Construction Environmental Management Plan

PF10-PR10-43-F001

Project: University of Manchester, Fallowfields Campus





GRAHAM are committed to supporting the UN Sustainable Development Goals, a blueprint to achieve a more sustainable future for all.

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The Environmental Manager and Project Manager will work collaboratively to conduct periodic reviews of this document to ensure that the information contained within it, is suitable and sufficient for site operations. It is anticipated that this will be carried out at least every six months.

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Contents

1.0 Organisational Arrangements
1.1 Introduction
1.2 Scope of the Project
1.3 Site location and Context
1.4 Purpose and benefits of the plan
1.5 GRAHAM Environmental Strategy and Climate Action Strategy
1.6 GRAHAM Environmental Management System
1.7 GRAHAM Environmental Policy Statement
1.8 Objectives and Targets
1.9 Environmental Roles and Responsibilities
1.10 Competence, Training and Awareness
1.11 Internal Communication
1.12 External Communication and Managing Neighbours
1.13 Records and Documents
1.14 Permissions, Consents and Licences
1.15 Monitoring of Construction Activities
1.16 Auditing of Construction Activities
1.17 Identification of Aspects and Impacts (Project Environmental Risk and Opportunities Register)
1.18 Environmental Risk Assessments

2.0 Site Compound Layout

3.0 Ecology and Biodiversity Management Plan
3.1 Ecological Issues
3.2 Existing Site Ecological Features
3.3 Species Management Plans
3.4 Habitat Management Plan
3.5 Biodiversity Action Plan

4.0 Land Management Plan
4.1 Geology and Contaminated Land Issues
4.2 Site Geology and Ground Conditions
4.3 Potential sources of contamination not previously identified
4.4 Potential Pathways
4.5 Potential Receptors
4.6 Mitigation Measures
4.7 Discovery of Contaminated Land Emergency Procedure

5.0 Water Management Plan
5.1 Water Management Issues
5.2 Existing Site Conditions
5.3 General Water Management Controls
5.4 Control Measures for Hazardous Substances
5.5 Control Measures for Plant and Equipment
5.6 Control Measures for Concrete, Cement and Grout
5.7 Control Measures for Oil Storage
5.8 Control Measures for Refuelling
5.9 Appointed Persons for Refuelling
5.10 Control Measures for Discharging Water
5.11 Control Measures for Abstracting Water from Excavations
5.12 Control Measures for Drainage
5.13 Control Measures for Flood Protection
5.14 Water Efficiency

6.0 Dust and Air Quality Management Plan
6.1 Dust and Air Quality Issues
6.2 Site Conditions
6.3 Monitoring Protocols
6.4 Records of details and action taken in response to exceptional incidents or dust-causing episodes
6.5 Dust and Air Pollution Mitigation Measures
6.6 Highway Condition Survey

7.0 Noise and Vibration Management Plan
7.1 Noise and Vibration Issues
7.2 Site Conditions
7.3 Noise Control Measures (General)
7.4 Operating Hours
7.5 Establishment of Baseline Conditions
7.6 Noise Monitoring Plan
7.7 Liaison with the Local Community during the Contract
7.8 Establishment of Working Relationship with the Local Authority
7.9 Section 61 of the Control of Pollution Act (COPA), 1974
7.10 Programming of Works
7.11 Distancing from Sensitive Receptors
7.12 Plant and Equipment
7.13 Traffic Noise during Construction
7.14 Noise Screening
7.15 Vibration

8.0 Energy and Carbon: Management and Reduction Plan
8.1 Energy & Carbon Issues
8.2 Climate Action Targets
8.3 Site Context
8.4 Decarbonising Roles and Responsibilities
8.5 Decarbonising Activities
8.6 Communication, Campaigning and Training
8.7 Measurement and Reporting
8.8 Carbon Offsetting
8.9 Nature Based Solutions

9.0 Site Waste and Resource Management Plan
9.1 Purpose and Description of the Project
9.2 Responsibilities and Declarations
9.3 Description of Waste Management Roles
9.4 Waste Management Policy
9.5 Benchmarks for Conserving Resources
9.6 Proposals for Waste Minimisation
9.7 Identification of Waste and Proposals for Waste Reuse and Recycling
9.8 Organisations which may be used to facilitate reuse
9.9 Waste Storage Arrangements
9.10 Office Waste Arrangements
9.11 Duty of Care and Waste Transfer Procedures
9.12 Waste Transfer Note Detail
9.13 UK SIC CODES - Excerpts from UK Standard Industrial Classification of Economic Activities
9.14 Minimisation of Hazardous Waste
9.15 Typical Hazardous Outputs
9.16 Management of Hazardous Waste
9.17 Hazardous Waste Consignment Note Detail
9.18 Training
9.19 Subcontractor Requirements
9.20 Management of Subcontractors
9.21 Waste Management Supplier Requirements
9.22 Waste Monitoring and Reporting

10.0 Invasive Species
10.1 Invasive Species Issues
10.2 Identification and Survey
10.3 Site Conditions
10.4 Invasive Species Management
10.3 Invasive Species Control and Eradication

11.0 Archaeology and Cultural Heritage
11.1 Archaeological Monitoring
11.2 Discovery of Unexpected Archaeological Finds

12.0 Emergency Response
12.1 Emergency Response Equipment and Resources
12.2 Environmental Incident Response Plan
12.3 Incident Response Reporting

13.0 Environmental Incident Response Plan

14.0 Incident Response Reporting

15.0 Appendices.

Appendix A – Noise Management Plan

Appendix B – Project Environmental Risk and Opportunities Register

Appendix C – Extract from Environmental Statement.

Appendix D – Swept Path Analysis

SECTION 1.0 Organisational Arrangements

Guidance Notes:

The information contained in this section describes the Environmental Management processes adopted on site.

1.1. Introduction

This document has been prepared by GRAHAM. In preparing this document GRAHAM is demonstrating their commitment to being an environmentally responsible company. This Construction Environmental Management Plan (CEMP) forms part of an overall environmental management system and is to be read in conjunction with the Construction Phase Plan and the Quality Plan for the Project.

This CEMP is intended to satisfy the requirements of the principles set down in the International Environmental Management System Standard ISO 14001:2015. Our policies and procedures described within this document are in compliance with relevant legislation and best practice guidance including PPG6: Pollution Prevention Guidelines, Working at construction and demolition sites.

The CEMP has also been developed to discharge Condition 18 attached to Planning Permission ref. 138126/OO/2023 which was issued by Manchester City Council. Planning Condition 18 states;

'Prior to the commencement of construction works including any site or vegetation clearance within any phase of development, a construction and environmental management plan outlining working practices in relation to that phase, shall be submitted to and approved in writing by the City Council as Local Planning authority, which for the avoidance of doubt shall include:

- *Measures to control noise and vibration.* ***(Section 7; Noise and Vibration Management Plan)***
- *Dust suppression measures. (****See Section 6,*** **Dust and Air Quality Management Plan)**
- *Sheeting of construction vehicles. (****See Section 6,*** **Dust and Air Quality Management Plan)**
- *Avoidance strategy for nesting birds. (****See Section 3.3;*** **Species Management Plan)**
- *Management of mammals and hedgehog. (****See Section 3.3;*** **Species Management Plan)**
- *The phasing and quantification / classification of vehicular activity associated with the construction.* ***(See Section 2; Construction Layout Drawings)***
  Utility works and associated traffic management ***(See Section 2; Construction Layout Drawings)***
- *Commentary on types and frequency of vehicular demands together with evidence (including appropriate swept-path assessment) of satisfactory routeing both within the site and on the adjacent highway.*
- *Contractor parking provision.* ***(See Section 2; Construction Layout Drawings)***
- *A highway dilapidation survey, the survey should include photographs and commentary on the condition of carriageway / footways on construction vehicle routes surrounding the site.* ***(See Section 6.6 Highway Condition Survey)***

The development shall be carried out in accordance with the approved management plan'

In preparing this document GRAHAM have drawn on information contained in the following documents:

- Ecological Constraints and Opportunities Report – University of Manchester, Fallowfield – Buro Happold (February 2023)
- Ground Conditions Phase 1 Desk Study Report – Fallowfield Campus Redevelopment Project – Buro Happold (August 2023)
- Flood Risk Assessment – Fallowfield Campus Redevelopment Project – Buro Happold (August 2023)
- Environmental Statement Volume 1: Main Report (Section 6 Air Quality) – Fallowfield Campus Redevelopment Project – Buro Happold (August 2023)

1.2. Scope of the Project

The University of Manchester would like to procure a Student Housing Partner ("SHP") to design, build, finance and operate new-build student accommodation at the Fallowfield Campus which should have minimal impact on the University's balance sheet.

