centre.
Primary education and early years facilities	Low	1 mile from the Site (walking distance)	There is surplus capacity (5.5.5%) for primary schools located within a 1 mile walking distance.. The ward in which the Site is located has a variety of early years providers and the latest childcare sufficiency assessment indicates that there is sufficient childcare provision locally (Deansgate). Further primary school provision is planned (including early years) within close proximity to the Proposed Development (Crown Street Primary School, which opened in September 2024).
Secondary education facilities	Low	2 miles from the Site (walking distance)	There is 6.2% surplus of capacity at secondary schools located within two miles walking distance of the Site. At the district level, pupil place capacity is higher at a 7.6% surplus.
Users of open/amenity space and children's play space	Low	Deansgate ward	For a city centre location, there is a good range of publicly accessible open / amenity spaces and children's play spaces that are accessible within the Deansgate ward. Baseline developments will also deliver new public realm that will add to the quality and connectivity between public spaces across the study area and wider city centre.

Identification and Evaluation of Likely Significant Effects

15.57. As indicated above, the assessment presented in this section relates to Scenario 3 (Existing Baseline plus the Proposed Development).

Construction Phase

Temporary Construction Employment

15.58. The period of construction works will support a number of on-Site and off-Site employment opportunities within the construction sector.

15.59. To estimate the impact of temporary employment supported as a result of the construction activity, the turnover per employee within the construction industry at the regional level (North West) is applied to forecast costs associated with the construction works for the Proposed Development and then divided by the expected duration of the construction works (in number of years) to provide the average number of construction workers per annum.

15.60. Based upon construction cost estimates provided by the Applicant (£284 million) and a construction period of 6 years, this would lead to an average labour requirement of approximately 245 FTEs per annum.

15.61. This employment could be expected to include a broad range of job-types and occupations, both on-Site as well as off-Site (i.e. both direct and indirect / supply chain employment). The nature of the jobs supported during the period of works is expected to vary. On-Site employment could include highly skilled professions (such as site surveyors) alongside lower skilled supply chain jobs (such as labourers), whilst off-Site activity could be expected to support employment across a wide supply chain ranging from suppliers of building materials to architects.

15.62. It is acknowledged that whilst some construction workers may live locally, and their expenditure on household goods and services would also support employment in local businesses, it is also likely that construction workers could be drawn from within the wider region, depending on the roles available and contractors selected. On this basis, an estimate of the induced effects supported by the construction activity cannot be accurately quantified, and therefore is not assessed.

15.63. Based upon developer targets set for the first phase of development on the Site (a target of 60% of the total construction workforce to be City of Manchester residents) it is reasonable to assume that a similar commitment towards employing local residents would be adopted for the Proposed Development. Similarly, developer targets set for the first phase of development on the Site indicated a commitment to providing apprenticeships to City of Manchester residents (target of 75% of all year long apprenticeships offered) and also a commitment to procuring sub-contractors and suppliers based in the City of Manchester (target of 70%). The implementation of similar commitments for the Proposed Development will ensure that the majority of construction jobs (both direct and in the supply chain and related services) can be accessed by people (both employed as well as unemployed) from within the Greater Manchester area.

15.64. The construction sector currently supports around 65,000 FTE jobs across Greater Manchester. The estimated annual construction jobs supported during the period of works could therefore be expected to represent 0.4% of all sub-regional employment in the construction sector. Given the small percentage, construction activity is not expected to stimulate a noticeable change in the baseline conditions at the sub-regional level, and as such, the magnitude of the impact is assessed to be minor.

15.65. With the sensitivity of the receptor assessed as moderate, this would give rise to a direct, temporary, short term and minor beneficial (not significant) effect.

Operational Phase

Employment and the Local Economy

15.66. The provision of a 160 bedroom luxury hotel in plot 2aand commercial floorspace, totalling 2,387 sqm (GIA) across both plot 2a and 2b (for retail, restaurant and bar uses) will make a positive contribution to the district employment levels.

15.67. For luxury hotels the typical employment generation is higher, with HCA guidance suggesting a benchmark of 1 FTE job per hotel bedroom. The employment generation from the proposed plot 2a hotel is therefore estimated at 160 FTEs (gross).

15.68. Applying appropriate employment densities for retail, restaurant and bar uses the employment generation from these uses is estimated at 102 FTEs (gross).

15.69. Factoring allowances for potential displacement of employment and multiplier effects at the district level, it is estimated that the Proposed Development will support 196 FTEs (net). This assumes a completed, fully operational scheme.

15.70. For the purposes of estimating the levels of expenditure likely to be generated by residents living within the Proposed Development, it is assumed that the accommodation will operate at full occupancy levels. ONS family spending data provide insight into household spending patterns at the regional (North West) level. It is estimated that the annual spend on retail goods and services (excluding housing costs) is £13,995 (current prices). This comprises £6,483 on convenience goods and £7,512 on comparison goods. Applying these assumptions to the total number of households to be provided by the Proposed Development generates an annual expenditure of £8.2 million. Making an allowance for spend retention within the district (based upon an analysis of data presented within MCC's most recent available Retail Study) it is estimated that £7.1 million could be retained within Manchester.

15.71. The regional (North West) turnover per FTE worker in the retail sector is estimated at c.£252,000 (current prices). The level of spending is therefore expected to support 28 FTE jobs directly. In combination with direct, on-Site employment presented above, the Proposed Development could generate in the order of 224 FTE jobs. This level of employment generation represents less than 0.5% of the total employment within the Retail and Accommodation & food services sectors combined (67,000) in Manchester. It therefore constitutes a negligible magnitude of change at the district level.

15.72. With the sensitivity of the receptor (individuals seeking employment) identified as high, this would give rise to a direct, long term and negligible (not significant) effect.

15.73. Through the application of a GVA per job benchmark (Manchester level) for relevant sectors (Accommodation & food services and Retail) to the level of direct on-Site employment (131 FTEs net), this could support a GVA uplift of c.£8.1m per annum. Combined with the increase in household spend reported above, this level of growth represents a negligible magnitude of change with reference to total levels of economic output/size of the economy at the district level.

15.74. With the sensitivity of the receptor (the local economy) identified as high, this would give rise to a direct, long term and negligible (not significant) effect.

Local Authority Revenue

15.75. Through the application of the average council tax charge for properties for the 2024/25 financial year (c.£2,500) to the number of households that the Proposed Development will bring forward, this could lead to an uplift in council tax revenue in the order of £1.5 million. This represents 0.7% of the total revenue received from council tax in the previous financial year (2023/24).

15.76. The level of potential increased revenue from business rates as a result of delivering on-Site commercial floorspace is estimated based upon benchmarks in the rateable value per square metre for retail properties at the Middle Super Output Area (MSOA) level (using data from the Valuation Office Agency). After accounting for a business rates multiplier (0.546), this is estimated at £199,000.

15.77. The potential revenue from business rates as a result of delivering a 160 bedroom hotel is estimated by applying the average rateable value per bedroom calculated from a small sample of hotels of an equivalent market positioning (luxury) in the local area. After accounting for a business rates multiplier, this is estimated at £207,000. In total, the potential business rates revenue from the Proposed Development is in the order of

£406,000 per annum. This level of increased revenue is 0.1% of the total business rates income to MCC in 2023/24.

15.78. The combined effect of local authority revenue is considered to represent a minor magnitude of change. With the sensitivity of the receptor identified as high, this would give rise to a direct, long term and minor beneficial (not significant) effect.

Primary Healthcare Facilities

15.79. The Proposed Development is expected to yield a population of around 1,855 persons. As a worst-case scenario, assuming all of these residents would be additional (and not already registered with GPs in the study area), this would lead to an increase in the number of registered patients per FTE GP from 2,341 to 2,387 +1.9%).

15.80. It cannot be estimated the extent to which this increase in population is attributable to people already living in the area and therefore already registered with services. This level of percentage increase is therefore considered to be extremely unlikely and therefore represents a worst-case position. Furthermore, given the demographic profile of the existing local resident population it is also noted that residents living at the Proposed Development and nearby baseline developments are likely to generate a generally lower level of demand for primary healthcare services.

15.81. Within this context, the magnitude of change is assessed as Minor. With the sensitivity of the receptor identified as low, this would lead to a direct, long-term and negligible (not significant) effect.

Primary and Early Years Education

15.82. The pupil yield from new development can be estimated using benchmarks provided at the local authority level using data from the Department for Education (DfE Pupil Yield Data Dashboard). At a Manchester level, 0.14 primary aged pupils are generated per new home. Applying this benchmark to the total number of homes proposed leads to the generation of 82 primary aged pupils. Again, this is presented as a worst case scenario since it is highly unlikely that all residents will be new to the area.

15.83. Presented as a worst-case, the addition of 82 pupils to the primary school roll within the study area (1 mile walking distance) would lead to a small deficit in pupil places against capacity (-33 places). The addition of new capacity at Crown Street Primary School from September 2024, will, once fully operational, increase capacity by 230 places, which would lead to an overall surplus of 197 places (17.6%).

15.84. Through the application of a local authority benchmark (0.03), the early years pupil yield from the Proposed Development is 18 (worst-case). Given the quantity of early years providers locally, combined with the existing childcare sufficiency assessment for the local area (Deansgate ward), it is considered that this level of increased demand could be accommodated by existing provision.

15.85. In assessing the magnitude of change, it should be noted that the application of district-wide pupil yield benchmarks will likely overestimate the number of school-aged children that a city centre development providing one and two bedroom housing will generate. Notwithstanding this, the city centre has experienced strong levels of population growth, driven predominantly by growth in young people attracted to living centrally, close to the variety of employment opportunities that Manchester increasingly offers. Whilst this demographic cohort typically would not lead to high levels of demand for pupil places, the continued attractiveness of the city centre as a place to live and work and ongoing residential growth is expected to result in additional demand for early years and later

primary school places as more residents choose to remain in the area when starting a family.

15.86. Within this context, the magnitude of change with respect to primary and early years education is assessed as being minor. With the sensitivity of the receptor assessed as low, the Proposed Development would give rise to a direct, long-term and negligible (not significant) effect.

Secondary Education

15.87. At a Manchester level, 0.07 secondary aged pupils are generated per new home (DfE Pupil Yield Data Dashboard). Applying this benchmark to the total number of homes proposed (once fully built out and occupied) leads to the generation of 41 secondary aged pupils. Again, this is presented as a worst case scenario since it is highly unlikely that all residents will be new to the area.

15.88. The addition of 41 pupils to the secondary school roll within the study area would lead to the maintenance of surplus capacity (5.6%) and above the recommended margin to maintain operational flexibility and parental choice.

15.89. The magnitude of change is therefore assessed as negligible. With the sensitivity of the receptor assessed as low, the Proposed Development would give rise to a direct, long-term and negligible (not significant) effect.

Open Space and Play space Provision

15.90. An uplift in the resident population will increase demand and usage of nearby open and green spaces and children's play spaces. The Proposed Development will bring forward 2,076 sq m internal amenity space and 1,189 sq m of external amenity space. This level of provision represents 1.1 sq m /person and 0.6 sq m /person respectively.

15.91. Whilst the delivery of this amenity space will enhance the living conditions of residents of the Proposed Development, it would make little (if any) contribution to the provision of publicly accessible outdoor space for the local population more generally. The Proposed Development will not make any contribution towards the provision of play space.

15.92. On balance it is assessed that the magnitude of change associated with the open/amenity space and play space provision is minor. With the sensitivity of the receptor assessed as low, the Proposed Development would give rise to a direct, long-term and negligible (not significant) effect.

Cumulative Effects

15.93. Within the discipline of Socio-Economics all cumulative developments identified have the potential to interact with the Proposed Development and are considered here.

15.94. Collectively, the cumulative developments have the potential to deliver:

- c.5,000 new homes;
- c.3,000 student bedspaces;
- c.135,000 sq m office floorspace; and
- c.10,000 sq m of retail floorspace.

15.95. The assessment of cumulative effects adopts a similar approach to the main assessment presented above. Given the breadth of cumulative developments identified it is considered that a proportionate approach is to adopt a consistent approach to assessment across different socio-economic effects. The assessment is necessarily approximate to provide a sense of the scale of impact relative to the baseline position alongside the Proposed

Development. Table 15.10 considers the cumulative effects of the Proposed Development alongside committed developments (Scenario 2a). It is assumed that any mitigation required to meet the needs arising from committed developments will be subject to negotiations for each scheme to provide adequate on/off site provision and/or financial contributions.

15.96.

Table 15.10 - Cumulative Assessment

Effect	Comment	Magnitude of change	Assessment of Significance
Temporary Construction Employment	Given the scale of development across all cumulative developments identified alongside the Proposed Development, although not quantified, it is reasonable to assume that this would lead to a substantial increase in the requirement for construction labour at the sub-regional (Greater Manchester) level. This has the potential to generate increased demand for labour as well as well as substantial levels of opportunity within the construction sector. A recent publication by RICS UK suggests that the construction sector is improving in terms of activity and that looking forward, indicators are upbeat. Given the anticipated scale of construction activity across the cumulative developments (alongside the committed baseline), in comparison with the overall level of construction activity across Greater Manchester, the magnitude of impact is assessed as moderate.	Moderate	Direct, short term, Moderate Beneficial (significant)
Employment and the Local Economy	An estimated 7,500 net additional jobs that could be generated by committed baseline and cumulative developments represents 1.7% of the total employment at the District level. This represents a minor magnitude of change.	Minor	Direct, long term, Moderate Beneficial (significant)
Local authority revenue	The local authority revenue generated by all cumulative developments cannot be estimated accurately and in a proportionate way. However, given the quantum of new commercial floorspace and new homes to be delivered through cumulative developments, it is likely that this would lead to a sizeable uplift in local authority revenue through business rates and council tax income. This is likely to represent a moderate magnitude of change.	Moderate	Direct, long term, Moderate Beneficial (significant)

Effect	Comment	Magnitude of change	Assessment of Significance
Primary Healthcare Facilities	Alongside the Proposed Development, cumulative developments could lead to a large population increase locally (c.16,500). Assuming that none of these residents are not already registered at practices within the local area, this would lead to an increase in the number of registered patients per FTE GP from 2,387 to 2,744 (c.17%). For the purposes of this assessment it has been assumed that each population-yielding development will mitigate its own impacts. On this basis, the magnitude of change reflects the impact of the Proposed Development in isolation and is therefore negligible.	Negligible	Direct, long term, Negligible (not significant)
Primary and early years education	Alongside the Proposed Development, applying relevant pupil yields to the estimated increase in households, the cumulative developments could lead to c.1,400 primary school age children and 300 early years children. These are considered to be extreme worst cases and given the type of residential development coming forward in the local area the demand for early years and primary education facilities is not expected to be high. That said, for the purposes of this assessment it has been assumed that each population-yielding development will mitigate its own impacts. On this basis, the magnitude of change reflects the impact of the Proposed Development in isolation and is therefore negligible.	Negligible	Direct, long term, Negligible (not significant)
Secondary education	Alongside the Proposed Development, applying relevant pupil yields to the estimated population increase, the cumulative developments could lead to c.700 secondary school age children. This is considered to be an extreme worst case and given the type of residential development coming forward in the local area the demand for secondary education facilities is not expected to be high. That said, for the purposes of this	Negligible	Direct, long term, Negligible (not significant)

Effect	Comment	Magnitude of change	Assessment of Significance
	assessment it has been assumed that each population-yielding development will mitigate its own impacts. On this basis, the magnitude of change reflects the impact of the Proposed Development in isolation and is therefore negligible.		
Open/amenity space and Play space	The extent of potential additional public realm and amenity space provision is not quantified but most if not all schemes will provide internal and external amenity space in addition to new areas of public realm that will enhance liveability and the connectivity between public spaces within this part of the city centre. For the purposes of this assessment it is assumed that each population-yielding committed development will provide amenity space to meet the needs of each scheme's residents. The extent to which play space features within committed developments has not been assessed. On this basis the magnitude of change reflects the impact of the Proposed Development in isolation and is therefore minor.	Minor	Direct, long term, Negligible (not significant)

Mitigation Measures

Construction Phase

15.97. No significant adverse effects are identified during the construction phase.

Operational Phase

15.98. No significant adverse effects are identified during the operational phase.

Residual Effects

Construction Phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitgiation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Change in employment during the construction stage	Individuals seeking construction employment	N/A	N/A	Direct, temporary (short term), Minor Beneficial (not significant)

Operational Phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Change in direct operational employment and change in economic performance (GVA and spend)	Individuals seeking employment and the local economy	N/A	N/A	Direct, long term, Negligible (not significant)
Change in annual fiscal contributions in the form of business rates and council tax contributions	Manchester City Council total business rates and council tax revenue	N/A	N/A	Direct, long term, Minor Beneficial (not significant)
Change in demand for healthcare facilities (GP services and dentists) as a result of the uplift in population	Primary healthcare facilities	N/A	N/A	Direct, long term, Negligible (not significant)
Change in demand for early years and primary school places arising from the uplift in population	Primary education and early years facilities	N/A	N/A	Direct, long term, Negligible (not significant)
Change in demand for secondary school places arising from the uplift in population	Secondary education facilities	N/A	N/A	Direct, long term, Negligible (not significant)
Change in demand for the use of the existing open space and amenity space and children's play space within close proximity to the Site.	Users of open/amenity space and children's play space	N/A	N/A	Direct, long term, Negligible (not significant)

Monitoring

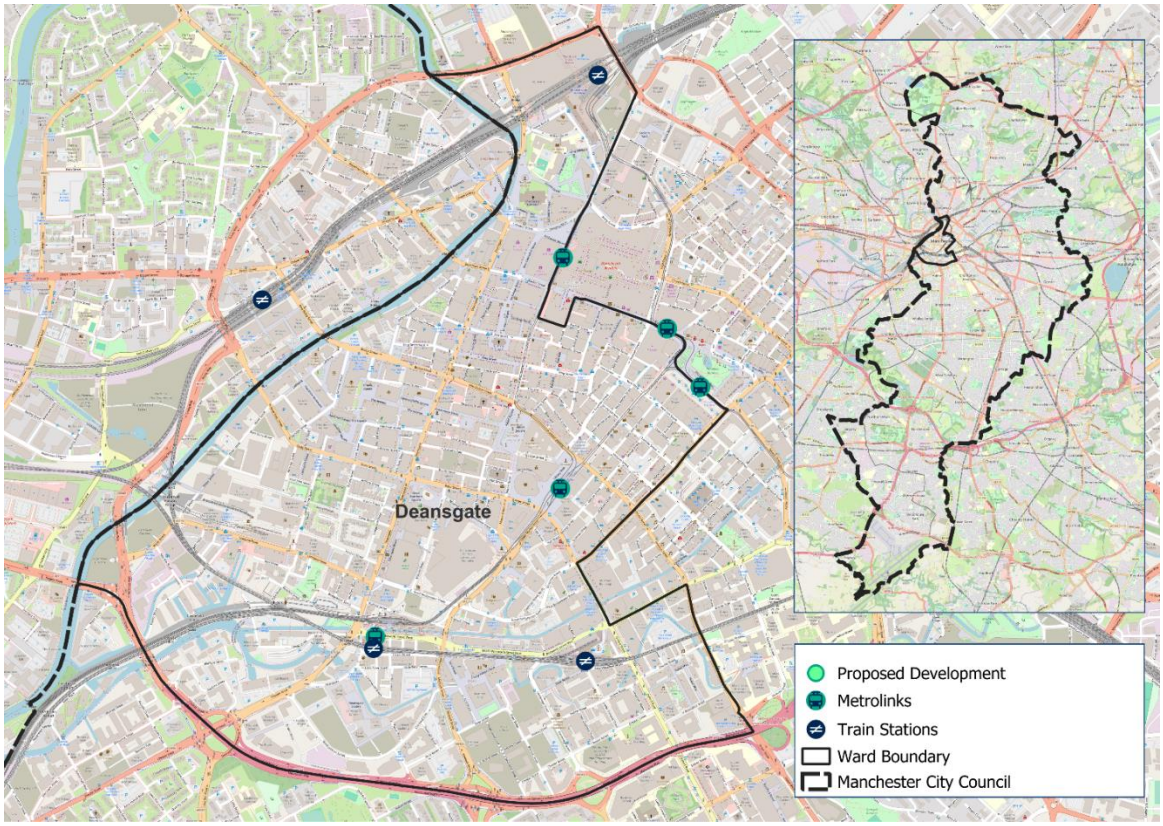
15.99. No monitoring is recommended during the operational phase.