The University envisages that, as a minimum, the first 2 phases at Fallowfield, a total of c. 2,300 – 2,500 beds, will be procured as a single transaction. The University intends to carry out some demolition while procuring the SHP (and prior to Financial Close) in order to create a first-phase development site. The University's preference is that once the first phase is operational, either the University or the SHP will demolish further buildings and commence subsequent phases, in order to maximise the number of beds that remain available before new ones are built. Total number of beds c 3,300.

The University will grant long-term property interests to the relevant project party (being either the SHP or its funder). The SHP will be entitled to earn rental income under the terms of a Project Agreement for an expected operation period of c. 50 years. The SHP will be required to finance and deliver the relevant facilities

1.3. Site Location and Context

The site comprises Fallowfield Campus which is located to the south of Manchester city Centre. The total area of the site is approximately 7.7 hectares (ha) in size.

The site is currently owned and operated by the University of Manchester (UoM). During the work, parts of the wider Fallowfield campus will remain open to UoM staff and students. The areas that will remain under UoM occupation throughout the duration of the demolition works are:

- Ashbourne Hall,
- Sheavyn House,
- Richmond Park,
- Unsworth Park,
- Uttley House and
- Fir's Botanical Grounds.

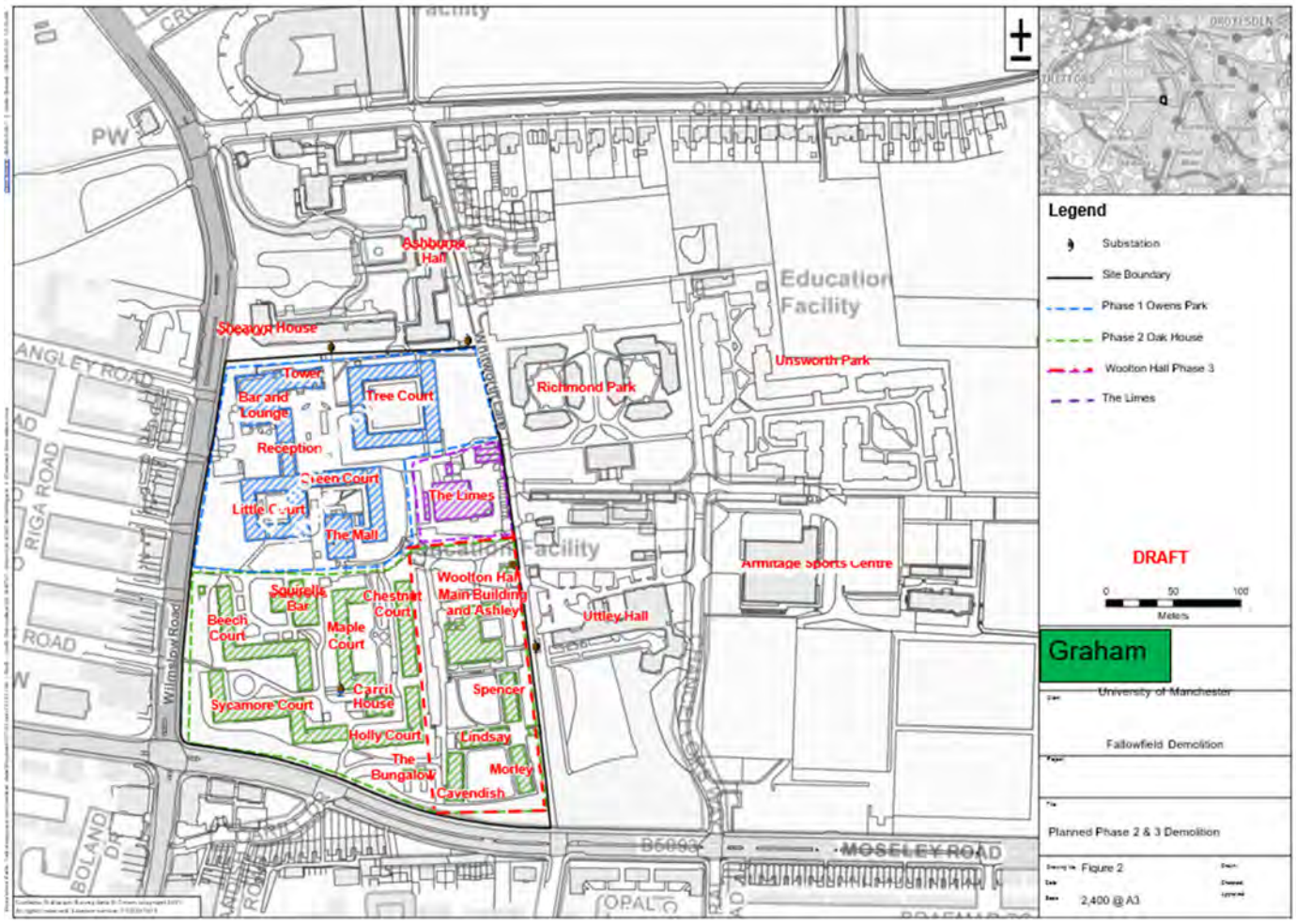


Figure 1: Site Boundary Plan Showing Buildings To Be Demolished

1.4. Purpose and benefits of the plan

- The plan defines the Environmental Management procedures, work practices and management responsibilities relating to the construction of the project.
- The plan demonstrates how GRAHAM intends to satisfy the requirements of the client
- The plan demonstrates how GRAHAM intends to produce environmental performance indicators
- The Plan defines the scope of environmental issues, together with the requirements for action by GRAHAM that shall be set out to avoid, minimize and mitigate construction effects on the environment, existing surrounding communities and new residents of the local area
- The plan sets out the individual responsibilities of Directors, Managers, Supervisors and Operatives, with their respective roles defined in a clear system of managerial control.
- The plan establishes the structure and content for the procedures to monitor compliance, including specific auditing by GRAHAM.
- The plan establishes a regular procedure for reporting environmental information and ensures that environmental issues are firmly on the agenda of progress review meetings.
- The plan ensures that complete documented records are kept for easy, accessible reference.
- The plan provides a statement of Intent to statutory, regulatory and local authorities to take effective action to work in compliance with all statutory provisions and protect the environment.

The CEMP is a live document which must be updated and developed throughout the course of the project. An update to the CEMP will be carried out every six months as a minimum.

1.5. GRAHAM Environmental Strategy and Climate Action Strategy

As part of the GRAHAM Environmental Sustainability Strategy, this project will seek to adopt solutions and opportunities which will positively impact upon our four key areas of Environmental Sustainability focus (as follows):

- **Protecting the Environment**
- **Environmental Management and Improvement**
- **Conserving Resources**
- **Climate Action**

The GRAHAM overarching commitment to working in support of the UN Sustainable Development goals will also underpin the Project ethos toward "Sustainable Development" and opportunities will be sought to positively influence the SDG's.



Figure 2: Key Focus Areas

1.6. GRAHAM Environmental Management System

GRAHAM operate an ISO 14001:2015 accredited Environmental Management System. We use this in conjunction with all relevant legal and other requirements for the environmental management of this project.

The environmental performance of the site will be regularly checked by site inspections carried out by our SHE Managers and Advisors and Environmental Audits carried out by the Environmental Sustainability Managers and Advisors. The implementation of our EMS will be audited both internally by our Systems Audit Manager and externally by NQA Ltd.

1.7. GRAHAM Environmental Policy Statements

The work carried out on the Project will be in compliance with:

- **GRAHAM Environmental Policy Statement**
- **GRAHAM Biodiversity Policy Statement**
- **GRAHAM Climate Action Policy Statement**
- **GRAHAM Green Travel Policy Statement**
- **GRAHAM Waste Management Policy Statement**

1.8. Objectives and Targets

GRAHAM SBTi Net Zero Verified Targets

We're committed to minimizing our impact on the environment, and key to this is our plan to reduce our greenhouse gas (GHG) emissions to net-zero. To ensure that this is meaningful and our progress against this target stands up against scrutiny, we have set near-term and long-term targets which have been approved by the Science Based Targets initiative (SBTi).

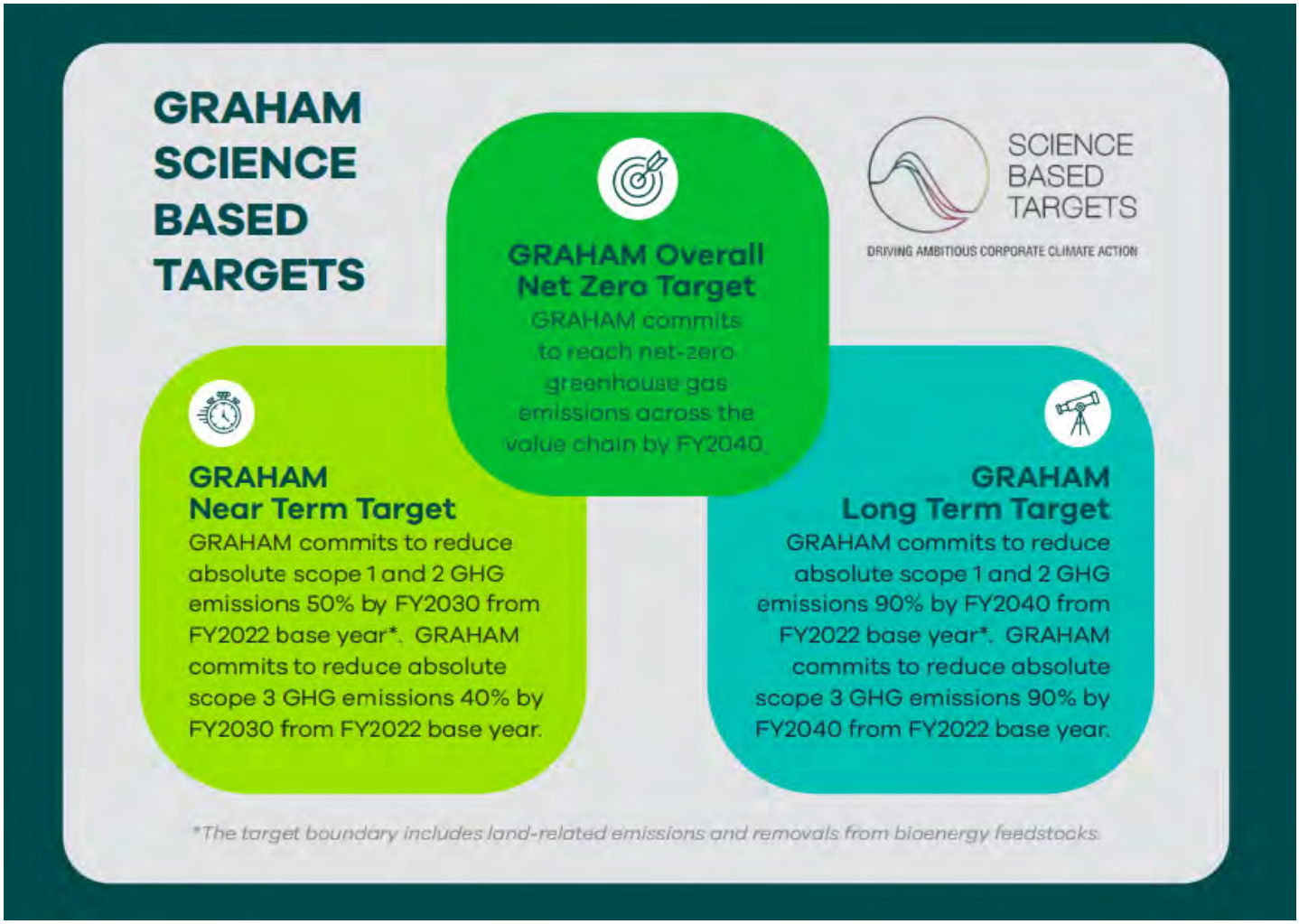


Figure 3: GRAHAM SBTi Targets

What is the Science Based Targets initiative (SBTi)?

The Science Based Targets initiative (SBTi) is a corporate climate action organisation that enables companies and financial institutions worldwide to play their part in combating the climate crisis, limiting global temperature rise to 1.5°C in line with the Paris Agreement. The SBTi is widely recognised as the 'gold standard' for greenhouse gas reduction target validation programmes and develop standards, tools and guidance which allow companies to set targets in line with what is needed to keep global heating below catastrophic levels.

Details of our all our corporate ambitions and targets relating to Environmental Sustainability are detailed below

FOCUS AREA	AMBITION	ORGANISATIONAL TARGET
CLIMATE ACTION	To eliminate carbon from our business and to measure and manage our progress towards a decarbonised economy	Net-zero carbon emissions by 2040
ENVIRONMENTAL MANAGEMENT AND IMPROVEMENT	To manage our business in such a way as to aid improvement in environmental performance in the workplace	Ensure that the GRAHAM Environmental Frequency Rate is maintained at less than 0.02.
CONSERVING RESOURCES	To have a net positive impact on resources and ensure the implementation of the principles of the circular economy by keeping products and materials at their highest utilisation throughout their lifecycle	To: a) Achieve zero avoidable construction waste by 2040 b) Maintain zero construction waste to landfill c) Reduce mains water consumption by 50% by 2030
PROTECTING THE ENVIRONMENT	To proactively manage ecological issues and contribute towards the protection and enhancement of natural assets to support wellbeing and help climate proof our communities	Increase the number of biodiversity actions by 50% (against a 2019/20 normalised baseline) by 2030

1.9. Environmental Roles and Responsibilities

- An organizational chart is shown within the Construction Phase Plan.
- The table below details the environmental duties and responsibilities for positions identified in the organization chart.

Name	Responsibilities
Project Director Neil McFarlane	• Assign specific environmental duties to competent members of the Project Team • Identify the environmental training needs of personnel under their control and arrange appropriate training programmes and ensure records are being maintained • Ensure that significant environmental aspects identified for the project are managed • Promote the continual improvement of environmental performance
Contracts Director Michael Green	• Ensure that the CEMP is produced, maintained and implemented on the project and distributed to all relevant parties • Ensure that all personnel for whom they are responsible are aware of the CEMP and implement the relevant requirements • Identify the competence of all subcontractors and suppliers and ensure that they are made aware of, and comply with, the Project Plans and any documentation requirements • Establish a consultation and communication system with all relevant interested parties associated with the project, including employees, partners, contractors, clients, designers and third parties, etc., where relevant
Engineering Manager Jim Flannery **Offsite Manager** Andy Fellows	• Ensure that all personnel undergo suitable and sufficient environmental induction before starting work on the project • Ensure that staff are attending the appropriate environmental courses that are organised by the Environmental Manager. Ensure the Environmental Manager is maintaining records • Monitor the performance of personnel and activities under their control and ensure that arrangements are in place so that all personnel can work in a manner which minimises risks to themselves and to the environment • Undertake a programme of regular project environmental inspections in accordance with procedures • Implement the environmental performance measurement, review and reporting requirements • Assist and support the Environmental Manager when pollution investigations are required • Co-operate with auditors during environmental audits and action any non-conformances