Reference List

15.100. This ES Chapter has been prepared in reference to the following:

1. Care Quality Commission (2023): https://www.cqc.org.uk/
2. Department for Education, School Capacity, Academic Year 2022/23- School capacity, Academic year 2022/23
3. Department for Education (2023) Securing developer contributions for education
4. Department for Education (2024) Pupil Yield Data Dashboard
5. Department for Education (2024) Get Information about Schools Service, GOV.UK
6. Greater Manchester Housing Strategy (2019)
7. Greater Manchester Local Industrial Strategy (2019)
8. Greater Manchester Integrated Care Partnership: More available GP slots for Manchester city centre residents as new medical centre unveiled | Greater Manchester Integrated Care Partnership (gmintegratedcare.org.uk)
9. Healthy Urban Development Unit: https://www.healthyurbandevelopment.nhs.uk/our-services/delivering-healthy-urban-development/hudu-model/
10. Homes and Communities Agency (2015) Employment Density Guide
11. Homes and Communities Agency (2014) Additionality Guide
12. Manchester City Council (2022) Manchester Blue and Green Infrastructure Strategy
13. Manchester Core Strategy (2012)
14. Manchester City Council (2022) Manchester Housing Strategy
15. 'Investing In Success' Manchester Economic Strategy (2023)
16. National Health Service (August 2024) General Practice Workforce Survey
17. National Planning Policy Framework (2023)
18. Office of National Statistics (2022) Business Register and Employment Services
19. Office of National Statistics Census Population Estimates (2020)
20. Office of National Statistics Census (2021): Number of Dwellings
21. Office of National Statistics Census (2021): Housing Tenure
22. Ordnance Survey Open Greenspace (2023)
23. ORVal Outdoor Recreation Valuation (Exeter.ac.uk)
24. Places for Everyone Plan, GMCA, (2023)
25. Royal Institute of Chartered Surveyors (2023) RICS, Q1 2023, UK Construction Monitor

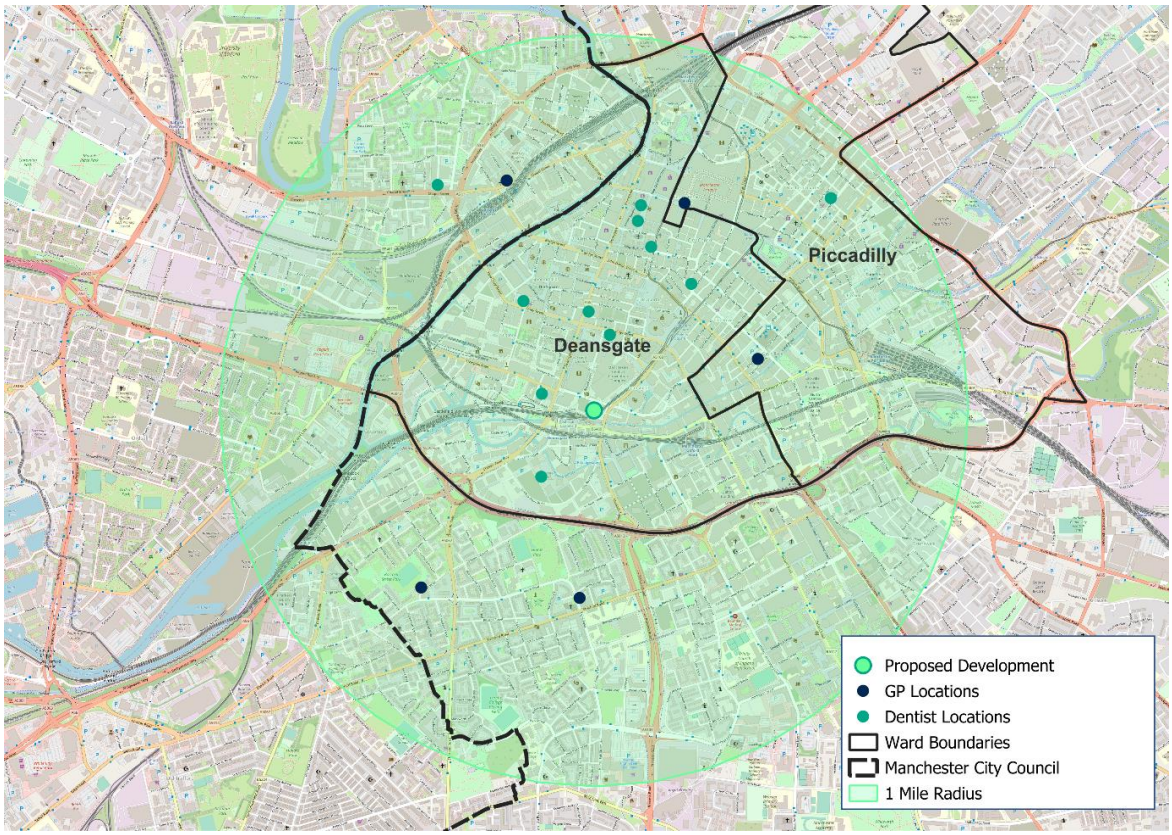
Figure 15.1



Site location plan

To Scale	Date: January 2024

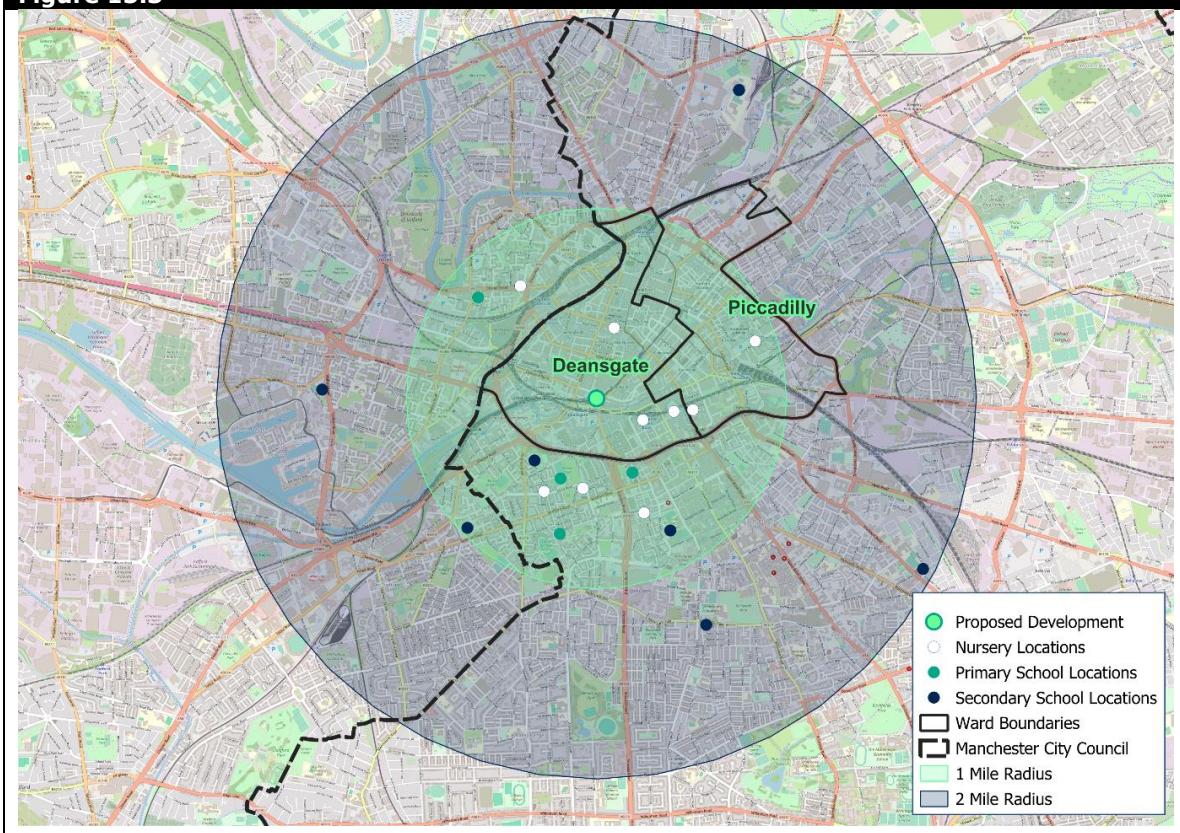
Figure 15.2



Location of GP practices and dentists within the study area

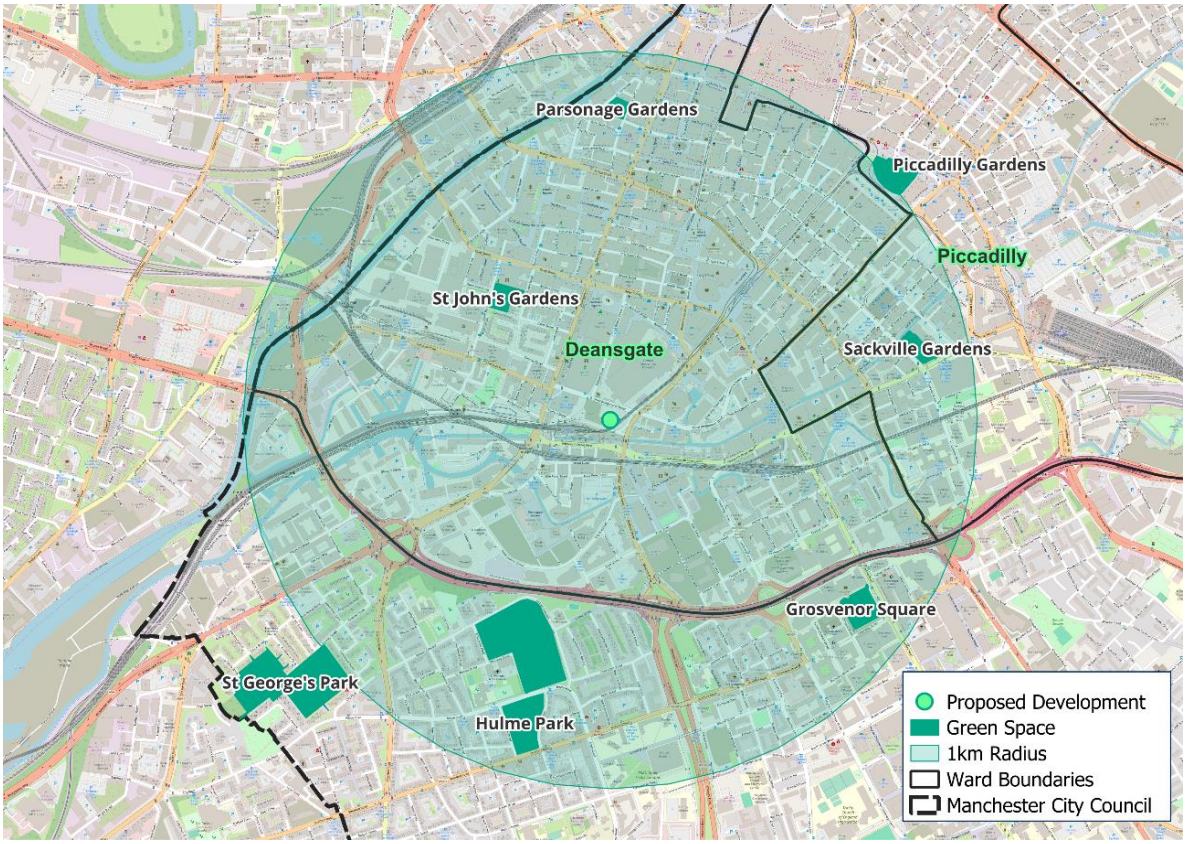
To Scale	Date: January 2024

Figure 15.3



Location of Primary and Secondary Schools	
To Scale	Date: January 2024

Figure 15.4



Open/amenity space provision in the study area

To Scale	Date: January 2024

16. Traffic and Transport

Introduction

16.1 This Chapter of the ES has been prepared by SLR Consulting Ltd and asseses the environmental implications of Transport arising from the Viadux Phase 2 development.

16.2 This Chapter is accompanied by the following appendices:

- Transport Assessment
- Framework Travel Plan

16.3 The authors of this Chapter have the following qualifications.

	Lead Author	Reviewer
Name	Ian Ellison	Gareth Davis
Company	SLR Consulting Ltd	SLR Consulting Ltd
Qualifications/Accreditations relevant to technical area	MSC in Transport Engineering & Planning, MCIHT	BSc(Hons), MSC in Transport Engineering & Planning, MCIHT, CMILT
Does the practitioner hold any IEMA qualification?	No	No
Company hold IEMA QMark?	Yes	
Years technical experience (in technical area)	11	30
Number of EIA's delivered to date	5	15

Assumptions and Limitations

16.4 The traffic forecasts are based on traffic surveys undertaken on a weekday in May 2022 complemented by other surveys conducted in March 2022 and daily traffic data surveyed in June 2022 on the A5103 to the south.

16.5 The trip forecasts are based on the TRICS database and while the appropriate parameters have been applied there is no site as large as that proposed and that alongside changes in travel behaviour can lead to some variability.

Relevant Legislation, Policy and Guidance

Legislation

16.6 The relevant legislation that applies for highways development is the Highways Act (1980) which defines the use of traffic on the highway.

16.7 The other main legislative act we will use is the Town & Country Planning Act (1990) which forms the planning background but specifically for highways, it will be used to implement the Stopping Up Order on Albion Street needed for the construction of the Plot 2c Retail Unit.

Policy

National Planning Policy

National Planning Policy Framework (2023)

16.8 The NPPF sets out the government's planning policies for England and how these are expected to be applied. At the heart of the Framework is a presumption in favour of sustainable development.

16.9 As part of promoting sustainable transport, paragraph 114 of the NPPF states that in assessing applications for development, it should be ensured that:

- appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;

- safe and suitable access to the Site can be achieved for all users;

- the design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance, including the National Design Guide and the National Model Design Code; and

- any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.

16.10 Paragraph 115 goes on to state that 'Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe'.

16.11 Finally, the NPPF notes that all developments that will generate significant amounts of movement should be required to provide a Travel Plan.

16.12 Accordingly, a Framework Travel Plan (FTP) has been prepared in support of this application, which will form the basis of a long-term management strategy for the Site, delivering sustainable transport objectives.

DECARBONISING TRANSPORT A BETTER GREENER BRITAIN, 2021

16.13 The DfT document Decarbonising Transport explains that homeworking has changed traditional commuter and shopping trips probably for ever, and that video conferencing has changed business travel. It references the pre pandemic trend prediction for road traffic to grow, and that this disadvantages communities, going on to say that: "We cannot pile ever more vehicles onto the same congested roads." It caps this with a statement that: "As we build back from the pandemic it will be essential to avoid a car led recovery."

16.14 A key commitment in the document is to embed transport decarbonisation principles in spatial planning and across transport policymaking. The government wants walking, cycling or public transport to be the natural first choice for journeys. Where developments are located, how they are designed and how well public transport services are integrated has a huge impact on whether people's natural first choice for short journeys is on foot or by cycle, by public transport or by private car. The planning system has an important role to play in encouraging development that promotes a shift towards sustainable transport networks and the achievement of net zero transport systems.

16.15 The DfT recognises that it has a role in helping local planning and highway authorities to better plan for sustainable transport and develop innovative policies to reduce car dependency. It is clear on the approach. It says that "we need to move away from transport planning based on predicting future demand to provide capacity ('predict and provide') to planning that sets an outcome communities want to achieve (vision and validate)". It refers to monitoring local transport outcomes to deliver on the ambitions for sustainable transport use.

Local Planning Policy

Manchester Core Strategy 2012

16.16 The Core Strategy forms the key document in Manchester's Local Development Framework and was adopted in 2012. It sets out a number of strategic policies that will guide the development of the city. Policy SP1 sets out the spatial principles that will guide development to 2027. One of these principles is as follows:

> 'New development will maximise the potential of the City's transport infrastructure, in particular promoting walking, cycling and the use of public transport.'

16.17 In addition, the policy goes on to state that developments in all parts of the city should 'improve access to jobs, services and education and open space by being located to reduce the need to travel and provide good access to sustainable transport provision'.

16.18 This is reinforced through policy DM 1 of the Core Strategy, which concerns development management. This states that all developments should have regard to specific issues including the access to new development by sustainable transport modes and vehicular access and car parking.

16.19 Policy T1 of the Core Strategy concerns sustainable transport. It states that the Council will support proposals that:

- Improve choice by developing alternatives to the private car; and

- Take account of the needs of road users according to a broad hierarchy consisting of, in order of priority:

- Pedestrians and disabled people,

- Cyclists, public transport,
- Commercial access,
- General off-peak traffic,
- General peak time traffic.

16.20 The development proposals are in line with these policy objectives, ensuring that the Site will be accessible to all users by a range of different transport modes.

16.21 Policy T2 states that the Council will actively manage the pattern of development to ensure that new development is:

- Located to ensure good access to the City's main economic drivers, including the Regional Centre, the Oxford Road Universities and Hospitals and the Airport and to ensure good national and international connections; and
- Easily accessible by walking, cycling and public transport; connecting residents to jobs, centres, health, leisure, open space and educational opportunities.

16.22 With regards to parking standards, the Core Strategy states that the 'maximum standards for car parking do not apply to the City Centre as each development in the City Centre will be considered on a case-by-case basis.'

Places for Everyone 2024

16.23 The Places for Everyone (PfE) Plan took effect and became part of the statutory development plan for each of the nine PfE authorities including Manchester City Council on March 21, 2024.

16.24 Policy JP-Strat14 covers Sustainable and Integrated Transport with the aim of network improvements so that 'half of all daily trips can be made by public transport, cycling and walking, especially those shorter journeys around neighbourhoods.

16.25 Policy JP-C1 aims to deliver an integrated accessible, low carbon network with world-class connectivity by: delivering a pattern of development that minimises both the need to travel and the distance travelled by unsustainable modes; enabling the provision of high quality digital infrastructure; locating and designing development to deliver a significant increase in the proportion of trips that can be made by walking, cycling and public transport; securing investment in new and improved transport infrastructure and services; and ensuring that development and transport investment fully considers the needs of all people, following a hierarchy of pedestrians, cyclists, powered two-wheelers, and public transport users, those doing business or providing services, and lastly people in personal motorised vehicles.

16.26 Policy JP-C3 on Public Transport supports a range of measures, including enhanced connections to other major cities; increased capacity at the bottlenecks in Manchester City Centre for light and heavy rail; improved public transport routes and services to growth areas and Manchester Airport; better integration of services between modes; more and higher quality public transport stations and interchanges; improved access to rapid transit routes.

16.27 Policies JP-C 4 and C5 promotes the Streets for All approach with design and management to make a significant positive contribution to the quality of place and support high levels of walking, cycling and public transport.

16.28 Policy JP-C6: Walking and Cycling aims to deliver a higher proportion of journeys made by walking and cycling, by creating safe, attractive, direct, easily navigable and integrated routes, and active neighbourhoods and street networks, plus ensuring that new developments are planned and constructed with walking and cycling as the primary means of local access.

16.29 Freight and Logistics is considered in Policy JP-C7 supporting the more efficient and sustainable movement of freight, ensuring that new development makes appropriate provision for deliveries and servicing in terms of road safety, traffic congestion and environmental impacts, in accordance with Policy JP-C8

16.30 Policy JP-C8: Transport Requirements of New Development indicates planning applications will be accompanied by a Transport Assessment/Transport Statement and Travel Plan where appropriate. New development to be located and designed to enable and encourage walking, cycling and public transport use, to reduce the negative effects of car dependency, and help deliver high quality, attractive, liveable and sustainable environments. The policy supports development that complies with the Policies JP-C1-C7 above.

16.31 On Parking it asks for adequate car parking provision including for disabled users and that provision is flexible to respond to demand. Cycle parking needs to meet the long-term demand from occupiers and where appropriate provide showers/changing facilities/cycle hire/pool bikes and information. It goes on to seek promotion of alternatives to car ownership such as ULEV car club vehicles and charging infrastructure and drop off points for taxis.

16.32 Servicing strategies needs to comply with safety requirements, aim to reduce emissions and traffic congestion such as by reducing the need for repeat deliveries.

16.33 The Policy requires that Construction Management Plans are produced for developments, where appropriate, to mitigate construction logistics and environmental impacts including air quality and noise on the surrounding area and encourage sustainable deliveries.

16.34 Policy JP-D2 concerns Developer Contributions, and the policy requires developers to provide, or contribute towards, the provision of mitigation measures to make the development acceptable in planning terms (Subject to considerations of viability). Contributions will be secured through the most appropriate mechanism, including, but not limited to, planning conditions, Section 106 planning obligations, agreements made under Section 278 of the Highways Act 1990 (as amended), or CIL (or any subsequently adopted planning gain regime.

Guide to Development in Manchester SPD & Planning Guidance, April 2007

16.35 This document brings together the development principles that will apply to new developments in Manchester. Paragraph 2.22 of the document states that:

> 'In order to reduce reliance on the car, residents and workers should be within easy walking distance of facilities such as clinics, corner shops, newsagents and public transport.'

16.36 The Proposed Development is well aligned with this goal, being located close to a range of different facilities. The guidance goes on to describe the need for Travel Plans in new developments, stating:

> 'A Travel Plan is a package of measures and actions aimed at reducing the need to travel by car by providing alternative choices and encouraging walking, cycling, and public transport use. At the planning stage consideration should be given to the proximity of the development to existing travel facilities and services, site layout, suitable density, cycling, pedestrian facilities and potential for parking restraint.'

16.37 Such an exercise has been completed for this development and informs part of this report along with the accompanying Framework Travel Plan.

Greater Manchester Transport Strategy 2040

16.38 TfGM has developed a 2040 Transport Strategy that sets out ambitions for a radical new approach to planning Manchester's transport system in support of long-term needs and aspirations.

16.39 The vision is for Greater Manchester to have 'World class connections that support long-term, sustainable economic growth and access to opportunity for all'. The Transport Vision aims are as follows:

- Supporting Sustainable Economic Growth;
- Protecting Our Environment;
- Improving Quality of Life for All; and
- Developing an Innovative City Region.

16.40 The 2040 Vision is supported by policies and proposals for improving the transport network in the medium term up to 2025 structured around spatial themes. A common theme is the need to tackle congestion on Manchester's transport networks and minimise the negative impacts of traffic on communities.

16.41 The Proposed Development aspires to conform to the vision and goals as set out within the 2040 Vision Document by ensuring that the Site is accessible by a variety of sustainable transport modes in order to deliver a quality development that enhances the environment.

City Centre Transport Strategy to 2040

16.42 The City Centre Transport Strategy, developed by MCC, TfGM and Salford City Council will guide how city centre transport is improved across the next two decades. It has been informed by a series of public consultation and engagement exercises, held over the last three to four years.

16.43 The strategy is a sub-strategy to the Greater Manchester Transport Strategy 2040. The vision, set out in the City Centre Transport Strategy, is for "a well-connected, zero-carbon city centre at the heart of the North, offering our residents, employees and visitors a great place to work, live and visit". The central aim is for 90% of all trips to the city centre in the morning peak to be made on foot (including people using wheelchairs, mobility scooters or guide dogs), by cycle, or on public transport before 2040.

16.44 The strategy sets out proposals to further improve the city centre's public transport and active travel networks and reduce car-based trips over the longer term, leading to the cleaner, greener, healthier, inclusive and integrated transport network that supports the growth of the city centre.

16.45 Walking will be prioritised as the main way for people to get around a cleaner, less congested city centre, which will also see more people encouraged to cycle to key destinations and improved public transport connections. The city centre will be age friendly and accessible, with all proposed changes taking accessibility, inclusion and the needs of different groups of city centre users into account.

Guidance

'Environmental Assessment of Traffic and Movement' (Institute of Environmental Management and Assessment), July 2023.

16.46 The Institute of Environmental Management and Assessment (IEMA) recently updated its guidance regarding the environmental assessment of traffic and movement. The document sets out how study areas should be defined, receptors identified, and effects assessed.

16.47 The following useful context is provided regarding traffic flow variation:

16.48 Para 2.18 Traffic forecasting is not an exact science, and the accuracy of projections is open to debate. It is generally accepted that accuracies greater than 10% are not achievable. It should also be noted that the day-to-day variation of traffic on a road is frequently at least + or -10%. At a basic level, it should therefore be assumed that projected changes in traffic of less than 10% create no discernible environmental impact. The cumulative effect of a number of developments attracting less than 10% of additional traffic may need to be assessed at a broader strategic or policy level.

16.49 Considering the above, it is possible that the majority of the potential proportionally impact of in this single scenario could be accounted for by typical day-to-day' variation in traffic. It should also be note that if the original trip generation of the TA were to be referenced, which is considered to be robust, as opposed to that of the revised 'sensitivity test' traffic flows, the junction operates with adequate reserve capacity.

‘Travel Plans, Transport Assessments and Statements’ (Department for Levelling Up, Housing & Communities, and Ministry of Housing, Communities & Local Government), March 2014

16.50 In March 2014, the Ministry of Housing Communities and Local Government in conjunction with the DfT, released advice on when transport assessments and transport statements are required, what they should contain (which is intended to assist stakeholders in determining whether an assessment may be required) and, if so, what the level and scope of that assessment should be.

16.51 The advice reflects current Government policy promoting a shift from the ‘predict and provide’ approach to transport planning to one more focused on sustainability. The document focuses on encouraging environmental sustainability, managing the existing network, and mitigating the residual impacts of traffic from the development proposals.

16.52 The guidance sets out that Travel Plans, Transport Assessments and Transport Statements can positively contribute to:

- Encouraging sustainable travel;
- Lessening traffic generation and its detrimental impacts;
- Reducing carbon emissions and climate impacts;
- Creating accessible, connected, inclusive communities;
- Improving health outcomes and quality of life;
- Improving road safety; and
- Reducing the need for new development to increase existing road capacity or provide new roads.

16.53 These documents support national planning policy, which sets out that planning should actively manage patterns of growth in order to make the fullest possible use of public transport, walking and cycling, and focus significant development in locations which are or can be made sustainable. A Transport Assessment and Framework Travel Plan have been produced to support the planning application and have been completed with this guidance in mind and are included as Appendix 8.1 and Appendix 8.2 in ES Volume IV respectively.

Manual for Streets, (Department for Transport (DfT)), 2007.

16.54 Manual for Streets is the guidance that forms the backbone of highway design in urban areas. The proposals will result in a change in the traffic signals on Albion Street/Great Bridgewater Street and the guidance for this is provided in the Design Manual for Roads and Bridges.

Local Transport Note 1/20, Cycle Infrastructure Design (DfT), 2020.

16.55 Manual for Streets is the guidance that forms the backbone of highway design in urban areas. The proposals will result in a change in the traffic signals on Albion Street/Great Bridgewater Street and the guidance for this is provided in the Design Manual for Roads and Bridges.

Assessment Methodology and Significance Criteria

Scenarios Tested

16.56 The baseline situation considered for this Transport Assessment of environmental impacts is based around the Existing Baseline Scenario whereby we consider the Site as is today i.e. Phase 1 tower as built, noting the office scheme which forms part of Phase 1 consent is not built out and the Slot Site (which originally formed part of the Beetham Tower consent) is vacant. As will be described later, this baseline will include traffic from committed development where this is progressing. Where there is a committed development that is approved, the development traffic from that scheme will be added cumulatively.

16.57 Transport impacts will be assessed due to construction and operational activities.

16.58 Estimated construction traffic flows and estimated operational flows, will be forecast over the course of a day. These will then be compared against the daily baseline flows to assess the level of impact.

16.59 Traffic flows in the area were surveyed in 2022. In addition to this, the traffic data from the Great Northern Warehouse (GNW) application, which was surveyed in March 2020, has also been reviewed and this showed similar comparable flows. The GNW application data includes the Deansgate / Great Bridgewater Street junction, although the peak periods on the network are slightly later than was actually surveyed for the GNW application and this is noted on the diagrams.

16.60 Traffic flows in this area have been falling since a previous survey was conducted in 2013, largely due to the city centre transport strategy to limit access through the city centre and reductions in City Centre parking. This trend is expected to continue as further limits on vehicle access in the city centre are made, most notably in this area on Deansgate where vehicle movement into or through the city is curtailed or prevented in preference for access by sustainable transport modes. Therefore, the current traffic flows represent a worst-case scenario in terms of background traffic volumes and future traffic flows will have less traffic on the network.

The Study Area

16.61 The IEMA guidance suggests two broad rules to identify the appropriate extent of the highways assessment area, which are as follows:

- Rule 1: Include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%);

- Rule 2: Include any other specifically sensitive areas where traffic flows have increased by 10% or more.

16.62 Where the predicted increase in traffic flows is lower than the above thresholds, the IEMA Guidelines suggest the significance of the effects can be stated to be negligible and further detailed assessments are not warranted. Furthermore, increases in traffic flows below 10% are generally considered to be insignificant in environmental terms given that daily variations in background traffic flow may vary by this amount.

16.63 The study area covers the highways close to the site, noting that the increase in traffic against the Baseline Scenario is forecast to be low. A desktop assessment, supported by a site visit, has been undertaken to identify the main sensitive receptors in the study area.

16.64 Based on that assessment, the traffic links that define the study area are as follows:

- Trafford Street Ramp (accessed from Albion Street);
- Trafford Street (accessed from Deansgate);
- Great Bridgewater Street (west of Albion Street);
- Great Bridgewater Street (east of Albion Street);
- Albion Street; and
- Deansgate south of Gt Bridgewater Street.

Source of Effect

16.65 An environmental impact can arise through the extra vehicle trips that might arrive at a site and from new transport infrastructure. The potential implications that may arise from additional traffic have been described in the new IEMA Guidelines and include:

- Severance of communities;
- Road vehicle driver and passenger delay;
- Non-motorised user delay;
- Non-motorised amenity;
- Fear and intimidation on and by road users;
- Road user and pedestrian safety; and
- Hazardous/large loads.

Sensitivity of Receptors

16.66 The significance criteria within the IEMA Guidelines provide definitions of environmentally sensitive receptors, as well as affected groups and special interests. It further advises that the traffic effects from a Proposed Development should be considered in respect of these receptors.

16.67 The sensitivity of a road or street takes account of the existing nature of the road and how it is currently used. In this case the existing streets are within the city centre and are characterised by existing traffic activity. The potential sensitive receptors are considered to be vulnerable road users primarily pedestrians and cyclists and existing local residents who would be accessing their properties frequently.

16.68 Given the current nature of the local highway with relatively closely spaced signal junctions and with a low speed 20mph limit and carrying a mix of traffic including HGVs and with highway infrastructure that complies with DfT requirements, it is considered that the local street and the potential Sensitive Receptors have a Low Sensitivity to change in traffic conditions.

16.69 We have considered the designation of potentially sensitive environmental receptors and given the nature of the area already characterised by traffic movement and the presence of those potential receptors within an existing city centre environment the potential sensitive receptors are detailed in Table 16.1 on a link by link basis.

Table 16.1 Links in the study Area and Associated Sensitive Receptors		
Link Ref.	Link Description	Sensitive Receptors
1	Trafford St. (Ramp accessed from Albion St)	Residents in Axis Tower fronting onto Trafford St
2	Trafford St. (Accessed from Deansgate)	Pedestrians along link
3	Albion St	Pedestrians and Cyclists along link Residents in dwellings in Hacienda Tower fronting onto Albion St
4	Great Bridgewater St. (west of Albion St.)	Pedestrians and Cyclists along link Residents in Beetham Tower fronting onto Gt Bridgewater St
5	Great Bridgewater St. (east of Albion St.)	Pedestrians and Cyclists along link
6	Deansgate	Pedestrians and Cyclists along link

Significance Criteria

16.70 In accordance with the latest IEMA guidance, the following paragraphs cover each of the impacts that will be considered within the Chapter and how the magnitude of change will be derived.

Severance of Communities

16.71 Severance is defined as the perceived division that can occur within a community when it becomes separated by a major traffic artery and describes a series of factors that separate people from places and other people. Such division may result from the difficulty of crossing a heavily trafficked road and a physical barrier created by the road itself.

16.72 The measurement and prediction of severance is difficult, but relevant factors include road width, traffic flow, speed, the presence of crossing facilities and the number of movements across the affected route.

16.73 IEMA Guidelines refer to the DfT's 'Manual of Environmental Appraisal', which states that “changes in traffic flow of 30%, 60% and 90% are regarded as producing slight, moderate and substantial changes in severance respectively.” It is advised that these broad indicators should be used with care and regard paid to specific local conditions. These indicators will be used as the basis of assessing the significance of the effect, along with the application of professional judgement to take account of local conditions and the character of each link.

Road Vehicle Driver and Passenger Delay

16.74 The IEMA Guidelines note that driver delay can occur at several points on the network, although the effects are only likely to be significant when the traffic on the highway network is predicted to be at or close to the capacity of the system.

16.75 The Transport Assessment (TA) contains a detailed assessment of the highway network operation. These assessments are summarised in the ES chapter where necessary and used to determine the

significance of the effect. The IEMA guidance states the assessment of driver delay will "normally be based on the technical work reported within the Transport Assessment, which generally focuses on conditions in the network peak periods, with highway mitigation defined to ensure conditions with the development are not materially worse than would otherwise have been the case without the development and mitigation."

16.76 Based on a Professional Judgements considering the nature of the highway network we have assumed that a change in delay of up 10% represents a Very Low Impact, a 30% increase as a Low Impact, a Medium Impact is assumed to arise at a 60% increase in delay and a High Impact would occur at a 90% increase in delay.

Pedestrian and Cycle Delay

16.77 The IEMA Guidelines note that Pedestrian Delay can serve as a proxy for other non-motorised users may experience when crossing the highway and is closely related to Severance.

16.78 The IEMA Guidelines refer to changes in pedestrian delay at uncontrolled crossings and refers to research on potential thresholds of delay to traffic volume. However, in this location all the main junctions have controlled pedestrian crossings that are called every cycle. Therefore, pedestrians do not see any change in the time to cross the highway even if there is an increase in traffic volumes.

16.79 Finally, the new guidelines, recommend that assessors use their judgement to determine the significance of the effect.

Pedestrian and Cycle Amenity

16.80 The IEMA Guidelines define pedestrian amenity as the relative pleasantness of a journey and can include fear and intimidation if they are relevant. As with pedestrian delay, amenity is affected by traffic volumes and composition along with pavement width and pedestrian activity. The guidelines suggest a tentative threshold for judging the significance of change in pedestrian amenity where traffic flow / HGV flow is halved or doubled, which would be considered a high change in magnitude. A change of less than half or double would be low and will therefore be discounted from further assessment. These thresholds will be used as the basis of assessing the significance of the effect along with professional judgement. Links where pedestrians are not permitted i.e. Trafford Street, will not be taken forward for further assessment.

Fear and Intimidation

16.81 Fear and Intimidation can be summarised as the impact that traffic has on pedestrians. It is dependent on the:

- Volume of traffic;
- HGV composition;
- Proximity to people;
- Level of protection – i.e. narrow footways

16.82 It is noted that there are no commonly agreed thresholds and therefore the assessment of the level of fear and intimidation will be made based on professional judgement, accounting for the factors identified above.

Accidents and Safety

16.83 The IEMA Guidelines do not include any definition in relation to accidents and safety, necessitating professional judgement to assess the implications of local circumstance, or factors which may increase or decrease the risk of accidents. Accidents are rare compared to the volume of traffic and it is noted that a significant increase in traffic is needed in order to give rise to any measurable increase in traffic flow.

16.84 In this case, professional judgement will be applied to consider the potential for development to give rise to a road safety issue. It will consider the change in traffic flow and composition, the background Road Safety conditions as presented in the TA and consider the clustering of accidents and the potential for additional vulnerable road users to influence road safety.

Summary of Magnitude of Change Derivation

16.85 Based on the definitions of each impact identified above, a summary of the criteria that have been used to determine magnitude of change from the baseline conditions as a result of the Proposed Development are set out in Table 16.2 below.

Table 16.2	Definitions of the Magnitude of Change			
	Very Low	Low	Medium	High
Severance	Change in total traffic or HGV flows of < 30%	Change in total traffic or HGV flows of 30%-60%	Change in total traffic or HGV flows of 60%-90%	Change in total traffic or HGV flows of > 90%
Driver & Passenger Delay	Change in modelled junction delays of < 10%	Change in modelled junction delays of 30%-60%	Change in modelled junction delays of 60%-90%	Change in modelled junction delays of > 90%
Pedestrian & Cycle Delay	A professional judgement based on the crossing opportunities at the main junctions.			
Pedestrian & Cycle Amenity	Change in total traffic or HGVs <100%		A judgement based on the routes with >100% change in the context of the individual characteristics	
Fear & Intimidation	A judgement based on the volume of traffic, HGV composition, proximity to people and the level of protection as described in the Transport Assessment.			
Accidents & Safety	A judgement based on quantitative analysis as set out in the Transport Assessment.			

16.86 It should also be noted however, that the absolute effect is also important e.g. the total flow of traffic or HGVs on a link. This is because an increase of 100% in the traffic flow on a road is likely to lead to an insignificant impact if the existing flows are low. Where this is applicable, professional judgement will be applied and commentary will be clearly provided within the ES chapter.

16.87 The above factors have been tested to consider the magnitude of that impact, assessing whether there is a Neutral, Negligible, Minor, Moderate or Major impact. This takes into account the following:

- Extent and magnitude of the effect;
- Effect duration (whether short, medium or long term);
- Effect nature (whether direct or indirect, reversible or irreversible);
- Whether the effect occurs in isolation, is cumulative or interactive;
- Performance against the IEMA environmental quality standards, DfT Standards set out in the Design Manual for Roads and Bridges, Manual for Street or other Industry Guidance;
- Sensitivity of the receptor;
- Compatibility with National and Local Transport Policies relating to the environment.

16.88 It is stressed that any impact arising during construction are by their nature temporary and this limits the long-lasting effects.