Name	Responsibilities
Logistics Manager Henry Rogers	• Ensure all environmental issues within their designated work area are identified and noted in the method statements if applicable • Liaise with Environmental Manager to ensure any environmental issues are dealt with swiftly and correctly • Issue daily task talks when environmental best practice is not utilised • Liaise with Environmental Manager when approaching subcontractors regarding environmental issues • Ensure environmental mitigation drawings are reviewed prior to works commencing • Ensure any environmental incidents are recorded and the associated procedure is followed • Read the CEMP prior to works commencing
Commercial Director Chris Brannigan	• Ensure that materials are ordered so that the quantity delivered, the timing of the delivery and the storage does not create unnecessary waste
Environmental Manager David O'Hagan	• Implementation of the CEMP Procedures • Liaise with the Engineering Manager to ensure all environmental aspects and requirements are included in the design • Draw up the CEMP to ensure all aspects, impacts, statutory requirements and Client commitments are reflected in the plan • Maintain and audit the CEMP and the documents which underpin it • Undertake a programme of regular project environmental inspections, monitoring, recording and reporting in accordance with procedures • Liaise with the Project Manager to ensure that the works are constructed in line with the CEMP • Liaise with the employer's environmental advisors, statutory bodies and the local community as required • Attend regular construction meeting to ensure environmental issues are discussed with the appropriate management • Comply with GRAHAM environmental incident investigation and reporting procedures • Chair Review Meetings involving relevant stakeholders and the Project Team • Support and provide training to the workforce with regard to understanding environmental aspects, impacts, regulatory requirements, best practice, constraints and methods of working
Design Manager George Howman/ Barry Higgins	• Be fully aware of the project environmental aspects in general and of their specialty in particular • Ensure the works are carried out to agreed working methods and procedures and to the required standard of quality • Train and educate the workforce regarding best practice, constraints and methods of working • Liaise with Environmental Manager to ensure any environmental issues are dealt with swiftly and correctly

Name	Responsibilities
Project Ecological Consultant Thompson Environmental	• Monitoring site works • Provision of status reports and updates • Provision of advice to and liaison with workers on site • Identify environmental risks and develop environmental controls • Delivery of environmental training for site personnel and sub-contractors • Liaison with the Site Team
Subcontractors TBC	• Provide evidence during procurement process to demonstrate commitment to the environment • Ensure all staff read the CEMP • Provide environmental mitigation required during their works • Appoint a member of staff responsible for coordinating environmental impacts and aspects • Ensure risk assessments address environmental issues associated with their works

Note - GRAHAM will notify the Employers Representative of any intended changes in personnel with core environmental responsibilities.

1.10. Competence, Training and Awareness

- The table below details the Environmental Competency and Training Plan for those personnel that will be employed on the Project
- Records of competency requirements and training will be maintained by the GRAHAM SHE Training department using an advanced training software tool which prompts in advance of refresher training requirements.
- A description of the training that will be delivered is outlined below

Description of training

Environmental Training	Description	Delivered by
Company SHE Induction	All members of staff receive a company induction which includes an introduction to the key aspects of the Environmental Management Systems within GRAHAM	HR Team
Site Specific SHE Induction	All site operatives are given site specific environmental information through the induction process	Designated member of the site team
Initial Environmental advisory/ communication training	Appropriate members of the site team receive an initial environmental advisory briefing. Key environmental aspects of the project are communicated at this stage	Environmental Team
SHE Briefings	Members of the site team attend an annual briefing which highlights areas of good practice, legislation changes and any new company initiatives	SHE Team
Spill Kit Training	Site teams are given practical training on the legal requirements regarding fuel storage, potential damage caused by such a spill, GRAHAM's spill procedure, measures to prevent spills occurring and practical training in the use of spill kits	Designated member of the site team / Environmental team
Carbon Literacy Training	Provision of training to staff on climate science and carbon in construction. The training outlines the necessity for both individuals and businesses to take action to reduce GHG emissions.	External body + Designated members of SHE Team

Environmental Training	Description	Delivered by
Environmental Champion Training	Specific members of the site team are assigned the environmental champion role. Training is provided to highlight their roles and responsibilities in managing environmental aspects onsite	Environmental Team
Environmental TBTs / Advice Notes	Environmental toolbox talks and advice notes are given on a regular basis to reinforce and further emphasize site environmental issues	Designated member of the site team
CIRIA / NEBOSH Award / SEATS - one day environmental awareness training	Environmental Champions attend a one day externally delivered environmental awareness course. This course introduces environmental issues and outlines mechanisms to improve site environmental performance.	External body
NEBOSH Certificate in Environmental Management (or equivalent)	Relevant SHE team members attain environmental management qualifications which are professionally certified to deliver a high level of environmental expertise	External body
Leading with Environmental Sustainability	Senior Management attend training which challenges leaders to formulate a strategic understanding of the risks and opportunities presented by a changing environment on their ability to do business	External body
Graduate Environmental Management Training Session	Graduates attend classroom-based training to provide them with an overview of the GRAHAM Environmental Management System	Environmental Team
Supply Chain Briefing	Key suppliers attend a briefing delivered to communicate environmental information relevant to their operations	SHE Team
Fuel Efficient Driver Training	High mileage drivers attend a practical driver training course to improve fuel efficiency through driving style	External body

Additional E-Learning Training courses

Environmental Training	Description	Delivered by
Introduction to Biodiversity	This training explains the principles and benefits of Biodiversity, and explains the opportunities of enhancing wildlife in the built environment	SCSS e-learning
The Circular Economy	This training introduces the concept of circular rather than linear economies	SCSS e-learning
Introduction to Environmental Management	This training provides an overview of Environmental Management	SCSS e-learning
Introduction to Sustainable Construction	This training introduces the principles of sustainability, sustainable development and sustainable construction	SCSS e-learning
Introduction to Climate Change and Carbon	This training provides an overview of Climate and Carbon	SCSS e-learning

1.11. Internal Communication

All staff and contractors will be informed of the content and location of this CEMP and associated controls. The induction of all new employees and contractors will include the contents of this plan and the Environmental Incident Response Procedure. Method Statements will be used to communicate specific environmental requirements as appropriate.

The Environmental Manager will have responsibility for communicating any changes in policy, procedure or legislation.

The Site Manager will have responsibility for maintaining internal communication, including changes to material on display.

The GRAHAM Environmental Policy (Section 1.7) and other appropriate environmental information will be displayed on all noticeboards.

1.12. External Communication and Managing Neighbours

GRAHAM will organize regular progress meetings with the Employer's Representative at agreed frequencies. The meetings will include an update on risk mitigation, progress against targets and a review of any audit/assurance monitoring findings.

GRAHAM will maintain a record of discussions held with statutory authorities.

The GRAHAM Site Team will agree with the Employer's Representative on how those affected by the works will be consulted, informed and mitigated of the consequences of the work. This is likely to include informing residents and stakeholders (both verbally and in writing) of activities that may cause an impact or nuisance.

1.13. Records and Documents

- Copies of all licences, consents, permits or permissions granted to GRAHAM (as shown in section 1.14) will be retained on site.
- Upon completion of the contract, final versions of the CEMP, operational controls and all other documents that record the environmental risks, best practice examples, mitigation measures, commitments, incidents and other relevant information for inclusion in the Health and Safety File/ O&M manuals will be provided to the Employers Representative.

1.14. Monitoring of Construction Activities

Environmental performance is monitored through the following activities:

1. Completion of the Weekly Site Supervisors Environmental Report - (IMS Ref: PF10-PR10-43-F016)
2. Inspections carried out by the SHE Team
3. Environmental Audits carried out by the Environmental Manager – (IMS Refs: PF10-PR10-40-F002 Environmental Audit/ PF10-PR10-40-F020 Environmental Advisory Audit Report/ PF10-PR10-44-F013 Waste and Resources Audit Report/ PF10-PR10-43-F034 Nuisance Audit Report/ PF10-PR10-43-F033 Energy Audit Report)
4. Review of Site Waste data, Carbon Impacts, Water Consumption and Biodiversity Actions (on Onos)
5. Noise and vibration monitoring (as necessary) – (IMS Refs:PF10-PR10-43-F026 Noise Monitoring Plan/ PF10-PR10-43-F027 Site Noise Forecasting Calculator/ PF10-PR10-43-F030 Noise Monitoring Report Form
6. Water Quality Monitoring (as necessary) (IMS Refs: PF10-PR10-43-F028 – Water Quality - Sampling Record/ PF10-PR10-43-F019 Water Quality – Visual Inspection Record
7. Dust and Air Quality Monitoring (as necessary) (PF10-PR10-43-F021 NRMM Inventory)

Environmental performance will also be a regular item included on the agenda for Progress meetings

1.15. Auditing of Construction Activities

The methodology for auditing construction activities includes but is not limited to:

- ❖ A review of documentation including the CEMP, environmental risk assessments, method statements, permits and licenses

- A review of site progress and results toward achieving GRAHAM SBTi targets and aspirations toward achieving diesel free construction sites
- A site visit which includes inspection of on-site waste skips, stockpiles, fuel storage arrangements and any nearby watercourses
- Discussions with the site team
- A report which includes findings and prioritised recommendations is then drafted by the auditor for action by the Site Manager

Details of the nominated personnel to conduct audits, report back and action mechanisms are detailed below

- **David O'Hagan**
- **Cat Clarkson**
- **Fiona Doyle**

The nominated auditors will ensure any areas of improvement are identified to the Site Manager and will undertake a follow-up to ensure that this improvement has taken place. Results of the audits will be made available to the Contracts Manager for information.