16.89 In order to define the magnitude of the effect the matrix below in Table 16.3 shows how these are categorised.

Table 16.3 Magnitude of Environmental Impacts	
Magnitude	Environmental Impact
Major	This can have a SUBSTANTIAL influence on the environment
Moderate	This can have a HIGH influence on the environment
Minor	This can have a MODERATE influence on the environment
Negligible	This can have a MINOR influence on the environment
Neutral	This WILL NOT HAVE ANY influence on the environment

16.90 It is stressed that any impact arising during construction are by their nature temporary and this limits the long-lasting effects.

16.91 When the Magnitude of the Impact is then compared to the sensitivity of the receptor we can derive a matrix of the expected impact as shown in Table 16.4.

Table 16.4	Sensitivity of Receptor			
Magnitude of Impact	High	Medium	Low	Very Low
Major	Major	Moderate	Minor/ Moderate	Minor (Not Significant)
Moderate	Moderate	Minor/ Moderate	Minor	Minor (Not Significant)
Minor	Minor/ Moderate	Minor	Negligible	Negligible (Not Significant)
Negligible/ Neutral	Negligible/ Minor	Negligible	Negligible	Negligible (Not Significant)
Where the effect is Negligible/Minor or Minor/Moderate, professional judgement will be applied to determine the appropriate scale of effect.				

16.92 Based on professional judgement, those effects of a moderate or major scale are considered significant in EIA terms. As has been described the potential Environmental Receptors are assumed to have a Low Sensitivity to the environmental impacts.

16.93 In determining the scale of effect and its significance, consideration has also been given to the duration of the effect, i.e. short term (< 7 years) and medium term (8-12 years) and temporary, or long term (>12 years) and permanent.

16.94 The nature of the effect has been described as either adverse or beneficial as follows:

- Beneficial – An advantageous effect to a receptor;
- Adverse – A detrimental effect to a receptor; and
- Neutral – An effect that is on balance both beneficial and adverse.

Baseline Conditions

16.95 As described in the TA, Traffic Surveys and queue length surveys conducted on 30th March 2022 and 10th May 2022. These traffic flows have been converted to two-way Annual Average Daily Traffic (AADT) flows using Factors from a daily count on the A5103 Medlock Street to the south and these are shown in Table 16.5 including the number of HGVs.

Table 16.5 Daily Traffic Flows	Two Way Survey Flows (2022) AM		PM		AADT	
Road Link	Vehicles	HGVs	Vehicles	HGVs	Vehicles	HGVs
Great Bridgewater Street (West of Albion St)	510	25	539	6	6092	462
Albion Street	1020	66	1047	12	12004	1163
Deansgate	935	34	1129	5	11986	581
Great Bridgewater Street (East of Albion St)	469	28	689	4	6725	477
Trafford Street (E)	65	12	52	15	679	402

16.96 As described these flows are robust and represent a high point in future traffic as city centre flows have been falling over time and have been assumed to reflect future traffic flows. On top of this we need to add committed development flows, and these are considered next.

Committed Developments

16.97 We have reviewed the Transport Assessments and statements of other committed developments and where the report forecasts additional traffic to distribute into our local area, and it is under construction then it is included in the Baseline Assessment.

16.98 Where the scheme is approved but not yet started construction, it is included as cumulative traffic in the future year assessment.

16.99 The list of committed developments as provided is described below in Table 16.6.

Table 16.6 Committed Developments

	Site Location	Planning Reference
Committed Development Baseline Sites	Plot 9a, First Street	132600/FO/2021
	Plot 10b, First Street (House of Social)	136170/FO/2023
	First Street South (Square Gardens)	125573/FO/2019
	Metropolitan University Science and Engineering Building	125799/FO/2019
	Great Jackson Plot F (Contour)	132199/FO/2021
	Havelock	129081/FO/2021
	Barclay House	118033/P3OPA/2017
	Viadux One and Two	115871/FO/2017
	Staycity Deansgate	125804/FO/2019
	The Blade and Three60	126668/FO/2020
	Town Hall refurbishment	119106/LO/2018
	St Michael's	114664/FO/2016
	Number 3 Circle Square	134288/FO/2022
	Deansgate South	129406/FO/2021
	One City Road	128002/FO/2020
	One Medlock Street	135419/FO/2022
	St George's Place	123261/FO/2019
	Vision	111003/FO/2016/C1
	Plot 10a, First Street	136043/FO/2023
	Park Place (Plot G, Great Jackson Street)	129273/FO/2021
	Bridgewater House Great	134694/FO/2022

Jackson Street	
Great Northern Warehouse	135565/FO/2022
Upper and Lower Campfield	138377/FO/2023
Metropolitan University Library	138424/FO/2023
Student Castle	121252/FO/2018
Great Jackson Street - Crown Street Plot D (The Lighthouse)	137227/FO/2023
Great Jackson Street Plot C and E (The Green)	137226/FO/2023
Apex Tower	133172/FO/2022
Plot 11 Block C First Street South	138831/FO/2023
Hotspur House	138805/FO/2023

16.100 There is a committed highway improvement called the Deansgate and Whitworth Street West Active Travel Scheme currently under construction that will significantly improve the infrastructure for pedestrians and cyclists on Whitworth Street and Deansgate. One consequence in traffic terms is that Whitworth Street (W) will be restricted to Buses, Taxis and Cyclists only. This does not significantly affect the link flows.

16.101 We have reviewed the Transport Assessments/Statements for the above projects and none of them specifically forecast traffic onto the local highway network around the Viadux Site. The one element that does need to be included is the traffic forecast for Viadux Phase 1. Finally at the time of the Traffic Surveys the Viadux Phase 1 construction traffic was present on the network and this needs to be deducted from the baseline flows. These changes are described in the TA and are summarised in Table 16.7 below.

Table 16.7 Baseline Traffic Flows	Two-Way Flows (A) Surveyed Flows		(B) Phase 1 Committed Development		(C) Phase 1 Construction Traffic		Total (A+B-C)	
Road Link	Vehicles	HGVs	Vehicles	HGVs	Vehicles	HGVs	Vehicles	HGVs
Great Bridgewater St (W of Albion St)	6092	596	43	0	56	51	6079	545
Albion St	12004	1535	48	5	56	51	11996	1489
Deansgate	11986	581	43	5	56	51	11974	535

Great Bridgewater St (E of Albion St)	6725	477	29	0	0	0	6754	477
Trafford Street (E)	377	402	84	10	12	10	449	402

Development Trip Forecasts

Construction Traffic

16.102 Construction traffic is typified by regular movements of HGVs delivering construction materials at regular intervals over the course of a working day and the arrival of contractor vans and construction workers on site tends to avoid the traditional peak periods.

16.103 In this location, construction workers can benefit from the excellent accessibility of the site by public transport or by active travel modes which helps limit the traffic demands. There is in effect no parking available on site for workers although there is scope for workers to use nearby public car parks if needed.

16.104 The effect of construction traffic is temporary and the approximate duration for the works is expected to be between 5-6 years.

16.105 The volume of Construction Traffic forecast is described in the TA. It does vary over time and the type of construction activity. The busiest periods are during construction pours when there are large volumes of concrete wagons arriving. However, these are episodic and so are not consistent across a typical week. Therefore, the forecast of vehicle flows is based on a typical robust forecast of construction traffic, and also considering there is likely to be Plot 2a and Plot 2b under construction at the same time.

16.106 The peak forecast construction traffic arriving on site is given in Table 16.8 below.

Table 16.8 Construction Traffic Forecasts Daily Vehicle Flows To and From Site	
Rigid HGVs	65
Articulated HGVs	5
LGVs	5

16.107 The construction traffic is distributed onto the highway network and the flow diagrams are presented in the TA and repeated here as Figure 16.1. The main access for construction traffic is based on Albion Street although as there are several locations for construction activity, some traffic is assumed to use Trafford Street and Great Bridgewater Street depending on the nature of construction activity.

16.108 The routeing around the site will be determined through the CEMP and will generally follow an approach from Mancunian Way, then in an anti-clockwise way use Albion, then Great Bridgwater Street and finally head south along Deansgate to leave the area.

Operational Traffic

16.109 The Operational Traffic forecasts are described in the TA. The site does not offer parking but there is traffic attracted from taxis/drop-offs and service vehicles. The forecast operational traffic arriving at Viadux is given in Table 16.9 below. These trips are distributed onto the network and are influenced by the servicing and drop-off/pickup locations and are shown in Figure 16.2. These forecasts reflect the economies of scale and the multiple land uses on site which means service vehicles can make multiple drops with one trip.

Table 16.9 Operational Traffic Forecasts Daily Vehicle Flows To and From Site	
Taxis/LGVs	109
HGVs	10

Identification and Evaluation of Likely Significant Effects

Construction Phase

16.110 The Daily Construction Traffic forecasts described in Table 16.8 and Figure 16.1 can then be compared against the baseline flows to determine the change in traffic flow during construction for development and this will then lead to a basis for assessing the environmental implications. This is described in Table 16.10 below.

Table 16.10 Construction Traffic Impact	Daily Two-Way Flows					
	Baseline Flows		Construction Traffic		% Change	
Road Link	Vehicles	HGVs	Vehicles	HGVs	Vehicles	HGVs
Great Bridgewater Street (West of Albion St)	6079	545	69	65	1%	12%
Albion Street	11996	1489	69	65	1%	4%
Deansgate	11974	535	69	65	1%	12%
Great Bridgewater Street (East of Albion St)	6754	477	0	0	0%	0%
Trafford Street	449	402	12	10	3%	2%

16.111 It can be seen that the number of vehicles on the network does not change significantly and is typically around a 1% change or 3% on Trafford Street. Such a change is well within the daily variation of flow and would not be perceptible to the observer.

16.112 There is a more notable change in HGV volumes with a 12% increase in HGVs on Great Bridgewater Street and Deansgate and this is a reflection of the routeing pattern.

16.113 Such a change in HGV volumes is on the cusp of being perceptible to road users and potentially sensitive environmental receptors. The assessment of these construction traffic flows on the area is described in Table 16.11.

Table 16.11 Construction Traffic Potential Significant Effect	Receptor(s)	Environmental Effect Significance and Duration (Temporary/Permanent)
Severance	Road Users, Non Motorised Road Users Local residents on: Trafford St. Albion St, Gt Bridgewater St, Deansgate	Negligible, Not Significant, Temporary
Road vehicle driver and passenger delay		Negligible, Not Significant, Temporary
Non-motorised user delay		Negligible, Not Significant, Temporary
Non-motorised user amenity		Negligible, Not Significant, Temporary
Fear and intimidation on and by road users		Negligible, Not Significant, Temporary
Road user and pedestrian safety		Negligible, Not Significant, Temporary
Hazardous/large loads		Negligible, Not Significant, Temporary

Operational Phase

16.114 The forecasts change in traffic flows as shown in Figure 16.2 and compared against the Baseline flows in Table 16.7 is given in Table 16.12 below.

Table 16.12 Operational Traffic Impact	Daily Two-Way Flows					
	Baseline Flows		Operational Traffic		% Change	
Road Link	Vehicles	HGVs	Vehicles	HGVs	Vehicles	HGVs
Great Bridgewater Street (West of Albion St)	6079	545	588	9	1%	2%
Albion Street	11996	1489	75	9	1%	1%
Deansgate	11974	535	41	9	1%	2%
Great Bridgewater Street (East of Albion St)	6754	477	49	0	1%	0%
Trafford Street	449	402	80	18	18%	4%

16.115 This analysis shows that the percentage change in traffic with development against the baseline flows is generally between 1-2% or less on the general highway. On Trafford Street the service yard located there does attract around 40 vehicles over the day, the majority of which are Light Goods Vans equating to around 18% of the existing lightly trafficked Trafford Street. This is still a low flow on what is a service route to Manchester Central, and is not expected to give rise to any adverse impact for road users. As has been described before such small changes are within the daily variation of traffic activity and therefore are unlikely to be perceptible to the road user. The assessment of these operational traffic flows on the area is described in Table 16.13.

Table 16.13 Operational Traffic Potential Significant Effect	Receptor(s)	Environmental Effect Significance and Duration (Temporary/Permanent)
Severance	Road Users, Non Motorised Road Users Local residents on: Trafford St. Albion St, Gt Bridgewater St, Deansgate	Negligible, Not Significant, Permanent
Road vehicle driver and passenger delay		Negligible, Not Significant, Permanent
Non-motorised user delay		Negligible, Not Significant, Permanent
Non-motorised user amenity		Negligible, Not Significant, Permanent
Fear and intimidation on and by road users		Negligible, Not Significant, Permanent
Road user and pedestrian safety		Negligible, Not Significant, Permanent
Hazardous/large loads		Negligible, Not Significant, Permanent

Cumulative Effects

Construction Assessment

16.116 The expected period of construction is between Q1 2026-Q1 2032. There are committed developments in the vicinity which could in theory result in construction activity during the same time period as for Viadux Phase 2. There is always a significant number of construction projects going on in the city centre at any one time, however the traffic implications of such activity are not quantified from other development reports. However, the cumulative effects are limited as the daily construction traffic flows are regulated to spread over the course of the day, so vehicles tend not to coincide and arrive in the same location at the same time.

16.117 Close to the site we note the Beetham Tower also has planned window replacement works so diversions will be in place. It is expected that these works would be completed from the compound and not affect the wider road network but progress on that will be monitored.

16.118 There is a large development, (Great Northern Warehouse Development), within 100m of Viadux. Discussions have been held with Trilogy, the developer on this scheme and we understand the scale of development, the timescales of the development and the proposed traffic management strategy. This would be subject to further consideration to coordinate activities to avoid significant adverse implications.

16.119 All major construction sites apply construction management plans which will help on the routeing and timing of vehicles. Manchester City Council also coordinate the construction activity where it impacts on the highway to limit any cumulative effect.

16.120 The scheme does result in road closures for the erection and removal of Tower Cranes and closures on Great Bridgewater St are needed for the Bridge removal operations. In addition, partial road

closures are expected to be required on Albion Street, Great Bridgewater Street and Trafford Street West at some point during construction.

16.121 When considering the potential implications of Cumulative Construction Traffic, it is considered that even with limited information, the potential cumulative impacts on the environment are not expected to change from the analysis given in Table 16.11. Therefore, before mitigation is considered the various potential impacts from construction traffic remains as a Negligible (not significant) impact and that is temporary over the construction period..

Operational Assessment

16.122 As described previously there is not expected to be any cumulative increase in traffic arising from other committed developments in the area.

16.123 Therefore, the potential environmental effects of the permanent Operational Phase of development prior to mitigation remains as described in Table 16.12 and remain as Negligible (Not Significant).

Mitigation Measures

Construction Phase

16.124 The Applicant will commit to implementing a Construction Environmental Management Plan (CEMP), which will accompany the planning application and would be conditioned. This is in line with best practice and will outline the measures to be introduced to minimise impacts during this phase. This will detail the access strategy for vehicle arrivals and departures and routings to be used.

16.125 The CEMP covers a broad range of measures to limit the environmental impact from construction. The key measures that relate to transport and vehicle movements include:

- Working hours will be in line with the LA planning requirements. These are anticipated to be 07.30–18.00 Mondays to Fridays and 08.00–14.00 Saturdays. No work on Sundays or Bank holidays. Most site operatives are expected to arrive before the traditional morning rush hour thereby limiting the impact at this time.

- Any large items of plant, or other large loads that need to be brought to or from the Site, will be transported during off-peak periods.

- Banksmen employed at the site accesses to ensure safe and efficient access.

- Dust Suppression will be employed using best practice. This will include the use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site.

- Wheel washing facilities will also be used to ensure that the road surfaces do not become muddied and slippery.

- Protection barriers for road users adjacent to the compound and temporary signage.

- Roadworks and temporary lane closures will be coordinated to have the least possible impact during peak times.

Operational Phase

16.126 The nature of the site as a car free development provides the basis for the limited impact of development traffic on the local area. On top of this there are mitigation measures in place to improve the use of sustainable transport modes.

16.127 The main improvement for transport with development are the off-site highway works, particularly to improve the pedestrian and cycle environment. The Viadux Phase 2 improvements will tie in with those at Watson Street and these will include the upgrading the footways and environment of Great Bridgewater Street by quality pavement surfacing and removing part of the bridge structure above thereby transforming the light available for all road users.

16.128 These improvements on Great Bridgewater Street then tie into a significant upgrade to the Albion Street signals. This improvement will transform the pedestrian crossing facilities, reducing the crossing distance and the severance effect, improving safety. On-Street cycle facilities are also upgraded as part of this improvement while broadly keeping most of the highway capacity for traffic with the exception that the new pedestrian crossing phases will reduce the time available for traffic thereby increasing some delay for drivers.

16.129 Finally, there are footway and public realm improvements on Albion Street including changes to reallocate space to pedestrians rather than vehicles.

16.130 A further key measure is the implementation of a Travel Plan to promote sustainable travel. A Framework Travel Plan accompanies this planning application, and the key measures are around providing information to occupiers on Active Travel/Public Transport/Car Sharing etc. The Framework Plan will be upgraded to a full Implementation Plan on occupation at which point the occupiers will be surveyed on an annual basis to get their feedback on their travel behaviours and to monitor the use of cycle parking and to identify any issues that can be resolved.

16.131 The Travel Plan will be subject to an annual review and monitoring with TfGM to consider the effectiveness of the plan and to take actions to progress the plan objectives.

Residual Effects

Construction Phase

16.132 The residual effect after considering the increase in construction traffic following the mitigation of a CEMP is presented below.

16.133 Table 16.14 provides a tabulated summary of the outcomes of the effects of construction phase of the Proposed Development once accounting for mitigation.

Table 16.14 Construction Phase Likely Significant Effect	Receptors	Environmental Effect (Pre-Mitigation)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration
Severance	Road Users, Non Motorised Road Users and local residents on: Trafford St. Albion St, Gt Bridgewater St, Deansgate	Negligible, Not Significant, Temporary	CEMP	Requirement of CEMP mandated by Planning Condition, to be implemented agreed with LPA/LHA prior to construction and monitored by contractor.	Negligible, Not Significant, Temporary
Road vehicle driver and passenger delay		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Non-motorised user delay		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Non-motorised user amenity		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Fear and intimidation on and by road users		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Road user and pedestrian safety		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Hazardous/large loads		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary

16.134 The assessment for all the relevant IEMA criteria found that during the demolition and construction period, the residual implications of construction traffic for a temporary period on the environmental receptors is considered to be Negligible (Not Significant) for all the effect categories (severance, driver delay, pedestrian delay, pedestrian amenity, fear and intimidation, and accidents and safety, vehicles with large /hazardous loads).

Operational Phase

16.135 Considering the Residual Impact of Operational Traffic following mitigation of the relatively modest increases in traffic, Table 16.11 provides a tabulated summary of the outcomes of the effects of operational phase of the Proposed Development once accounting for mitigation.

16.136 As can be seen in Table 16.15 the resultant assessment post mitigation for the environmental implications of severance, road user delay, non motorised user delay & amenity, fear and intimidation caused by large vehicles and road safety is Negligible.