1.16. Identification of Aspects and Impacts (Project Environmental Risk and Opportunities Register)

Prior to actual commencement on site, the Environmental Manager consultation with the Project Manager will complete a site-specific Project Environmental Risk and Opportunities Register in order to identify the relevant environmental aspects and impacts associated with the works. This risk register will outline the controls that must be put in place to manage any significant adverse environmental impacts to acceptable levels. (IMS Ref: PF10-PR10-43-F003)

1.17. Environmental Risk Assessment

As well as including Health, Safety, Welfare and Quality requirements, Work Package Plans shall include environmental risk assessments (IMS Ref: PF10-PR10-01-F003) and give consideration of the following environmental requirements:

- List of significant impacts relevant to the activity
- Identification of receptors/ resources likely to be affected by the works
- On-site monitoring arrangements
- Environmental controls for statutory nuisance aspects – noise/ dust/ fumes/ lighting
- Refueling, repairing and servicing of mobile plant
- Waste management controls
- Selected mitigation methods to minimize impacts
- A list of relevant consents
- Training and briefing requirements

Work Package Plans must be completed and filed for inspection by stakeholders, regulators and other interested parties.

Environmental Risk Assessment is an ongoing process within GRAHAM to ensure that new hazards with changing consequences and likelihoods can be identified.

SECTION 2.0 Construction Layout Drawings

Guidance Notes:

The series of drawings provided in this section advise of the following:

- Contractor site boundary
  - Construction boundary/ hoarding line
  - Construction Traffic Route on Highway
  - Construction within site boundary
  - Construction Traffic diversion route to holding area
  - Construction Compound area
  - Demolition segregation fencing within site boundary
  - Access gates with wheel wash areas
  - Stockpile locations
  - Crawler Crane radius
  - Student Access routes
  - Pedestrian Walkway
  - Wagon Holding area/ site parking

- Demolition Phasing
  - Details of enclosure of working areas (hoarding provision)
  - Construction traffic management proposals
  - Parking
  - Delivery routes
  - Plant movements
  - Site access

- Utility connection Plan
  - Site Layout and cable routes to show external highways impacted
  - Substation Location and On-site Cable Routes

- Swept Path Analysis
  - Swept Path Analysis (SPA) have been undertaken covering the 2 main access / egress points (Upper Wilmslow Road & Moseley Road) which service the proposed development and include scenarios for both the demolition and construction activities and the associated vehicles. (The SPA drawings are provided in Appendix D and contain the details of the larger vehicles that will be utilising these access points).

    The Upper access / egress location on Wilmslow Road can accommodate the demolition and construction vehicles without the need to make any amendments to existing highway infrastructure etc, with the lower Wilmslow Road access (just north of Furness Road) being confirmed as an access point only for emergency vehicles, small vans and occasional cars (if required).

    The Access / Egress location on Moseley Road will require the following temporary alterations in accommodating the largest of the vehicles (Low Loader), for which arrangements will be made outside of this CEMP.
    - Suspension of a bay (temp TRO) either side of the access point required (this appears to be the case for other vehicles using this access too).
    - Widening of the dropped kerb from approx. 3.7m to a minimum of 11.2m.
    - The largest vehicle would cross the centreline but does keep a minimum of approx. 4.3m clear on the opposite carriageway so vehicles could still pass with ease and such manoeuvres will be supervised with banksman.
    - The lamppost on street would need to be relocated.
    - The existing gates will be fully removed, including the pedestrian gate next to the vehicle gate and replaced with robust appropriate security gates.

- Temporary Waggon Holding Area & Parking
    - It has been agreed with the UoM that the Car Park located off Moseley Road (south of the Armitage Centre) that full, unrestricted access will be provided for the development during the working week 07.00 – 18.00 and Saturday mornings 07.00 – 12.00.
    - This the based on the car park being substantially underutilised during these hours and many parking spaces being available elsewhere on campus, as recorded by historical survey information from the 2015 Owens Park planning application and 2025 Reserved Matters Application for Fallowfield Campus Redevelopment.
    - The UoM have requested that the car park be cleared earlier on Wednesdays (around 17.00), is recognising a potential increase in student use for sports events on this day.
    - We have agreed with the UoM that if for any reason waggons have to remain outside of these periods, they will be enclosed behind adequate safety fencing, which will remain during out of working hours as necessary.
    - To that end, it is anticipated that the use of this park cark as set out, will not have a significant impact on the current UoM arrangements for parking on the campus.