Table 16.15 Operational Phase Likely Significant Effect	Receptors	Environmental Effect (Pre-Mitigation)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration
Severance	Road Users, Non Motorised Road Users and local residents on: Trafford St. Albion St, Gt Bridgewater St, Deansgate	Negligible, Not Significant, Temporary	Highway Improvements, notable new pedestrian crossing facilities and cycle lanes Public Realm improvements on Albion St and Gt Bridgewater St. Travel Plan to encourage sustainable transport behaviours and use of cycle facilities.	Highway and public realm works mandated by Planning Condition, and secured via a Section 278 agreement. Travel Plan secured by condition.	Negligible, Not Significant, Temporary
Road vehicle driver and passenger delay		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Non-motorised user delay		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Non-motorised user amenity		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Fear and intimidation on and by road users		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Road user and pedestrian safety		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Hazardous/large loads		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary

Monitoring

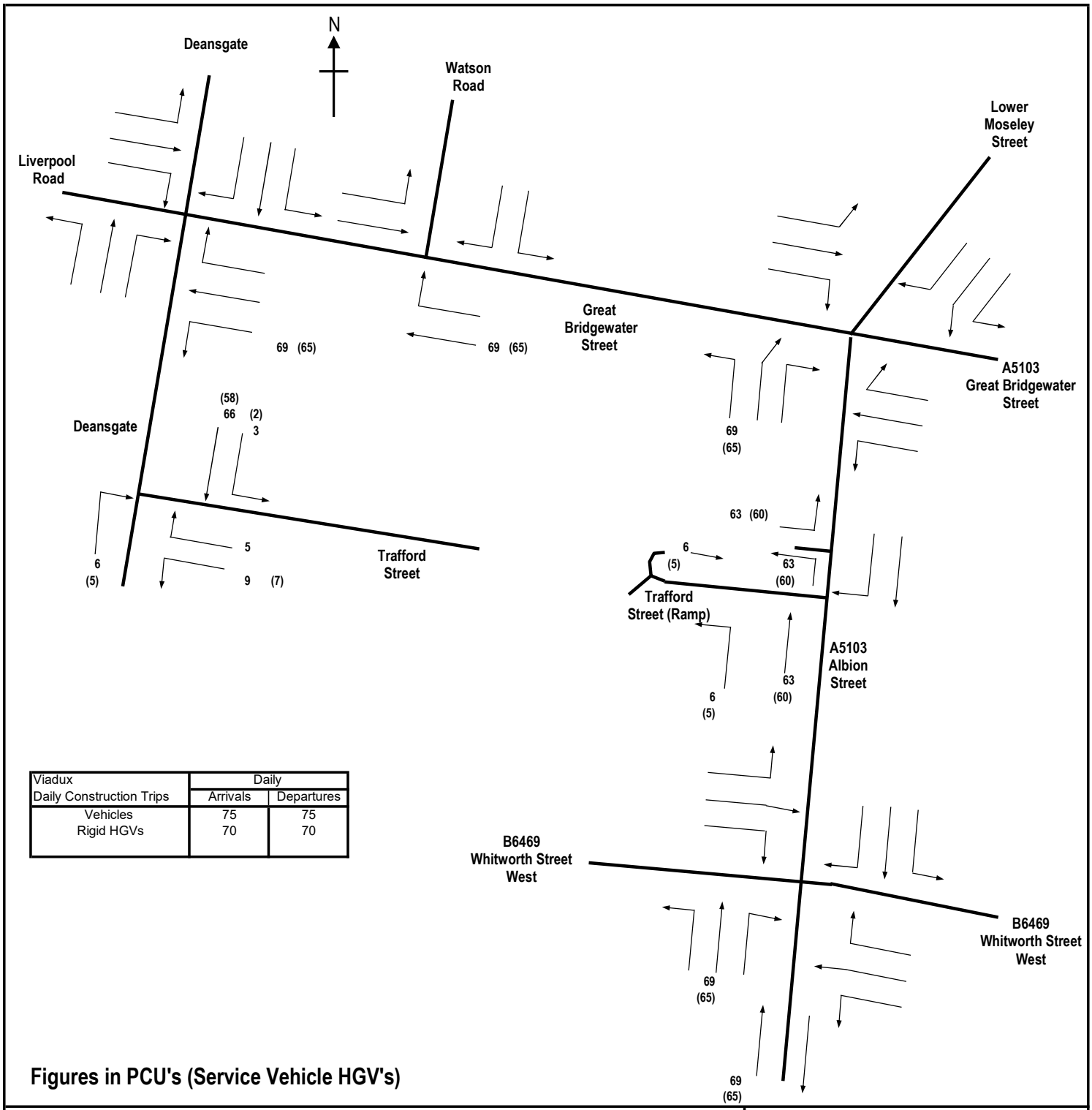
The Travel Plan is part of a continuous process for improvement, requiring monitoring, review and revision to ensure it remains relevant.

The off-site highway improvements will be adopted by the local highway authority and therefore these improvements will be monitored and maintained in perpetuity.

Reference List

This ES Chapter has been prepared in reference to the following:

- Institute of Environmental Management and Assessment Guidelines: Environmental Assessment of Traffic and Movement. 2023.
- Highways England. Design Manual for Roads and Bridges: LA104 Environmental Assessment and Monitoring Revision 2020.
- Department for Levelling Up, Housing and Communities. National Planning Policy Framework. 2023.
- Planning Practice Guidance: Travel Plans, Transport Assessments and Statements. [Online] 06 03 2014. [Cited: 01 05 2023.] https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements.
- Department for Transport. Decarbonising Transport: A Better, Greener Britain. 2021.
- Department for Transport and National Highways. Strategic Road Network and the Delivery of Sustainable Development. [Online] 23 12 2022. [Cited: 01 05 2023.] https://www.gov.uk/government/publications/strategic-road-network-and-the-delivery-of-sustainable-development.
- Greater Manchester Combined Authority (excl. Stockport). Places for Everyone. 2022.
- Chartered Institute of Highways and Transportation. Better Transport, Better Places. 2019.
- Town and Country Planning Association. 20-Minute Neighbourhoods: Creating Healthier, Active, Prosperous Community. An Introduction for Council Planners in England. 2021.
- Institute of Highways and Transportation. Providing for Journeys on Foot. 2000.
- Chartered Institute for Highways and Transportation. Planning for Walking. 2015.
- Department for Communities and Local Government. A Guide to Better Transport – Reducing the need to travel. 2001.
- Department for Transport and Institute of Highways and Transportation. Cycle Friendly Infrastructure: Guidelines for Planning and Design. 1996.

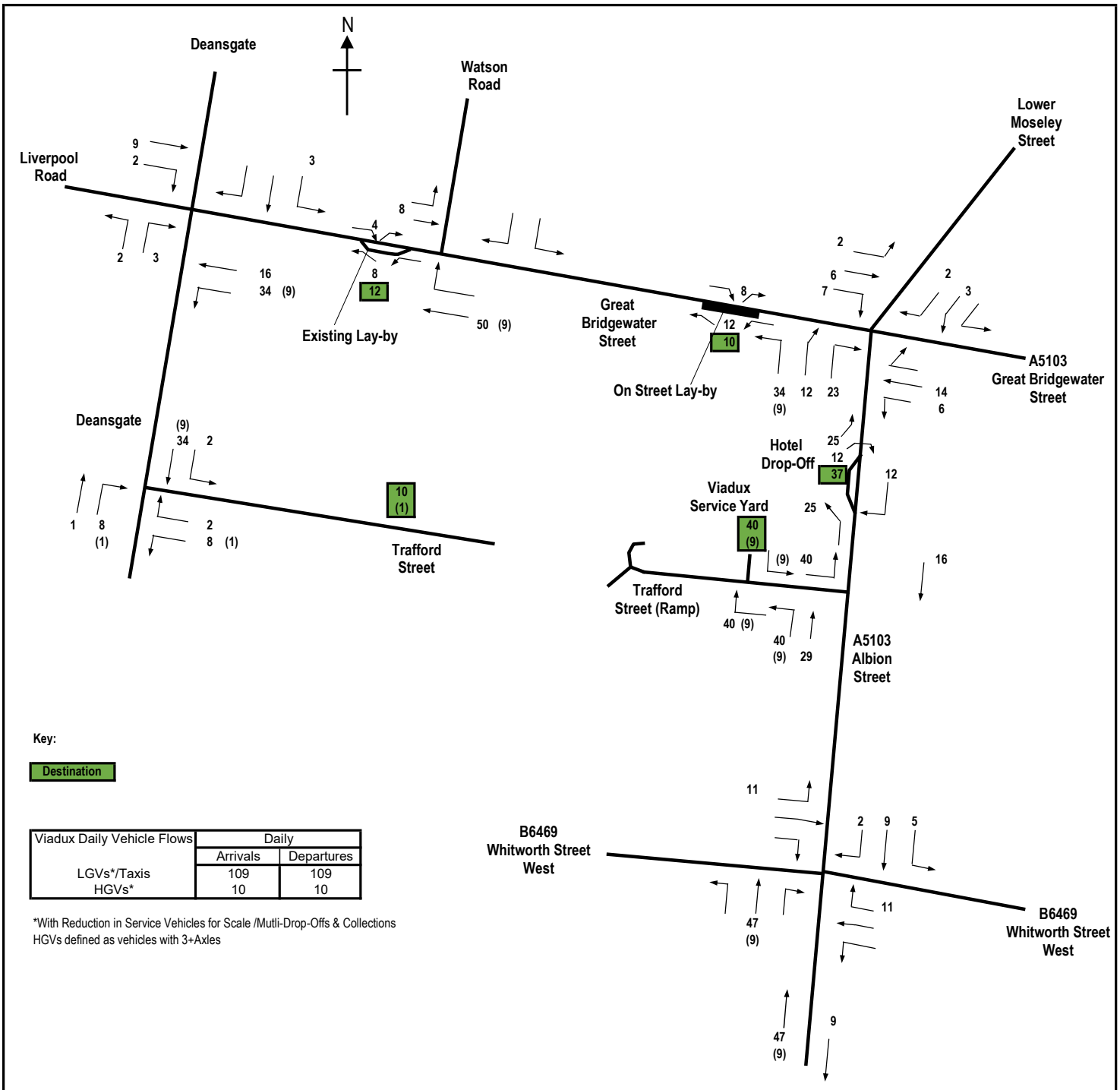


Viadux Daily Construction Trips	Daily	
	Arrivals	Departures
Vehicles	75	75
Rigid HGVs	70	70

Figures in PCU's (Service Vehicle HGV's)

DRAWING TITLE: Construction Trips Daily Flows			
JOB TITLE: Viadux			
DRAWN BY: GD	DATE: MAY 2022	SCALE: NTS	REF: FIGURE 16.1

SLR



Viadux Daily Vehicle Flows	Daily	
	Arrivals	Departures
LGVs*/Taxis	109	109
HGVs*	10	10

*With Reduction in Service Vehicles for Scale /Mutli-Drop-Offs & Collections
HGVs defined as vehicles with 3+Axles

DRAWING TITLE: Viadux Development Trips - Weekday Daily			
JOB TITLE: Viadux Phase 2			
DRAWN BY: GD	DATE: Oct 2024	SCALE: NTS	REF: FIGURE 16.2

17. Archaeology

Introduction

17.1 This Chapter of the ES has been prepared by Katie Harvey, Civic Heritage and asseses Archaeology.

17.2 This Chapter is accompanied by the following appendices:

- Appendix 17.1: Archaeological Desk-based Assessment (DBA).

17.3 The authors of this Chapter is Katie Fletcher, who has a BA (Hons) degree in Archaeology and is experienced in the production of desk-based assessments, scoping reports, historic environment assessments, heritage statements, post-excavation assessments and the supervision of archaeological fieldwork.

	Lead Author	Reviewer
Name	Katie Fletcher	Ollie Cook
Company	Civic Heritage	Civic Heritage
Qualifications/Accreditations relevant to technical area	BA (Hons) degree in Archaeology	BA (Hons) in Archaeology
Does the practitioner hold any IEMA qualification?	No	No
Company hold IEMA QMark?	No	
Years technical experience (in technical area)	8	9
Number of EIA's delivered to date	25	-

Assumptions and Limitations

17.4 In undertaking the archaeological assessment of the Site, there are several limitations and constraints that have affected the outputs from this work. These include:

- Assumptions based on the date and location of archaeological remains excavated during Phase 1.
- Assumptions regarding the location of heritage assets. The location of the heritage assets is based on national grid references from historic maps, which may have slight inaccuracies;

- Limitation of research sources for the period pre-dating the late 18th century, therefore, unknown archaeological remains from earlier periods may survive within the application site; and
- Manchester's Historic Environment Records is third party data and therefore the assessment relating to each heritage asset is reliant on the accuracy of this data.

These assumptions and limitations are typical for an archaeological assessment and are not expected to affect the validity of the outcome of the assessment.

Relevant Legislation, Policy and Guidance

Legislation

- Annex 1 of 'Scheduled Monuments: identifying, protecting, conserving and investigating nationally important archaeological sites under the Ancient Monuments and Archaeological Areas Act 1979'

Policy

National planning policy

- National Planning Policy Framework (Department of Levelling Up, Housing and Communities, Dec 2023), section 16, paragraphs 195-214

Local planning policy

- Manchester City Council adopted a Core Strategy in 2012, which is scheduled until 2027. The heritage strategy is outlined in Objective 6: Environment, which summarises the approach the local authority will take in determining planning applications which may affect the historic environment. Policy EN3 is of particular relevance.

Regional policy

- North West Regional Research Framework, accessed December 2023
- Places for everyone (Policy JP-P2: Heritage and Policy JP-Strat2)

Guidance

The following national guidance and industry standards have informed this assessment:

- 'Guidance on Heritage Impact Assessments for Cultural World Heritage Properties' issued by the International Council on Monuments and Sites (ICOMOS) in January 2011;
- Chartered Archaeologists' (CIfA's) Standards and Guidelines for Historic Environment and Desk Based Assessments;
- Guidance for best practice for treatment of human remains excavated from Christian burial grounds in England.

Assessment Methodology and Significance Criteria

Scenarios Tested

17.5 Scenario 1: Existing Baseline = Site as is today i.e. Phase 1 tower as built with the various amendments, Plots 2a and 2b in their existing use.

17.6 Scenario 2: Existing Baseline + Viadux Plot 2a + Viadux Plot 2b.

The Study Area

17.7 The study area for this assessment comprises a 250m radius from the boundary of the application site, which was agreed with GMAAS. The size of the study area was established based on professional judgement and is considered to be an appropriate size to place the Site within a suitable archaeological context in order to accurately assess the archaeological potential of the Site.

17.8 There are no other developments in the area that could result in the loss or interference with the same types of remains.

17.9 The study area includes the adjacent Phase 1 and Beetham Tower, which both uncovered Roman remains. The presence of nearby Roman remains increases the potential for below-ground Roman remains to survive within the Site.

Source of Effect

17.10 The construction stage of the Proposed Development will impact archaeological receptors.

17.11 Once the Proposed Development is complete, the operational phase will not affect archaeological receptors. As such, an assessment of the completed development stage of the Proposed Development has been scoped out of this ES chapter.

Significance Criteria

17.12 The significance criteria uses the approach to assessing heritage value contained within 'Guidance on Heritage Impact Assessments for Cultural World Heritage Properties' issued by the International Council on Monuments and Sites (ICOMOS) in January 2011 (ICOMOS, 2011). This document states that an archaeological asset's significance can be assessed as very high, high, medium, low, negligible or unknown.

Sensitivity / Value	Description
Very High	Sites of acknowledged international importance inscribed as World Heritage (WH) property; Individual attributes that convey Outstanding Universal Value (OUV) of the WH property; and Assets that can contribute significantly to acknowledged international research objectives (ICOMOS, 2011).
High	Nationally-designated Archaeological Monuments protected by the State Party's laws; Undesignated sites of the quality and importance to be designated; and Assets that can contribute significantly to acknowledged national research objectives (ICOMOS, 2011).
Medium	Designated or undesignated assets that can contribute significantly to regional research objectives (ICOMOS, 2011)
Low	Designated or undesignated assets of local importance; Assets compromised by poor preservation and/or poor survival of contextual associations; and Assets of limited value, but with potential to contribute to local research objectives (ICOMOS, 2011).
Negligible	Assets with little or no surviving archaeological interest (ICOMOS, 2011).

Table 17.1 sensitivity / value of heritage asset (receptor) criteria (ICOMOS 2011)

17.13 The impact was assessed in terms of the sensitivity of the Site to the magnitude of change or scale of impact during any future redevelopment scheme. The magnitude, or scale of an impact is often difficult to define, but has been termed as major, moderate, minor, negligible or no change, as shown in Table 17.2:

Magnitude	Description
Major	Changes to attributes that convey OUV of WH properties. Most or all key archaeological materials, including those that contribute to OUV such that the resource is totally altered.
Moderate	Changes to many key archaeological materials, such that the resource is clearly modified.
Minor	Changes to key archaeological materials, such that the resource is slightly altered.
Negligible	Very minor changes to key archaeological materials, or setting.
No change	No change.

Table 17.2 Scale of Impact Magnitude (ICOMOS 2022)

17.14 The interaction of the scale of impact (Table 2) and the importance of the archaeological site (Table 1) produce the impact significance. This may be calculated by using the matrix shown in Table 17.3:

Value of heritage asset (receptor)	Scale & severity of impact				
	No change	Negligible change	Minor change	Moderate change	Major change
Very High	Neutral	Slight	Slight / Moderate	Large / Very large	Very large
High	Neutral	Slight	Slight / Moderate	Moderate / Large	Large / Very large
Medium	Neutral	Neutral/Slight	Slight	Moderate	Moderate / Large
Low	Neutral	Neutral/Slight	Neutral/Slight	Slight	Slight / Moderate
Negligible	Neutral	Neutral	Neutral/Slight	Neutral/Slight	Slight

Table 17.3 Significance Matrix (ICOMOS 2011)

Baseline Conditions

17.15 The Site lies within the Castlefield area of Manchester, which is believed to have been conducive for prehistoric activity based on a number of finds that have been excavated in the area. During an excavation that took place in 2020 associated with Phase 1, two potential prehistoric pits were excavated within the Site.

17.16 The Site (Plot 2B) lies within the Area of Castlefield Roman Vicus. Previous investigations revealed Roman remains within the north-west part of the Site (Plot 2B), comprising a Romano-British pit or linear feature. Further remains were discovered within broadly the centre of the Site during Phase 1, including evidence of two possible prehistoric pits and a series of Roman pits and ditches that likely relate to the extent of the Roman civilian settlement located outside of the fort wall (immediately west of Plot 2A). In addition, previous Roman findspots lie within the Site, together with a section of

Roman road (near to Plot 2A) associated with either the Manchester to Oldham, or the Manchester to Buxton road and the Roman road from Manchester to Buxton.

17.17 No medieval activity is known within the Site and it lies beyond Manchester's medieval core, though several medieval findspots are within the vicinity of the Site. The Site was most likely arable land associated with farming and divided by field boundaries (Plot 2B and potentially Plot 2A) in the post-medieval period. Post-medieval soils were excavated during a previous excavation that took place partly within Plot 2B. In addition, three cottages had been established within the Site (Plot 2B) by the late 18th century, together with a row of single-depth dwellings on the south side of Strand Court.

17.18 By 1801 the Great Bridgewater Street Wesleyan Chapel had been erected, and by 1809 a rectory (within Plot 2B), Sunday School (within Plot 2B), and the chapel's burial ground (within Plot 2B) had been established. In addition, two double-depth properties had been established on the south side of Trumpet Street, and a narrow rectangular commercial building (within Plot 2B). An iron foundry had been established in c.1806, at the junction of Great Bridgewater Street and Albion Street, and Commercial Mill (Marsden's Mill), had been erected by 1809, between Trumpet Street and Trafford Street.

17.19 By 1824/1831, the remainder of the Site had been developed including Union Iron Foundry (partly within Plot 2B), and various types of workers' housing, including double-depths, blind-backs and back-to-backs (within Plot 2A and 2B). Open yards occupied the south side of Trumpet Street.

17.20 The Site was subject to significant reorganisation in the late 1880s, when a new railway viaduct was built linking Central Station to the existing network (Castlefield Viaduct; List Entry 1292315), which is currently extant and is designated as a Grade II Listed Building. The construction of the viaduct led to the clearance of all the houses, Union Iron Foundry, the open yards and some of the buildings associated with the chapel. The burial ground was reported to have been 'swept away' prior to the construction of the Great Northern Railway Company's viaduct, however, the burial ground is still marked on maps following the construction of the railway viaduct. Several businesses occupied the brick arches beneath the viaduct.

17.21 An automobile engineering works had replaced the buildings formerly associated with the Great Bridgewater Street Methodist Chapel in the west of the site by 1922. By the 1940-60s, the former foundry on the eastern edge of the Site was utilised as an engineering works.

17.22 An excavation associated with Phase 1 was undertaken in 2020. The excavation correlates with much of Plot 2a, and revealed potential prehistoric pits, Roman remains, 19th-century workers' houses and part of an early 19th-century mill. A small portion of the north-west corner of the Site was also excavated (covering the north-eastern edge of Plot 2B) and indicates that the remainder of the Site has high potential to contain archaeological remains.

17.23 The potential for the Site to contain buried archaeological remains is considered to be high. Remains may include prehistoric remains, Roman activity, late medieval to post-medieval relict soils and field boundaries, a burial ground and associated religious buildings, an early 19th-century cotton mill and early 19th-century foundries. Any remains that do exist within the Site are likely to be of low to medium significance and, without a programmed of mitigation, the scheme could damage or destroy these remains.

17.24 Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first

instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.

Identification and Evaluation of Likely Significant Effects

The assessment of the likely archaeological effects of the Proposed Development during the construction stage are identified below. No significant effects will arise during the operational phase.

Construction Phase

The construction works, particularly the proposed intrusive works, could potentially lead to the complete or partial removal of archeological receptors and the associated loss of its research potential / heritage significance.

17.25 Archaeological receptors that correlate with the locations of Plots 2A, and 2B, and will be impacted by the Proposed Development may include prehistoric remains, Roman activity, late medieval to post-medieval relict soils and field boundaries, an 18th-century cottage, a burial ground and associated religious buildings, an early 19th-century cotton mill (Marsden's Mill), 19th-century workers' housing, a possible commercial building and early 19th-century foundries. The landscaping and/or ground-breaking works that will be undertaken on these plots have the potential to damage or destroy these below ground archaeological remains, if present.

17.26 Any unknown prehistoric remains, Roman remains and remains of Marsden's Mill could potentially be of Medium significance (see Table 17.1). Given that complete removal of this archaeological receptor is possible, the impact magnitude is considered to be Major (see Table 17.2). This will result in a Moderate to Large Adverse scale of impact without mitigation (see Table 17.3).

17.27 Remains associated with late medieval to post-medieval relict soils and field boundaries, a burial ground and associated religious buildings, an engine and gas retort and early 19th-century foundries are likely to be of Low significance (see Table 17.1). Given that complete removal of this archaeological receptor is possible, the impact magnitude is considered to be Major (see Table 17.2). This will result in a Slight to Moderate Adverse scale of impact without mitigation (see Table 17.3).

17.28 There is limited potential for the Site to contain 18th-century cottages, 19th-century workers' housing and commercial building due to the later redevelopment of the Site across the footprint of these buildings. Any remains would be of Low significance (see Table 17.1). Given that complete removal of this archaeological receptor is possible, the impact magnitude is considered to be Major (see Table 17.2). This will result in a Slight to Moderate Adverse scale of impact without mitigation (see Table 17.3).

17.29 The Proposed Development will result in Permanent, irreversible damage to archaeological receptors. There is a total of 16 archaeological receptors within the Site, listed in Table 17.4.

Operational Phase

17.30 Once the Proposed Development is complete, the operational phase will not affect archaeological receptors. As such, an assessment of the completed development stage of the proposed development has been excluded from this ES chapter.

Cumulative Effects

17.31 Most of the archaeological receptors considered in the assessment would, if present within the Site, only lie within the Site itself.

17.32 There are a small number of receptors considered in the assessment that could extend beyond the Site boundary into surrounding areas. Archaeological receptors beyond the Site, within the committed developments, are expected to have undertaken a desk-based archaeological assessment to identify any potential impacts on archaeological assets, should any assessment identify the potential for archaeological impacts, it is expected that mitigation would have been agreed and implemented, either prior to the submission of the application, or secured as a planning condition. In each case, the exact scope and extent of any archaeological investigations required would be agreed with the GMAAS, in their capacity as archaeological advisors to Manchester City Council. As such, like the Proposed Development, all of the committed developments are expected to fully mitigate their potential archaeological effects. On this basis, significant inter-development cumulative effects will not arise. A detailed inter-development cumulative assessment has therefore not been undertaken.

Mitigation Measures

Construction Phase

17.33 A programme of archaeological mitigation will be undertaken before the construction phase to offset the harm of the Proposed Development to archaeological receptors. In the first instance, a programme of archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) should take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In addition, archaeological monitoring in the form of a watching brief should take place during any ground-breaking works beneath the main roads and the road junction in the north-eastern corner of the Site.

17.34 A programme of archaeological mitigation will be set out in a Project Design, in consultation with Greater Manchester Archaeological Advisory Service (GMAAS), in their capacity as archaeological advisors to Manchester City Council. The exact scope and extent of any such further investigation of the Site will be determined by GMAAS.

17.35 Should significant archaeological remains be encountered during the archaeological evaluation or watching brief, further excavation may be required to offset the harm of the development to the buried archaeological resource (through the preservation of archaeological remains by record), in line with the guidance provided by the National Planning Policy Framework (Paragraphs 210 and 211).

17.36 The Historic England publication HEAN17 describes the advancement of our understanding via archaeological excavations as a public benefit. Given the resulting research will contribute to the increased knowledge and understanding of these archaeological receptors (a public benefit), the magnitude of the residual impacts on these receptors are considered to be reduced as a result of this mitigation.

Residual Effects

Construction Phase

17.37 Below is a tabulated summary (Table 17.4) of the outcomes of the Proposed Development on the archaeological receptors following the implementation of mitigation.

Likely Significant Effect Post-Mitigation	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)

Negligible	Unknown prehistoric Remains	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Neutral, Permanent, Irreversible
Negligible	Unknown Roman remains	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and	Neutral, Permanent, Irreversible

			record areas) and watching brief, which can be secured via a planning condition.	
Minor	Roman road (near Plot 2A)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Slight, Permanent, Irreversible
Minor	Manchester to Buxton Roman road	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of	Slight, Permanent, Irreversible

			an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	
Minor	Castlefield Roman vicus: Area of Roman Manchester (Plot 2B)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Slight, Permanent, Irreversible
Negligible	Late medieval to post-medieval relict soils and field boundaries (Plot 2B, but also potential within Plots 2A)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if	Neutral, Permanent, Irreversible

			present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	
Negligible	18th-century cottages (Plot 2B)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Neutral, Permanent, Irreversible
Negligible	Methodist Chapel burial ground (Plot 2B)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the	Neutral, Permanent, Irreversible

		of the proposed development in line with the NPPF.	Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	
Negligible	Rectory (Plot 2B)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Neutral, Permanent, Irreversible
Negligible	Sunday School (Plot 2B)	A programme of archaeological mitigation is proposed that will preserve the	Following consultation with GMAAS (as archaeological advisors to MCC), it	Neutral, Permanent, Irreversible

		archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	
Negligible	Commercial building on Trumpet Street (Plot 2B)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Neutral, Permanent, Irreversible

Negligible	Workers' housing (Plot 2A and 2B)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Neutral, Permanent, Irreversible
Negligible	Great Bridgewater Street foundry	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and	Neutral, Permanent, Irreversible

			record areas) and watching brief, which can be secured via a planning condition.	
Minor	Marsden's Mill	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Slight, Permanent, Irreversible
Negligible	Union Foundry (Plot 2B)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of	Neutral, Permanent, Irreversible

			an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	
Negligible	Engine and gas retort house (Plot 2A)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Neutral, Permanent, Irreversible

Operational Phase

N/A

All archaeological receptors will have been mitigated before the operational phase.

Monitoring

N/A

17.38 All archaeological receptors will have been mitigated before the operational phase. Therefore, monitoring would not be required.

Reference List

17.39 This ES Chapter has been prepared in reference to the following:

- ICOMOS. Guidance on Heritage Impact Assessments for Cultural World Heritage Properties. Online resource : International Council on Monuments and Sites, 2011.
- CIFA. Standard and Guidance for Historic Environment Desk-based Assessment. 2017.
- DCMS. Annex 1: Scheduled Monuments & nationally important but non-scheduled monuments. Online resource : Department for Culture, Media and Sport, 2013.
- APABE. Guidance for best practice for treatment of human remains excavated from Christian burial grounds in England. s.l. : English Heritage, 2017.
- UK Parliament. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017. s.l. : The Stationery Office Limited under the authority and superintendence of Carol Tullo,Controller of Her Majesty's Stationery Office and Queen's Printer of Acts of Parliament., 2017. 571.
- Ministry of Housing, Communities & Local Government. National Planning Policy Framework. Online resource : Ministry of Housing, Communities & Local Government, 2023.
- Research Framework. North West Regional Research Framework. [Online] 2022. https://researchframeworks.org/nwrf/.

18. Summary of Residual Effects

Introduction

18.1. This chapter summarises the residual effects that are set out in each individual relevant chapter.

Townscape and Visual Impact

Construction Phase

18.2. Significant residual construction phase impacts are summarised in the table 18.1 below. Table 18.1 summarises only the construction phase effects that are significant residual effects. The full assessment of construction phase impacts is contained within Appendices 6.1, 6.2 and 6.3.

Table 18.1 Significance of Construction Phase Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Moderate Adverse	Viewpoint 4	None	N/A	Moderate adverse effects. Temporary. Significant.
Moderate Adverse	Viewpoint 11	None	N/A	Moderate adverse effects. Temporary. Significant.
Moderate Adverse	Viewpoint 13	None	N/A	Moderate adverse effects. Temporary. Significant.
Moderate Adverse	Viewpoint 14	None	N/A	Moderate adverse effects. Temporary. Significant.
Moderate Adverse	Viewpoint 20	None	N/A	Moderate adverse effects. Temporary. Significant.
Moderate Adverse	Viewpoint 28	None	N/A	Moderate adverse effects. Temporary. Significant.

Operational Phase

Table 18.2 Significant Operation Phase Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Moderate Beneficial	Townscape Character - Petersfield	None	N/A	Moderate beneficial effects. Permanent. Significant.
Moderate Beneficial	Urban Grain	None	N/A	Moderate beneficial effects. Permanent. Significant.
Moderate Beneficial	Land Use	None	N/A	Moderate beneficial effects. Permanent. Significant.
Moderate Beneficial	Building Heights	None	N/A	Moderate beneficial effects. Permanent. Significant.

Moderate Beneficial	Movement and Linkages	None	N/A	Moderate beneficial effects. Permanent. Significant.
Moderate Beneficial	Site character	None	N/A	Major beneficial effects. Permanent. Significant.
Moderate Beneficial	Viewpoint 4	None	N/A	Moderate beneficial effects. Permanent. Significant.
Moderate Neutral	Viewpoint 4 - Nighttime view	None	N/A	Moderate neutral effects. Permanent. Significant.
Moderate Adverse	Viewpoint 11	None	N/A	Moderate adverse effects. Permanent. Significant.
Moderate Adverse	Viewpoint 13	None	N/A	Moderate adverse effects. Permanent. Significant.
Moderate Neutral	Viewpoint 14	None	N/A	Moderate neutral effects. Permanent. Significant.
Moderate Adverse	Viewpoint 20	None	N/A	Moderate adverse effects. Permanent. Significant.
Moderate Adverse	Viewpoint 28	None	N/A	Moderate adverse effects. Permanent. Significant.

Heritage

Construction Phase

18.3. Table 18.3 below considers the potential impact of the Proposed Development (both physical and visual) on designated heritage assets during the construction phase. These impacts will therefore generally be identified as 'temporary', with any 'permanent' effects identified when a loss of historic fabric is proposed.

18.4. The impacts outlined in Table 18.3 below are applicable to Scenario 2 using Scenario 1 as the baseline.

Operational Phase

18.5. Overall, this assessment has identified that the completed and operational phase of the Proposed Development will result in varying degrees of beneficial and adverse impacts on the built historic environment within the identified study area.

18.6. The potential direct and indirect effects for individual heritage assets are presented in Table 18.3 below. The impacts outlined are applicable to Scenario 2a, using Scenario 1 as the baseline.

Table 18.3 Impact on Heritage Assets – Operational Phase

Receptor(s)	**Significance / Sensitivity value**	**Scale of Impact**	**Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)**
Demolition and Construction Phase			
Castlefield Viaduct (direct impact)	Medium	Minor adverse	Minor adverse – Permanent
Castlefield Viaduct (indirect impact)	Medium	Minor adverse	Minor adverse -Temporary
Manchester Central (G-MEX)	High-medium	Moderate adverse	Moderate Adverse – Temporary
Britons Protection	Medium	Moderate adverse	Moderate Adverse – Temporary

Receptor(s)	Significance / Sensitivity value	Scale of Impact	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
13-17 Albion Street	Medium	Moderate adverse	Moderate Adverse – Temporary
Operational Phase			
Royal London House, Deansgate (west side) Nos.188 to 202.	Medium	Negligible-minor adverse	Negligible-minor adverse
Rylands Library, Deansgate (west side)	Very High	Negligible adverse	Negligible adverse
Sawyers Arms Public House, Deansgate (west side) No.138	Medium	Neutral	Neutral
Deansgate, Nos.184 and 186	Medium	Neutral	Neutral
Onward Buildings	Medium	Neutral	Neutral
Elliot House	Medium	Neutral	Neutral
Former entrance to Deansgate Station Nos.223 to 233	Medium	Minor adverse	Minor adverse
Opera House Theatre, Quay Street	Medium	Neutral	Neutral
Sunlight House, Quay Street (north side)	Medium	Negligible adverse	Negligible adverse
Albert Memorial Hall, No.27	Medium	Minor adverse	Minor adverse
Harvester House, Peter Street (north side), No.37.	Medium	Negligible-minor adverse	Negligible-minor adverse
Lancashire House, Peter Street.	Medium	Negligible-minor adverse	Negligible-minor adverse
Free Trade Hall, Peter Street.	High	Minor adverse	Minor adverse
Former Theatre Royal (now listed as Royale Club) Peter Street.	Medium	Minor adverse	Minor adverse
Peter Street (south side), No.56 to 58. Former Young Men's Christian Association .	Medium	Minor adverse	Minor adverse
Midland Hotel	High	Moderate adverse	Moderate adverse
Mount Street, Friends' Meeting House.	Medium	Neutral	Neutral
Albert Chambers, 16-18 Albert Square.	Medium	Minor adverse	Minor adverse

Receptor(s)	Significance / Sensitivity value	Scale of Impact	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Carlton House, Albert Square	Medium	Minor adverse	Minor adverse
St Andrew's Chambers, Albert Square	Medium	Minor adverse	Minor adverse
Manchester Town Hall	Very High	Minor adverse	Moderate adverse
Frasers Statue	Medium	Neutral	Neutral
Brights Statue	Medium	Neutral	Neutral
Heywood's Statue	Medium	Neutral	Neutral
Gladstone's statue Fountain (Jubilee)	Medium	Neutral	Neutral
Albert Memorial	Very High	Minor adverse	Moderate adverse
Mulberry Street Roman Catholic Church of St. Mary.	Medium	Neutral	Neutral
G-MEX. (Formerly listed as former Central Station.)	High-medium	Minor adverse	Minor adverse
Lawrence Buildings, Central Street, No.7	High	Minor adverse	Minor adverse
Central Public Library St Peter's Square	High	Moderate adverse	Moderate adverse
Albert Square, No.1. Abbey National	Medium	Negligible adverse	Negligible adverse
Manchester Town Hall Extension	High	Moderate adverse	Moderate adverse
St. John Street Numbers 25 To 31 And Attached Former Chapel	High-medium	Minor-moderate adverse	Minor-moderate adverse
St John Street No.8-8a	High-medium	Minor adverse	Minor adverse
St John Street No.10	High-medium	Minor adverse	Minor adverse
St John Street No.12-16	High-medium	Minor adverse	Minor adverse
St John Street No.18-20	High-medium	Minor adverse	Minor adverse
St John Street No.22	High-medium	Minor adverse	Minor adverse
St John Street No.24	High-medium	Minor adverse	Minor adverse
St John Street No.24a-26	High-medium	Minor adverse	Minor adverse
St John Street No.28	High-medium	Minor adverse	Minor adverse
St John Street No.21-25	High-medium	Minor-moderate adverse	Minor-moderate adverse

Receptor(s)	Significance / Sensitivity value	Scale of Impact	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
St John St. No.19	High-medium	Minor-moderate adverse	Minor-moderate adverse
St John Street No.11-17	High-medium	Minor-moderate adverse	Minor-moderate adverse
Byrom Street - No.15	High-medium	Minor adverse	Minor adverse
St Johns College (Great John Street Hotel)	Medium	Neutral	Neutral
Deansgate Goods Station and Attached Carriage Ramp.	High	Minor-moderate adverse	Minor-moderate adverse
Lloyds House.	Medium	Negligible-minor adverse	Negligible-minor adverse
1-5 Central Street (North Side).	Medium	Neutral	Neutral
Church of St Matthew	Medium	Neutral	Neutral
Eagle House, Cross Street.	Medium	Neutral	Neutral
Prudential Assurance Office.	Medium	Neutral	Neutral
Northern Assurance Building, 9-21 Princess Street	Medium	Neutral	Neutral
City Art Gallery, Mosley Street (East Side).	Very High	Negligible adverse	Negligible adverse
The Athenaeum, 81 Princess Street (North East Side).	High	Neutral	Neutral
Memorial Cross, St Peter's Square	Medium	Negligible adverse	Negligible adverse
Cenotaph, St Peter's Square	High	Minor adverse	Minor adverse
Castlefield Viaduct, GMex to Dawson Street	Medium	Minor beneficial	Minor beneficial
Britons Protection, 50 Great Bridgwater Street	Medium	Minor beneficial	Minor beneficial
13-17 Albion Street	Medium	Minor beneficial	Minor beneficial
Lock 90 east of Albion Bridge	Medium	Neutral	Neutral
Lock 91 west of Gaythorn Tunnel	Medium	Neutral	Neutral
Rochdale Canal Lock Keepers Cottage at Lock 91	Medium	Negligible beneficial	Negligible beneficial
Manchester Junction & Altrincham Railway Viaduct	Medium	Neutral	Neutral
Chepstow House	Medium	Minor-moderate adverse	Minor-moderate adverse
Canada House	Medium	Minor adverse	Minor adverse