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Date Published: 14/10/2024



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Vehicle Key

A) 4.6t Light Van

B) 12m Rigid

C) 19m Low Loader

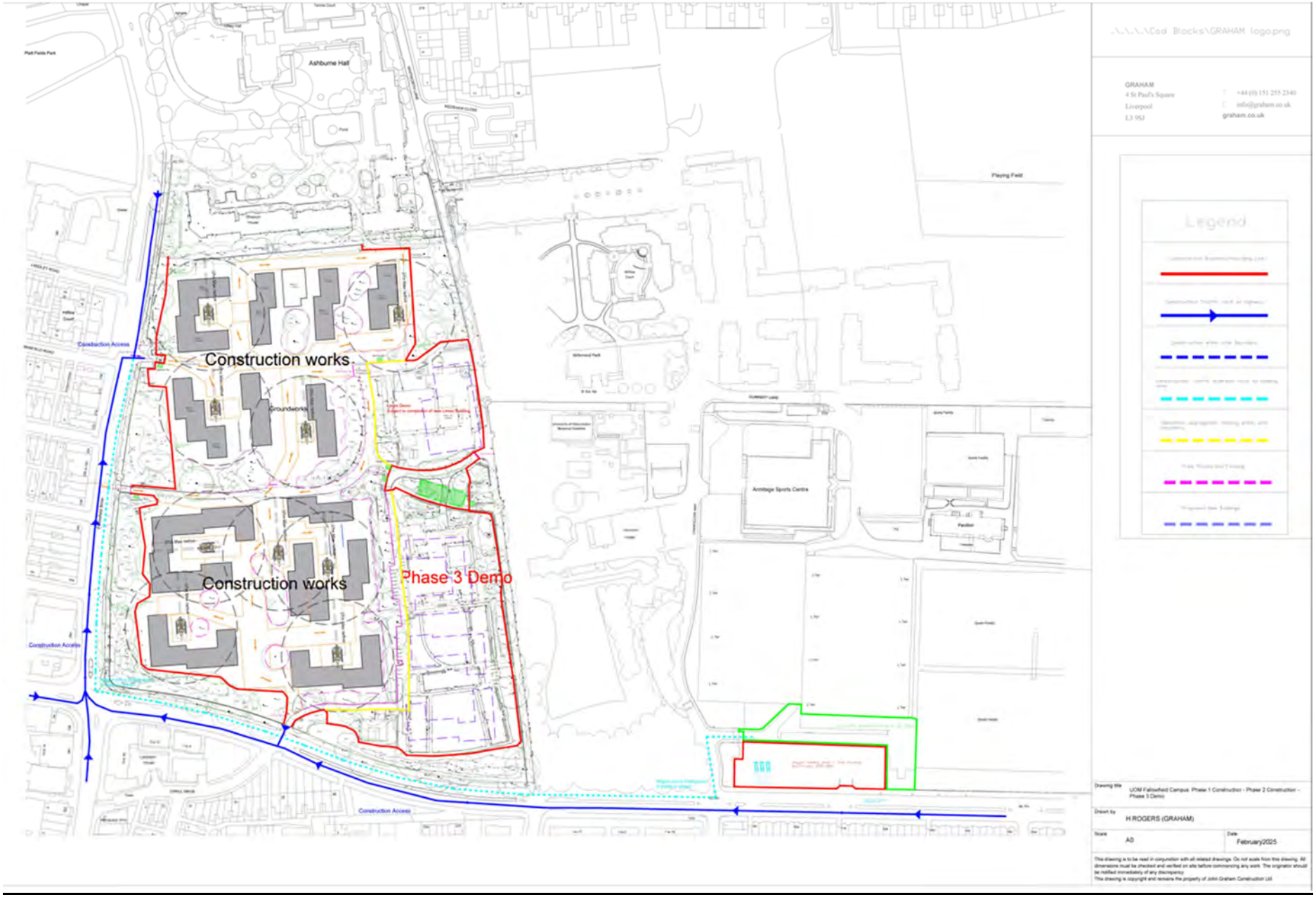
D) Large Tipper

E) Max Legal Artic

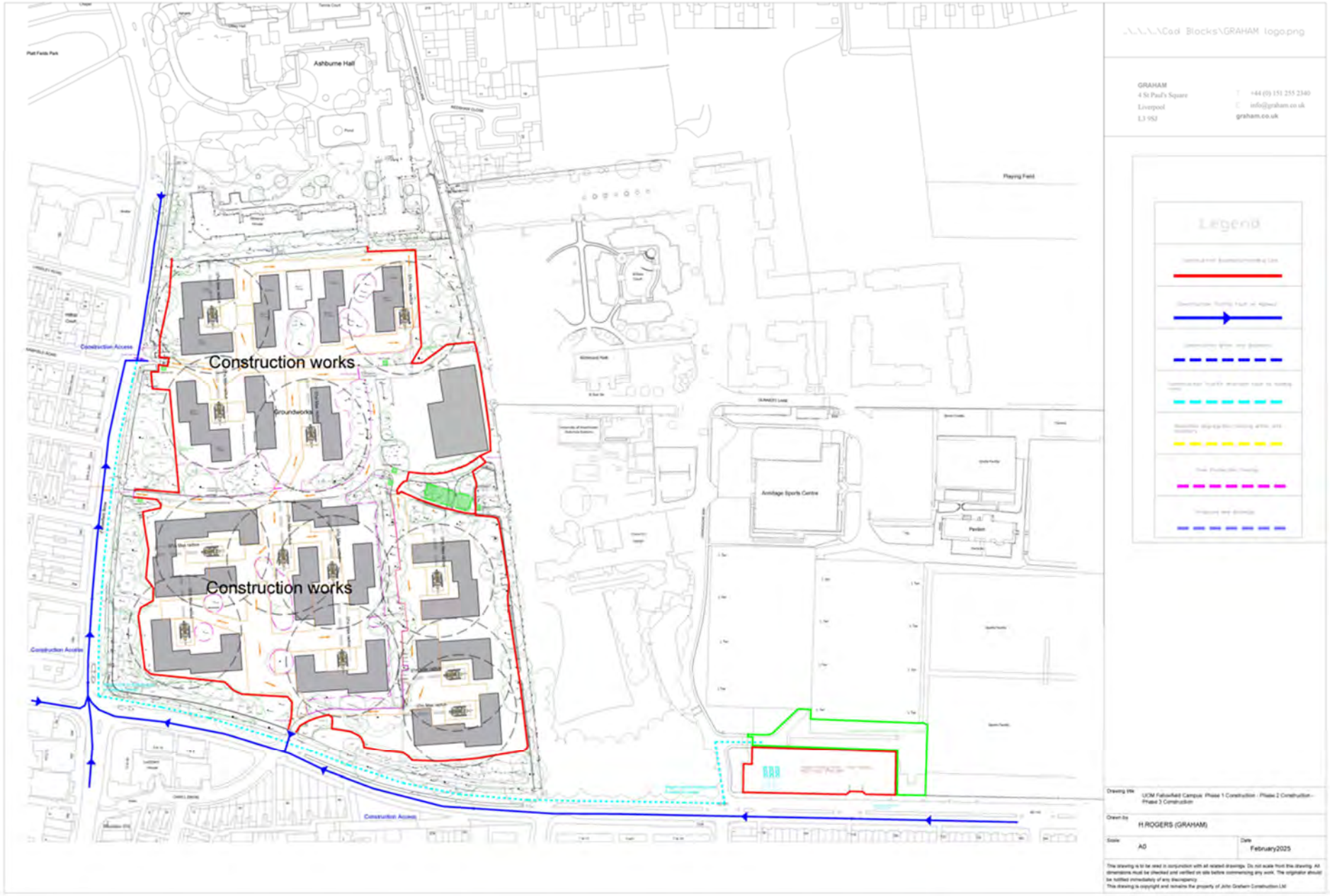
Drawing title	UOM Fallowfield - SPA Delivery Drawing with Notes P1
Drawn by	H.ROGERS (GRAHAM)
Scale	A0
Date	May 2025

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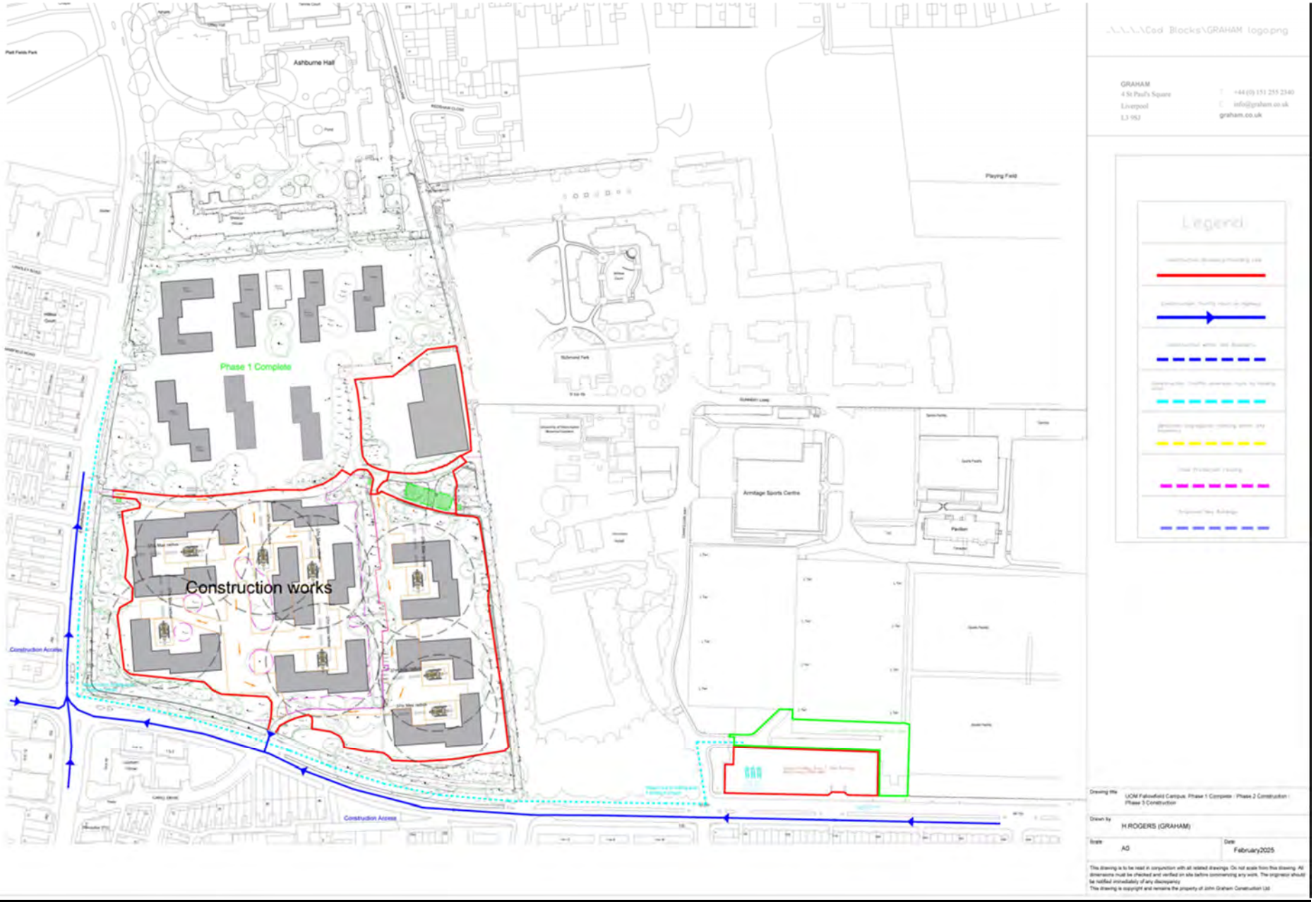