Receptor(s)	Significance / Sensitivity value	Scale of Impact	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Peveril on the Peak	Medium	Minor-moderate adverse	Minor-moderate adverse
Manchester and Salford Junction Canal Tunnel	Medium	Neutral	Neutral
235-291, Deansgate	Medium	Minor adverse	Minor adverse
Castlefield Information Centre	Medium	Negligible (neutral)	Negligible (neutral)
Former Market Hall (Liverpool Road)	Medium	Negligible beneficial	Negligible beneficial
21-41 Liverpool Road	Medium	Negligible beneficial	Negligible beneficial
Museum Of Science and Industry, Air and Space Museum	Medium	Negligible beneficial	Negligible beneficial
Power Hall Of Museum of Science and Industry	Medium	Negligible beneficial	Negligible beneficial
Manchester Museum of Science and Industry, Former Lower Byrom Street Warehouse	Medium	Negligible beneficial	Negligible beneficial
Old Warehouse to North of Former Liverpool Road Railway Station	Very High	Negligible beneficial	Negligible beneficial
Liverpool Road Railway Station Masters House	Very High	Negligible beneficial	Negligible beneficial
Former Commercial Hotel	Medium	Negligible beneficial	Negligible beneficial
123 Liverpool Road	Medium	Negligible beneficial	Negligible beneficial
St Ann's Church	Very High	Minor adverse	Moderate adverse
Former Congregational Chapel	Medium	Neutral	Neutral
Merchants Warehouse	Medium	Negligible beneficial	Negligible beneficial
Middle Warehouse at Former Castle Field Goods Yard	Medium	Negligible beneficial	Negligible beneficial
Bridgewater House	Medium	Neutral	Neutral
Remains of eastern wall of the Roman fort,	Very high	Neutral	Neutral
Tootal, Lee and Broadhurst	High	Neutral	Neutral
George Street, 63	Medium	Neutral	Neutral
Boundary Stone on Knott Mill Bridge	Medium	Neutral	Neutral
Lee House	Medium	Negligible adverse	Negligible adverse
Princes Building	Medium	Neutral	Neutral
32 Dickinson Street	Medium	Neutral	Neutral
110-114 Portland Street	Medium	Neutral	Neutral
116-118 Portland Street	Medium	Neutral	Neutral
127-133 Portland Street	Medium	Neutral	Neutral

Receptor(s)	Significance / Sensitivity value	Scale of Impact	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
61 Oxford Street	Medium	Neutral	Neutral
St James Building	Medium	Neutral	Neutral
The Palace Theatre	Medium	Neutral	Neutral
Manchester Oxford Road Station	Medium	Neutral	Neutral
Former Refuge Assurance Company Offices	High	Neutral	Neutral
Chorlton New Mill and Attached Chimney	Medium	Neutral	Neutral
Mill chimney stack on west side of junction with Cambridge Street	Medium	Neutral	Neutral
Former Cotton Mill On West Side Of Junction With Cambridge Street	Medium	Neutral	Neutral
Chorlton Old Mill	Medium	Neutral	Neutral
Mill On Northeast Corner Of Junction With Chester Street	Medium	Neutral	Neutral
St Peters Square Conservation Area	High	Moderate adverse	Moderate adverse
Albert Square Conservation Area	Very High	Moderate adverse	Moderate adverse
St Ann's Conservation Area	High-medium	Minor adverse	Minor-moderate adverse
Deansgate / Peter Street Conservation Area	High-medium	Minor adverse	Minor adverse
St Mary's Parsonage Conservation Area	Medium	Neutral	Neutral
St Johns Gardens Conservation Area	High-medium	Minor-moderate adverse	Minor-moderate adverse
Castlefield Conservation Area	Medium	Negligible-minor beneficial	Negligible-minor beneficial
Upper King Street	High	Neutral	Neutral
Whitworth Street Conservation Area	High	Neutral	Neutral
George Street Conservation Area	Medium	Neutral	Neutral

Air Quality

Construction Phase

Table 18.4 Residual Effects

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Construction Phase - Dust Soiling	High	The mitigation measures identified in Section 8.84 and detailed in Technical Appendix 8.1 (Appendix C) would ensure that the residual effects of nuisance dust soiling and PM_{10} health effects from all activities within the construction stage would have a negligible effect.	Measures implemented during construction phase via best practice measures	Negligible (Not significant) Temporary and Short-Term
Construction Phase - Human Health	High			Negligible (Not significant) Temporary and Short-Term

Noise Vibration

Construction Phase

18.7. The implementation of noise mitigation measures as outlined above would assist in the reduction of adverse noise effects generated by construction activities.

18.8. Table 18.5 presents the calculated post-mitigation noise levels at the receptors identified above due to cumulative noise from construction works at the Site during the various construction 'Timeslices' identified in Table 18.5.

18.9. The full pre-mitigation construction noise calculation sheets are presented in Appendix 9.5.

Table 18.5: Calculated post-mitigation' noise levels at sensitive receptors during construction 'Timeslices'

Timeslice	Noise Level at Receptor, dB LAeq,T		
	A - Axis Tower	B - Beetham Tower	C - Viadux 1
1	69	51	68
2	69	51	68
3	68	49	67
4	69	75	74
5	69	75	75
6	69	74	73
7	67	75	73
8	67	73	72
9	67	69	70
10	63	69	69

18.10. The calculations demonstrate impact risks from construction works can be mitigated to be Negligible.

18.11. It is expected that vibration levels at sensitive receptors during the construction works would also be Negligible.

18.12. A range of mitigation measures to minimise disturbance due to the construction works has been recommended, including the maintenance of communication between the Contractor, MCC and local residents.

18.13. 7The noise impact of construction traffic on roads local to the Proposed Development during the construction phase of the development is expected to be Negligible.

18.14. Table 18.6 summarises the construction phase noise and vibration impact assessment.

Table 18.6: Summary of Construction Phase Noise and Vibration Impacts

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Construction noise	Existing local residents and proposed future local residents	Solid screening around the site. Communication with MCC and local residents. Application of 'Best Practicable Means' and noise control guidance from BS5228 and AL72. (Reference Paragraph 9.138-9.140) Implementation of a scheme of noise monitoring. (Reference Paragraph 9.140)	Noise limits and best practicable means defined in CMP. Scheme of noise monitoring defined in CMP.	Negligible to Minor (Temporary)
Construction traffic noise on local roads	Existing local residents and proposed future local residents	-	-	Negligible (Temporary)
Construction vibration	Existing local residents	Communication with MCC and local residents. Application of 'Best Practicable Means' and noise control guidance	Vibration limits and best practicable means defined in CMP. Scheme of vibration monitoring defined in CMP.	Negligible to Minor (Temporary)

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
		from BS5228 and AL72. (Reference Paragraph 9.138-9.140) Adopt low-vibration methods for piling. (Reference Paragraph 9.142) Implementation of a scheme of vibration monitoring. (Reference Paragraph 9.140)		
	Potential damage to neighbouring buildings	-	-	Negligible (Temporary)

Operational Phase

18.15. Noise limits for the proposed commercial unit within the Proposed Development have been established. Compliance with these noise limits should ensure that the environmental noise impact from the commercial unit is Negligible during the operational phase.

18.16. The noise impact of additional traffic on the roads local to the Proposed Development during the operational phase of the development is expected to be negligible.

18.17. Noise limits for future fixed plant serving the Proposed Development have been established. Compliance with these noise limits should ensure that the environmental noise impact from the Proposed Development is Negligible during the operational phase.

18.18. Table 18.7 summarises the operational phase noise impact assessment.

Table 18.7: Summary of Operational Phase Noise Impacts

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Noise from commercial unit operations	Existing local residents and proposed future local residents	Tenant to adhere to noise limit	Tenant lease agreements	Negligible (Permanent)

Change in road traffic noise on local roads	Existing local residents and proposed future local residents	-	-	Negligible (Permanent)
Noise from building services plant	Existing local residents and proposed future local residents	Landlord and commercial tenant to adhere to noise limit	Acoustic design specification Planning condition	Negligible (Permanent)

Daylight, Sunlight and Overshadowing

Operational Phase

Table 18.8 – DSO Operational Phase Residual Impacts

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Adverse reduction in daylight amenity	Hill Quays	None	n/a	Minor Adverse (Permanent)
	Riverside Mews	None	n/a	Negligible (Permanent)
	The Rhine	None	n/a	Negligible (Permanent)
	The Nile	None	n/a	Minor Adverse (Permanent)
	30 City Road East	None	n/a	Negligible (Permanent)
	Lumiere Building	None	n/a	Minor Adverse (Permanent)
	14 Albion Street	None	n/a	Negligible (Permanent)
	The Ropeworks	None	n/a	Negligible (Permanent)
	21 Little Peter St	None	n/a	Negligible (Permanent)
	8-16 Bridgewater St	None	n/a	Negligible (Permanent)
	20 Southern St	None	n/a	Negligible (Permanent)
	18-12 Southern St	None	n/a	Negligible (Permanent)
	8-10 Southern St	None	n/a	Negligible (Permanent)
	357-361 Deansgate	None	n/a	Minor Adverse (Permanent)
	Deansgate Quay	None	n/a	Minor Adverse (Permanent)
	Ropeworks Block 1	None	n/a	Minor Adverse (Permanent)
	The Danube	None	n/a	Negligible (Permanent)
	Jurys Inn	None	n/a	Minor Adverse (Permanent)
	Beetham Tower	None	n/a	Negligible (Permanent)
	21-35 Whitworth St	None	n/a	Negligible (Permanent)
	84 Great Bridge St	None	n/a	Negligible (Permanent)
	Chepstow house	None	n/a	Negligible (Permanent)
	Hacienda	None	n/a	Minor Adverse (Permanent)

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
	325-327 Deansgate	None	n/a	Negligible (Permanent)
	Viadux 1	None	n/a	Minor Adverse (Permanent)
	Free Trade Hall	None	n/a	Negligible (Permanent)
	Great Northern Twr	None	n/a	Minor Adverse (Permanent)
	Midland Hotel	None	n/a	Negligible (Permanent)
	Axis Tower	None	n/a	Minor Adverse (Permanent)
Adverse reduction in sunlight amenity	Hill Quays	None	n/a	Negligible (Permanent)
	Riverside Mews	None	n/a	Negligible (Permanent)
	The Rhine	None	n/a	Negligible (Permanent)
	The Nile	None	n/a	Negligible (Permanent)
	Lumiere Building	None	n/a	Negligible (Permanent)
	The Ropeworks	None	n/a	Negligible (Permanent)
	21 Little Peter Street	None	n/a	Negligible (Permanent)
	8-16 Bridgewater St	None	n/a	Negligible (Permanent)
	20 Southern St	None	n/a	Negligible (Permanent)
	18-12 Southern St	None	n/a	Negligible (Permanent)
	8-10 Southern St	None	n/a	Negligible (Permanent)
	357-361 Deansgate	None	n/a	Negligible (Permanent)
	Deansgate Quay	None	n/a	Negligible (Permanent)
	Ropeworks Block 1	None	n/a	Negligible (Permanent)
	The Danube	None	n/a	Negligible (Permanent)
	Jurys Inn	None	n/a	Negligible (Permanent)
	Beetham Tower	None	n/a	Negligible (Permanent)
	84 Great Bridge St	None	n/a	Negligible (Permanent)
	Chepstow house	None	n/a	Negligible (Permanent)
	Hacienda	None	n/a	Negligible (Permanent)
	325 - 327 Deansgate	None	n/a	Negligible (Permanent)
	Viadux 1	None	n/a	Negligible (Permanent)
	Free Trade Hall Peter Street	None	n/a	Negligible (Permanent)
	Great Northern Tower	None	n/a	Minor Adverse (Permanent)
	Midland Hotel	None	n/a	Negligible (Permanent)
	Axis Tower	None	n/a	Negligible (Permanent)

Solar Glare

Operational Phase

18.19. The likely significant effects of solar glare from the Proposed Development described above are considered a worst-case scenario. All solar glare effects are considered moderate to high sensitivity depending on the

whether it is a controlled junction or not, and the effects are permanent and long term, therefore the residual effects are the same as during the operational stage.

Table 18.9 Solar Glare Operational Phase Residual Impacts

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Minor adverse and not significant effects on Solar Glare	Road users at nearby road junctions Train/Tram Drivers on nearby tracks	Embedded in the design, no further mitigation needed.	N/A	Minor adverse and not significant effects on Solar Glare
Minor to Moderate adverse and significant effects on Solar Glare	Road users at Watson Street (WS1)	Para 11.98: Proposed Glazing Specifications should be low reflectance to areas of elevations specified.	Planning Condition	Minor to Moderate adverse and significant effects on Solar Glare
	Tram Drivers travelling eastbound (TRAM_Eastbound)			Minor adverse and not significant effects on Solar Glare
Moderate adverse and significant effects on Solar Glare	Road users at Castle Street (CS1)	Para 11.98: Proposed Glazing Specifications should be low reflectance to areas of elevations specified.		Moderate adverse and significant effects on Solar Glare
	Road users at Portland Street (PS1)			
	Road users at Lower Mosley Street (LMS2)			
Major adverse and significant effects on Solar Glare	Road users at Great Bridgewater Street (GBS1)	Para 11.98: Proposed Glazing Specifications should be low reflectance to areas of elevations specified and Para 11.99: substitution of 2x glazed panels at podium level to non-reflective materials.		Moderate adverse and significant effects on Solar Glare

Wind Microclimate

Construction

Table 18.10 – Wind Construction Phase Residual Impacts

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitgiation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Negligible effects	All	None	N/A	Negligible effects

Operational

Table 18.11 – Wind Operational Phase Residual Impacts

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Exceedance of safety criteria as a result of the Proposed Development	- Great Bridgewater Street (location 90 & 96)	Glazed canopy structure at the northern edge of level 01	Mitigation to be designed and developed in detail, secured via planning condition.	Major adverse, to be reduced to Negligible upon finalisation of mitigation detail.

Climate Change

Construction Phase

18.20. While it is predicted that implementation of additional mitigation measures for reducing embodied carbon will bring the total CO2eq under the RIBA 2025 Target for residential buildings (800kgCO2eq/m2), it is not expected that the embodied carbon will be reduced to achieve the RIBA 2030 Target. Therefore, the effect remains as a Moderate Adverse significant effect.

Table 18.12 Summary of Significant Effects – Construction Phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Embodied CO2eq emissions	Global Climate	Use of cement replacement Efficient structural design Reduction of construction site impacts (e.g. waste reduction, reducing transport distances)	Building Design Construction Environmental Management Plan (CEMP) and Construction Resource Management Plan.	Moderate Adverse Permanent Significant

Operational Phase

18.21. In line with best practice guidance, mitigation measures for reducing operational energy have already been incorporated into the design of the scheme, therefore residual effects are as per those previously identified.

Table 18.13 Summary of Significant Effects on Climate Change – Operational Phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Operational CO2eq emissions	Global Climate	Implementation of Energy Strategy	Building Design	Moderate Adverse Permanent Significant

18.22. In line with best practice guidance, mitigation measures for minimising hazards that may impact upon the Proposed Development as a result of climate change have already been incorporated into the design.

Table 18.14 Summary of Significant Effects on Climate Change - Operational Phase

Potential Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Rising Flood Levels / increased rate of run-off causing inundation	Buildings and Infrastructure	Building positioned towards northern end of site with appropriate falls. Ground to be reprofiled with gullies, channel drains, and permeable surfaces used. Drainage system to reduce discharge by at least 70% and designed with a 45% climate change allowance	Building design	Moderate Adverse Permanent
High winds resulting in a risk of structural damage and reduction in mechanical ventilation capacity	Buildings and Infrastructure	Design of building and roof to mitigate against impact of high winds. Intake and exhaust positions protected from direct wind impact.	Building design	Moderate Adverse Permanent
Risk to the safety of building occupants from doors slamming.	Building Occupants	Use of anti-door slam products.	Building design	Moderate Adverse Permanent
Extremes of temperature may result in building services being unable to maintain thermal comfort levels.	Building Occupants	Cooling & heating plant selection based on projected future temperatures. Facility for cooling capacity increase to be included in infrastructure. Adequate preheating to limit thermal lag on occupation	Building design	Moderate Adverse Permanent
Extreme cold events may lead to plant failure due to freezing or defrost cycles	Buildings and Infrastructure	Plant selection to be based on projected temperatures. Include use of waste heat on air-based equipment to raise operating temperatures.	Building design	Minor Adverse Permanent
Landscape planting may be affected by extreme temperatures, drought and precipitation	Planting	Planting designed to thrive across extremes of temperature and precipitation events. Landscape management.	Landscape design	Minor Adverse Permanent
Damage to building fabric and services due to increased moisture and precipitation	Buildings and Infrastructure	External fabric to be designed as a weathertight structure. Roof and external wall materials will	Building design	Moderate Adverse Permanent

Potential Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
		be guaranteed to perform for a minimum of 25 years. Intake and exhaust positions will be protected from water ingress. Roofs fully designed for snow loads and to avoid ponding.		
Reduced rainfall may decrease the amount of water available for the development.	Building occupants	Water supplies and storage to include allowance for more potable water consumption. Low water use sanitary fittings specified where appropriate to minimise water demand. Pulsed output water meters to be installed on the water supply so that occupants can monitor their water usage.	Building design	Minor Adverse Permanent
Drying soils / subsidence / ground movement could result in structural damage to buildings.	Buildings and Infrastructure	Structural engineers to ensure design of foundations is mitigated against the risk ground shrinkage.	Building design	Moderate Adverse Permanent

Human Health

Construction Phase

18.23. Post-mitigation residual effects are summarised in the tables 18.15 and 18.16, as follows:

Table 18.15 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the construction phase. Significant Receptors listed as identified from each technical chapter and as relevant according to those presented in paragraph x.42 previously – workers, residents & visitors (nearby & site), and pedestrians – during construction and operational phases.

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Construction Phase				
Socioeconomics: Employment	Workers & local economy	N/A	N/A	Negligible
Visual - viewpoints	4 of 28 viewpoints	None	N/A	Moderate Adverse, Temporary
Air Quality: dust	Workers, nearby residents	Screening & practices to reduce nuisance dust	CEMP	Negligible

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Noise	Local residents	Screening & noise controls	CEMP	Negligible – Minor Adverse, Temporary
Noise - traffic	Local residents	Traffic management	CEMP	Negligible
Vibration	Local residents	Communication & monitoring	CEMP	Negligible-Minor; Temporary
Wind Microclimate	Passers by	Screening & practices to reduce nuisance wind	CEMP	Negligible

Operational Phase

Table 18.16 – Summary of Receptors, Likely Significant Effects, Mitigation Measures, and Residual Effects during the operational phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Operational Phase				
Socioeconomics: Employment	Workers & local economy	N/A	N/A	Negligible
Socioeconomics: LA income	MCC rates & tax	N/A	N/A	Minor Beneficial (Not Significant)
Socioeconomics: Healthcare	Residents	N/A	N/A	Negligible
Socioeconomics: educational	Residents	N/A	N/A	Minor Adverse – Negligible (Not Significant)
Socioeconomics: Open Space & amenity	Residents & visitors	N/A	N/A	Negligible
Housing	Residents	N/A	N/A	Moderate Beneficial
Crime	Residents & Visitors	N/A	N/A	Minor Beneficial (Not Significant)
Townscape – character, urban grain, land use, movement, site character	Residents & visitors	Embedded in design	N/A	Moderate Beneficial Significant to Major Beneficial (Site Character)
Visual - viewpoints	Townscape viewpoints	Embedded in design	N/A	Various – ranging from moderate adverse to moderate beneficial
Heritage	Residents, Visitors - Listed Buildings & Conservation Areas	Embedded in design	N/A	Various – ranging from Minor Beneficial (not significant) to Moderate Adverse (significant)
Noise – commercial unit	Local residents	Noise limits in lease agreement	Tenant lease agreement	Negligible

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (i.e., Temporary/Permanent)
Noise- building services plant	Local residents	None needed	N/A	Negligible
Noise- traffic change	Local residents	None needed	N/A	Negligible
Daylight & sunlight	Surrounding properties	None needed	N/A	Negligible to Minor Adverse – Not Significant
Solar Glare:	16 locations – road users; train/tram drivers	Embedded in design, no further mitigation needed	N/A	Minor Adverse Not Significant
Solar Glare:	4 road locations	Glazing specifications should be low reflectance to areas of elevations specified	Planning condition	Minor-Moderate Adverse Signficant
Wind Microclimate	Some 21 areas in surrounds	Updated landscaping; provision of walls & 50% porous gates	Planning condition	Negligible
Climate Change	Buildings & infrastructure; residents & visitors	Building & landscape design & management details	Planning condition	May reduce Moderate Adverse

Socio-Economic

Construction Phase

Table 18.17 Summary of Significant Effects on Socio-Economic - Construction Phase

Likely Significant Effect	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Change in employment during the construction stage	Individuals seeking construction employment	N/A	N/A	Direct, temporary (short term), Minor Beneficial (not significant)

Operational Phase

Table 18.18 Summary of Significant Effects on Socio-Economic - Operational Phase

Likely Significant Effect	Receptor(s)	Mitigation	Means of	Post Mitigation Residual

		Measure	Implementation of Mitigation	Effect – Significance and Duration (Temporary/Permanent)
Change in direct operational employment and change in economic performance (GVA and spend)	Individuals seeking employment and the local economy	N/A	N/A	Direct, long term, Negligible (not significant)
Change in annual fiscal contributions in the form of business rates and council tax contributions	Manchester City Council total business rates and council tax revenue	N/A	N/A	Direct, long term, Minor Beneficial (not significant)
Change in demand for healthcare facilities (GP services and dentists) as a result of the uplift in population	Primary healthcare facilities	N/A	N/A	Direct, long term, Negligible (not significant)
Change in demand for early years and primary school places arising from the uplift in population	Primary education and early years facilities	N/A	N/A	Direct, long term, Negligible (not significant)
Change in demand for secondary school places arising from the uplift in population	Secondary education facilities	N/A	N/A	Direct, long term, Negligible (not significant)
Change in demand for the use of the existing open space and amenity space and children's play space within close proximity to the Site.	Users of open/amenity space and children's play space	N/A	N/A	Direct, long term, Negligible (not significant)

Traffic and Transport

Construction Phase

18.24. The residual effect after considering the increase in construction traffic following the mitigation of a CEMP is presented below.