Ashburne Hall
Playing Field
Construction works
Groundworks
Construction works
Live Students
Armitage Sports Centre
Construction Access
Construction Access
Construction Access
Legend
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Liverpool
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Drawing title
UOM Fallowfield Campus. Phase 1 Construction - Phase 2 Construction
Drawn by
H ROGERS (GRAHAM)
Scale
A0
Date
February2025



Version No: 7.0
Date Published: 14/10/2024


Ashburne Hall
Playing Field
Construction works
Groundworks
Construction works
Armitage Sports Centre
Pavilion
Construction Access
Construction Access
Construction Access
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Legend
Drawing Title
UCM Fallowfield Campus Phase 1 Construction - Phase 2 Construction - Phase 3 Construction
Drawn by
H.ROGERS (GRAHAM)
Scale
A0
Date
February2025


Ashburne Hall
Lower Blocks Complete
Lower Blocks Fit-out works only
Construction works
Armitage Sports Centre
Pavilion
Playing Field
Construction Access
Construction Access
Legend
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A0
February2025



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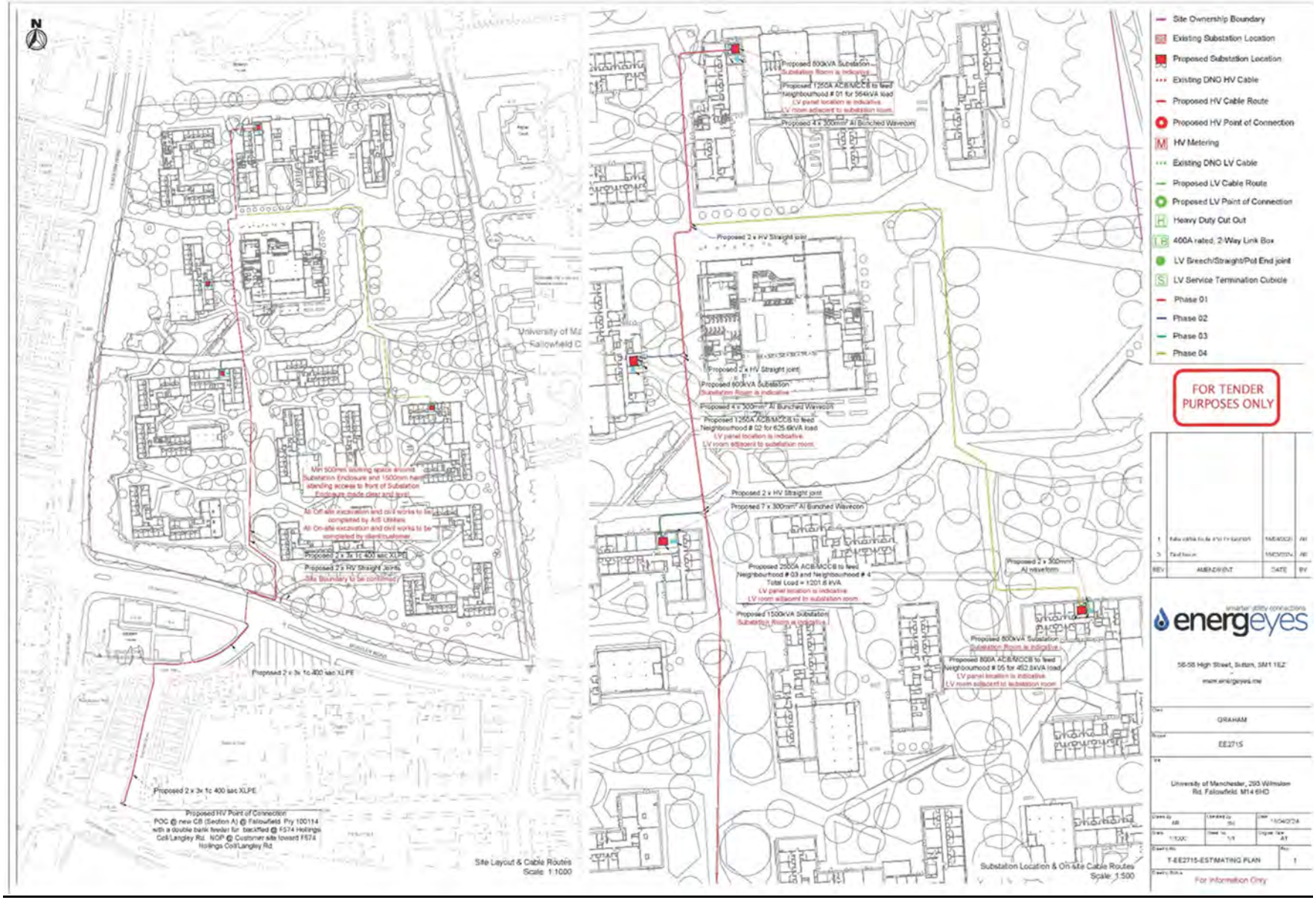


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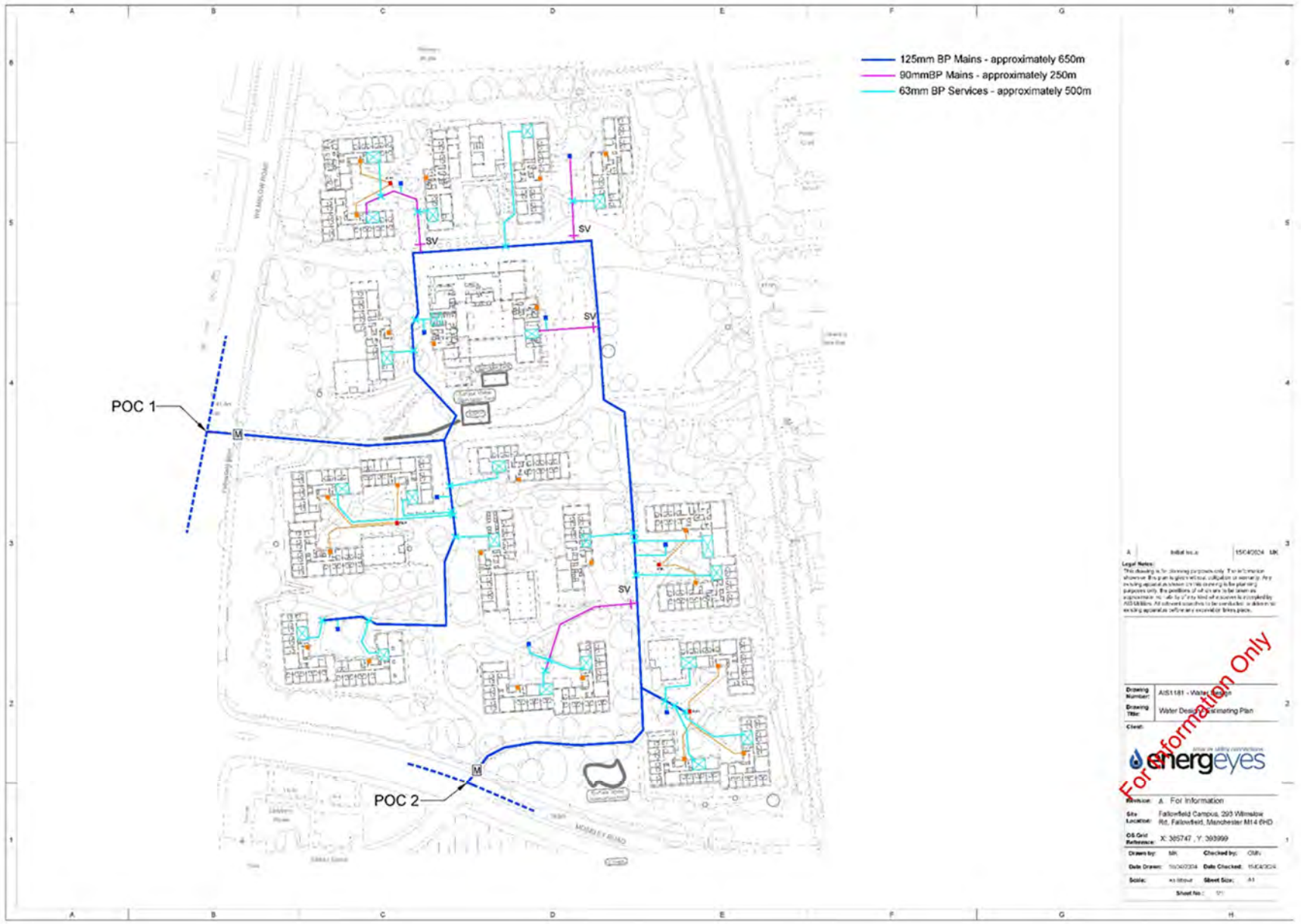