18.25. Table 18.19 provides a tabulated summary of the outcomes of the effects of construction phase of the Proposed Development once accounting for mitigation.

Table 18.19 Construction Phase Likely Significant Effect

Construction Phase Likely Significant Effect	Receptors	Environmental Effect (Pre-Mitigation)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration
Severance		Negligible,	CEMP		Negligible,

	Road Users, Non Motorised Road Users and local residents on: Trafford St. Albion St, Gt Bridgewater St, Deansgate	Not Significant, Temporary		Requirement of CEMP mandated by Planning Condition, to be implemented agreed with LPA/LHA prior to construction and monitored by contractor.	Not Significant, Temporary
Road vehicle driver and passenger delay		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Non-motorised user delay		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Non-motorised user amenity		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Fear and intimidation on and by road users		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Road user and pedestrian safety		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Hazardous/large loads		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary

18.26. The assessment for all the relevant IEMA criteria found that during the demolition and construction period, the residual implications of construction traffic for a temporary period on the environmental receptors is considered to be Negligible (Not Significant) for all the effect categories (severance, driver delay, pedestrian delay, pedestrian amenity, fear and intimidation, and accidents and safety, vehicles with large /hazardous loads).

Operational Phase

18.27. Considering the Residual Impact of Operational Traffic following mitigation of the relatively modest increases in traffic, Table 9.11 provides a tabulated summary of the outcomes of the effects of operational phase of the Proposed Development once accounting for mitigation.

18.28. As can be seen in Table 15 the resultant assessment post mitigation for the environmental implications of severance, road user delay, non motorised user delay & amenity, fear and intimidation caused by large vehicles and road safety is Negligible.

Table 18.20 Operational Phase Likely Significant Effect

Operational Phase Likely Significant Effect	Receptors	Environmental Effect (Pre-Mitigation)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration
Severance	Road Users, Non Motorised Road Users and local residents on: Trafford St. Albion St, Gt Bridgewater St,	Negligible, Not Significant, Temporary	Highway Improvements, notable new pedestrian crossing facilities and cycle lanes Public Realm improvements	Highway and public realm works mandated by Planning Condition, and secured via a Section 278 agreement. Travel Plan secured by condition.	Negligible, Not Significant, Temporary
Road vehicle driver and passenger delay		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Non-motorised user delay		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary

Non-motorised user amenity	Deansgate	Negligible, Not Significant, Temporary	on Albion St and Gt Bridgewater St. Travel Plan to encourage sustainable transport behaviours and use of cycle facilities.		Negligible, Not Significant, Temporary
Fear and intimidation on and by road users		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Road user and pedestrian safety		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary
Hazardous/large loads		Negligible, Not Significant, Temporary			Negligible, Not Significant, Temporary

Archaeology

Construction Phase

Table 18.21 – Construction Phase Residual Effects

Likely Significant Effect Post-Mitigation	Receptor(s)	Mitigation Measure	Means of Implementation of Mitigation	Post Mitigation Residual Effect – Significance and Duration (Temporary/Permanent)
Negligible	Unknown prehistoric Remains	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Neutral, Permanent, Irreversible
Negligible	Unknown Roman remains	A programme of archaeological mitigation is	Following consultation with GMAAS (as	Neutral, Permanent, Irreversible

		proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	
Minor	Roman road (near Plot 2a and potentially 2c)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Slight, Permanent, Irreversible

Minor	Manchester to Buxton Roman road (Plot 2c)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Slight, Permanent, Irreversible
Minor	Castlefield Roman vicus: Area of Roman Manchester (Plot 2b)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be	Slight, Permanent, Irreversible

			secured via a planning condition.	
Negligible	Late medieval to post-medieval relict soils and field boundaries (Plot 2b, but also potential within Plot 2a)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Neutral, Permanent, Irreversible
Negligible	18th-century cottages (Plot 2b)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and	Neutral, Permanent, Irreversible

			watching brief, which can be secured via a planning condition.	
Negligible	Methodist Chapel burial ground (Plot 2b)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Neutral, Permanent, Irreversible
Negligible	Rectory (Plot 2b)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or	Neutral, Permanent, Irreversible

			strip, map and record areas) and watching brief, which can be secured via a planning condition.	
Negligible	Sunday School (Plot 2b)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Neutral, Permanent, Irreversible
Negligible	Commercial building on Trumpet Street (Plot 2b)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation	Neutral, Permanent, Irreversible

			(consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	
Negligible	Workers' housing (Plot 2a and 2b)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Neutral, Permanent, Irreversible
Negligible	Great Bridgewater Street foundry	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist	Neutral, Permanent, Irreversible

			of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	
Minor	Marsdens Mill (Plot 2c)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Slight, Permanent, Irreversible
Negligible	Union Foundry (Plot 2b)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In	Neutral, Permanent, Irreversible

			the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	
Negligible	Engine and gas retort house (Plot 2a)	A programme of archaeological mitigation is proposed that will preserve the archaeological deposits by record prior to their removal during the construction stage of the proposed development in line with the NPPF.	Following consultation with GMAAS (as archaeological advisors to MCC), it has been agreed that a programme of archaeological evaluation will take place within the Site to establish the presence or absence of buried archaeological remains, and if present, their extent and significance. In the first instance, this will likely consist of an archaeological evaluation (consisting of trial trenches and / or strip, map and record areas) and watching brief, which can be secured via a planning condition.	Neutral, Permanent, Irreversible

Operational Phase

18.29. All archaeological receptors will have been mitigated before the operational phase.

Planning Conditions or Obligations

18.30. The above includes reference to a mitigation measures that will be required to be secured on any subsequent planning approval. To further assist, the below provides a summary of potential mechanisms to secure the proposed mitigation measures identified as part of the ES.

18.31. Where inherent mitigation is included in the design of the Proposed Development, and as such will be included as the proposals, it is anticipated that suitably worded planning conditions requiring the Proposed Development to be constructed in accordance with the approved plans or details would be appropriate.

18.32. A suitably worded planning condition could be appropriate to secure the submission of a Construction Management Plan(s) for the construction phase of the Proposed Development in line with Chapters 2, 5, 7, 8, 9, 12, 13 and 16 of the ES.

18.33. It has been anticipated that suitably worded planning conditions or obligations may be required where necessary in relation to the following measures:

- Chapter 8 (Air Quality) paragraph 8.86 and 8.87 – Emissions Mitigation Assessment;
- Chapter 8 (Air Quality) paragraph 8.88 – Travel Plan;
- Chapter 9 (Noise and Vibration) paragraph 9.174 – Plot 2c Plant noise;
- Chapter 9 (Noise and Vibration) paragraph 9.148 – building service plant noise;
- Chapter 11 (Solar Glare) paragraph 11.99 – 11.100 – Proposed glazing specifications for eastern podium, and the northern end of the eastern elevation;
- Chapter 12 (Wind) paragraph 12.132 – Wind mitigation at Great Bridgewater Street;
- Chapter 16 (Traffic and Transport) paragraphs 16.128 – 16.131 – Highway Improvements;
- Chapter 16 (Traffic and Transport) paragraph 16.133 – Travel Plan;
- Chapter 17 (Archaeology) paragraph 17.37 – programme of archaeological mitigation.

18.34. Mitigation identified in Chapter 14 (Human Health) are identified above.

19. Type 1 Cumulative Effects

Introduction

19.1. This Chapter gives consideration to 'Type 1' cumulative effects. The assessment is informed by the results of the technical assessments as set out in Chapters 6 to 17 inclusive of the ES.

19.2. Type 1 cumulative effects are also known as 'inter-project' effects, which are the combined effects arising from the Proposed Development upon a set of defined sensitive receptors.

19.3. Type 2 cumulative effects are considered within the ES technical chapters. The technical chapters also had regard to the potential for Type 1 cumulative effects, however for robustness the results of a standalone assessment of these is provided below.

Legislation Policy and Guidance

Legislation

19.4. There is no legislation outlining how cumulative effects should be assessed or determined as significant. However, there is a requirement in Part 1, Schedule 4 of the EIA Regulations to consider cumulative effects. Cumulative is not defined in the EIA Directive or Regulations however a dictionary definition is 'increasing by one addition after another'.

19.5. The EIA Regulations require 'a description of the likely significant effects', including cumulative effects.

19.6. In the context of this assessment, 'cumulative effects' refers to the interactions between different likely residual effects resulting from the Proposed Development (Type 1). Both positive and negative effects are considered across the construction and operational phases.

Policy

19.7. As this Chapter considers the cumulative effects of the technical areas within the ES, all relevant policy has already been reviewed within the individual technical chapters.

Guidance

19.8. A number of guidance documents which relate to assessing cumulative effects have been used to inform the assessment and include:

- European Commission (EC) Environment DG (May 1999), 'Study on the Assessment of Indirect and Cumulative Impacts as well as Impact Interaction', Hyder Consulting; and
- Institute of Environmental Management and Assessment (1992), Guidelines for the Environmental Assessment of Road Traffic.#

19.9. The EC guidelines 'are not intended to be formal or prescriptive, but are designed to assist EIA practitioners in developing an approach which is appropriate to a project'.

19.10. Paragraph 24 of the National Planning Practice Guidance (NPPG) (Reference ID: 4-024-20170728) outlines the consideration to be given to cumulative effects in the context of EIA:

"Each application (or request for a screening opinion) should be considered on its own merits. There are occasions, however, when other existing or approved development may be relevant in determining whether

significant effects are likely as a consequence of a Proposed Development. The local planning authorities should always have regard to the possible cumulative effects arising from any existing or approved development."

Assessment Methodology and Significance Criteria

Methodology

19.11. This assessment is primarily concerned with where there is a likelihood of significant Type 1 cumulative effects occurring, in accordance with EIA practice and the NPPG guidance.

19.12. The assessment is based on experience and professional judgement, drawing upon relevant guidance set out above and the residual environmental effects identified within the results of the EIA technical assessments. The assessment has been undertaken by suitably qualified and experienced EIA practitioners.

19.13. The assessment has primarily focused on sensitive receptors identified within close proximity to the Site (e.g. local residents and businesses located in close proximity to the Site), likely cumulative effects, and their capacity to accommodate changes that will occur as a result of the combined residual environmental effects.

19.14. Relevant guidance has been reviewed, and an approach has been developed which uses the residual environmental effects identified within the ES. An exercise which tabulates the residual effects against receptors or receptor groups has then been carried out in order to identify the potential for Type 1 cumulative effects.

19.15. Negligible or neutral residual effects have been excluded from the assessment as, by their nature, they are considered to be imperceptible. Therefore, only minor, moderate or major effects have been given consideration during the assessment.

19.16. For the purposes of the assessment, receptor groups have been identified as those surrounding the Site and those identified within the individual technical assessments.

Significance Criteria

19.17. The following terms have been used to define the significance of the effects identified:

- Major effect: where the Proposed Development could be expected to have a very significant effect (either positive or negative) cumulatively;
- Moderate effect: where the Proposed Development could be expected to have a noticeable effect (either positive or negative) cumulatively;
- Minor effect: where the Proposed Development could be expected to result in a small, barely noticeable effect (either positive or negative) cumulatively; and
- Negligible: where no discernible effect is expected as a result of the Proposed Development cumulatively.

19.18. The significance level attributed to each effect has been assessed based on the magnitude of change due to the combination of residual effects and the sensitivity of the affected receptor/receiving environment to change, as outlined in Chapter 2 of the ES. Magnitude of change is assessed on a scale of major, moderate, minor and negligible and the sensitivity of the affected receptor/receiving environment is assessed on a scale of high, medium, low and negligible.

Limitations and Assumptions

19.19. Due to the reliance on qualitative data and subjective opinion, there are limitations related to the range and depth in which the cumulative effects have been investigated. It must be realised that analysing the cumulative effects of developments is often speculative and cannot be predicted as clearly as individual

effects such as the effects upon traffic of a development, which relies heavily upon quantitative data to inform the assessment.

19.20. As a result, a number of assumptions have been made throughout in terms of the outcome of the accumulation of effects and based upon professional judgement. This section and the assessment process of identifying the likely significant Type 1 cumulative effects have, however, provided a reasoned consideration of and insight into the potentially significant Type 1 cumulative effects of the Proposed Development.

Identification of Likely Significant Type 1 Cumulative Effects

Construction Phase

19.21. Based on the methodology detailed above, Table 19.1 presents the results of the review of the potential for interactions of individual effects during the construction phase of development. The potential effect interactions are then discussed further.

Table 19.1; Type 1 Cumulative Effects Construction Phase

Sensitive Receptor Group	Construction Phase Residual Effects	Likely Significant Cumulative Effects
Humans	Noise and vibration: Construction noise for existing local residents and proposed future local residents. Construction traffic noise on local roads for existing local residents and proposed future local residents. Construction vibration to existing local residents. Air Quality: Construction Phase - Dust Soiling and other air quality effects associated with the construction phase. Socio-economic – positive change in employment during the construction stage to increase expendable income	Minor adverse (Not significant) Temporary and Short-Term
Neighbouring Residential Properties	Noise and Vibration: Potential damage to neighbouring buildings as a result of vibration. Potential noise intrusion during construction works.	Negligible
Local Highway and Public Transport	Traffic and transport: Driver delay through increased constuction traffic and temporary changes to highway network.	Minor adverse
The Economy	Socio-Economic: Job creation and supply chain leading to increase in tax revenues and GVA	Minor beneficial

Sensitive Receptor Group	Construction Phase Residual Effects	Likely Significant Cumulative Effects
Views, Visual Setting Townscape	TVIA: Temporary adverse effects on visual setting during the construction period from identified viewpoints.	Minor-moderate adverse on selected views
Historic Environment	Archaeology: impact on below ground historic assets that will be recorded during the construction phase. Heritage above ground: physical impact on Grade II Listed Viaduct as the construction commences Visual impact on identified heritage assets as the development is built out	Moderate adverse
The climate	Climate change: Embodied CO2eq emissions affecting contributions to the carbon budgets	Minor adverse

19.22. Table 19.1 shows that there is unlikely to be in-combination operational phase Type 1 cumulative effects to arise. This is due to the extensive technical assessments throughout the design process and the identified mitigation in-built into the design.

Operational Phase

19.23. Based on the methodology detailed above, Table 19.2 presents the results of the review of the potential for interactions of individual effects during the operational phase of development. The potential effect interactions are then discussed further.

Table 19.2: Type 1 Cumulative Effects – Operational Phase

Sensitive Receptor Group	Operational Phase Residual Effects	Likely Significant Cumulative Effects
Humans	Wind: Exceedance of safety criteria as a result of the Proposed Development Conditions windy, in terms of comfort, for thoroughfare / cycleway use. Conditions windy, in terms of comfort, for use of the Level 03 terrace. Conditions windy, in terms of comfort, within the surrounding area. Daylight, Sunlight and overshadowing: Adverse reduction in daylight amenity at 11 local receptors.	Minor adverse

Sensitive Receptor Group	Operational Phase Residual Effects	Likely Significant Cumulative Effects
	Adverse reduction in sunlight amenity at 1 local receptor. Noise: Noise from commercial unit operations, change in road traffic noise on local roads and noise from building services plant. Air Quality: n/a Solar Glare: Adverse effects on Solar Glare for road users at nearby road junctions and Train/Tram Drivers on nearby tracks Townscape and built heritage: well-being through the enjoyment of townscape and heritage assets.	
Local Highways, Public Transport, pedestrian and cycle networks	Transport: increased intensity of vehicles using the site from service vehicles. Enhanced pedestrian routes into and around the Site. Solar Glare: Adverse effects on Solar Glare for road users at nearby road junctions and Train/Tram Drivers on nearby tracks causing a risk to drivers and users of the road network	Minor adverse
The economy	Socio-economic: Change in direct operational employment and change in economic performance (GVA and spend) Change in annual fiscal contributions in the form of business rates and council tax contributions	Minor beneficial
The climate	Flood risk: Rising Flood Levels / increased rate of run-off causing inundation. Climate Change: Operational CO2eq emissions affecting climate change. Extremes of temperature may result in building services being unable to maintain thermal comfort levels. Extreme cold events may lead to plant failure due to freezing or defrost cycles	Moderate adverse

Sensitive Receptor Group	Operational Phase Residual Effects	Likely Significant Cumulative Effects
	Landscape planting may be affected by extreme temperatures, drought and precipitation Damage to building fabric and services due to increased moisture and precipitation Reduced rainfall may decrease the amount of water available for the development. Drying soils / subsidence / ground movement could result in structural damage to buildings. Wind: High winds resulting in a risk of structural damage and reduction in mechanical ventilation capacity Risk to the safety of building occupants from doors slamming.	
Local Healthcare and Education Facilities	Socio-Economic: Change in demand for early years and primary school places arising from the uplift in population Change in demand for healthcare facilities (GP services and dentists) as a result of the uplift in population Change in demand for secondary school places arising from the uplift in population Change in demand for the use of the existing open space and amenity space and children's play space within close proximity to the Site.	Minor adverse
Views, Visual Setting, Heritage and Townscape	TVIA: Visual impact on identified viewpoints following the construction of the development. Built Heritage: Visual impact on heritage assets identified	Moderate adverse

19.24. Table 19.2 shows that there is unlikely to be in-combination operational phase Type 1 cumulative effects to arise. This is due to the extensive technical assessments throughout the design process and the identified mitigation in-built into the design.

Mitigation Measures

19.25. Where relevant, the individual residual effects which contribute to the potential cumulation have been considered within the ES and mitigated where necessary and feasible.

19.26. No mitigation is proposed for the identified Type 1 cumulative effects.

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