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Date Published: 14/10/2024

Utility Connection Plans (As of Dec 2024)



Version No: 7.0
Date Published: 14/10/2024


125mm BP Mains - approximately 650m
90mmBP Mains - approximately 250m
63mm BP Services - approximately 500m
POC 1
POC 2
SV
SV
SV
SV
For Information Only
energeyes
Drawing Number:
Drawing Title:
Water Design Estimating Plan
Client:
Revision: A For Information
Site Location: Fallowfield Campus, 293 Wilmslow Rd, Fallowfield, Manchester M14 6HD
OS Grid Reference: X: 385747 , Y: 393999
Drawn by: MK
Checked by: OMc
Date Drawn: 15/04/2024
Date Checked: 15/04/2024
Scale: as labour
Sheet Size: A1
Sheet No.: 01

SECTION 3.0 Ecology and Biodiversity Management Plan

Guidance Notes:

This section contains details of ecological considerations (such as nesting seasons, protected species etc.) and steps required to safeguard ecology during construction.

3.1 Ecological Issues

3.2 Existing Site Ecological Features

3.3 Species Management Plans

3.4 Habitat Management Plan

3.1 Ecological issues

This section prescribes the mitigation measures which are necessary to be implemented in order to prevent or reduce adverse impacts upon ecological receptors. It also considers the legal requirements associated with statutory protected species and sites. Details of our aspirations and methodologies for the achievement of biodiversity net gain are also included.

3.2 Existing Site Ecological Features

Existing Site Ecological Features, designations and potential impacts

No statutory designated sites within 2km of the site. One non-statutory designated site was identified within 1km of the site known as The Fallowfield Loop, a disused railway cutting designated as a Regionally Important Geological Site (RIGS).

Five protected species records were returned within the site boundary. These records comprise three records of common pipistrelle Pipistrellus pipistrellus bat roosts, and two records of the European hedgehog Erinaceus europaeus.

The site mainly comprises buildings, hardstanding, other neutral grassland bordering and between buildings, patches of broadleaved woodland, scattered broadleaved trees, hedgerows, line of trees and an off-site pond to the north of the site.

Invasive Species

Invasive non-native plant species Japanese Knotweed, was present on site between buildings B18 and B22.

Roosting Bats

A total of 37 buildings and structures were assessed externally for the potential to support roosting bats, where 29 of the buildings were assessed as having high, moderate or low potential to support roosting bats, and eight as having negligible potential.

In addition, seven trees on site were assessed as having any potential to support roosting bats, six of which having low potential and one moderate.

Breeding Birds

Birds are likely to utilise the buildings, hedgerows, broadleaved woodland and line of trees, and the site offers connectivity to the wider landscape providing foraging opportunities

Great Crested Newt

The pond that lies within Ashburne Hall area could support great crested newts. Edna testing on the ponds was completed on 12th June 2024 and found to be negative, therefore GCN require no further consideration.

Habitats

There are also areas of mixed woodland, predominately around the periphery of the site, together with introduced shrubs and ornamental planting, flower and raised beds. There is also a large number of mature trees across the site throughout the amenity grassland.

Figure 4: Habitat Map



3.3 Species Management Plans

BATS

The buildings bat roosting potential can be separated into four distinct areas

1. Ashburne Hall (B1 to B6) They are generally considered to offer high potential for bats, with the surrounding grounds and woodland offer good, unlit foraging habitat
2. Owen's Park (B7 to 14a) The majority have numerous weep holes above the windows and potential gaps beneath the fascia boards/soffits that could offer roosting opportunities. They have negligible to high potential to support bats.
3. Oak House (B15 to B21) The majority have numerous weep holes above the windows and potential gaps beneath the fascia boards/soffits that could offer roosting opportunities. They have negligible to high potential to support bats.
4. Woolton Hall (B22 to B27) They have ornate ventilation slits on some of the gable ends that could allow access into any roof voids that may be present.

There are 7no. trees identified with bat roost potential. These vary from Moderate to low potential.

The habitats onsite will provide some commuting and foraging resources for local bat populations, in particular the woodland belts and mature trees.

LEGISLATION

Bats and their roosts are protected under the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981, as amended. Taken together, this legislation makes it an offence to:

- Deliberately capture, injure or kill a bat
- Deliberately disturb a bat in such a way as to be likely:
  - To impair its ability to survive, to breed or reproduce, or to rear or nurture its young; or
  - To impair its ability to hibernate or migrate; or
  - To affect significantly the local distribution or abundance of the species to which they belong.
- Damage or destroy a breeding site or resting place of a bat
- Keep, transport, sell or exchange, or offer for sale or exchange, any live or dead bat or any part of, or anything derived from a bat.

In addition, bats are also a priority species in England as required under Section 41 of the Natural Environment and Rural Communities Act 2006. Consultation with the relevant authority is therefore required before any work is undertaken that might affect bats.

MITIGATION

Surveys

- An internal survey of the buildings identified as having a potential bat roosting impact will be undertaken by a licensed bat worker. The survey method will be based on Bat Conservation Trust guidelines (4th Edition) (Collins, J (ed), 2023). The search inside the buildings will look for evidence of bats, such as bat droppings.
- Hibernation surveys may be required, depending on the results of the internal inspections, to support a Bat European Protected Species License (EPSL)
- A Ground Level Tree Assessment survey will be carried out, using binoculars and high-powered torches, to identify trees which are suitable for roosting bats, or require increased survey to effort to confirm suitability. Next phase surveys will be above ground inspections.
- A Bar Safeguarding Report will be issued detailing results on the Ground Level survey, providing recommendations for further surveys, mitigation or safeguarding requirements.

- Exact mitigation measures will depend on the survey results.

Where an EPSL is required a method statement and works schedule will be developed to identify specific mitigation measures. This section will be updated in due course.

General

- Exact mitigation measures will depend on the survey results.
- All site operatives will be made aware of the possibility of finding bats during demolition of buildings, during works at built structures and during tree felling. If bats are found in properties or trees, operatives will stop work immediately and contact the Site Management Team
- Confirmed bat roost sites will not be disturbed or obstructed until a European Protected Species licence has been obtained from Natural England. Once obtained, the licence conditions for mitigation and compensation will be fully followed

Noise and Vibration

- Best Practicable Means will be adopted to ensure that noise emissions and vibration is reduced whenever practicable.

Lighting

- All lighting will be task orientated and be kept to the minimum amount required for security/health and safety.
- Lights will be switched off when not in use, where practicable and safe to do so.
- Light spill will be minimized using adjustable column heights and/or cowls/hoods.

ENHANCEMENT

A strategy outlining the approach to biodiversity net gain assessment across all phases of development will be submitted to and agreed in writing by the City Council as local planning authority, alongside the Reserved Matters Application.

The aim of the strategy would indicate the approach to the assessment across the site, how this is to be assessed per phase and how any improvements could be provided.

The strategy shall then be implemented across each phase of development and a verification report provided on the completion of the final phase of development to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved strategy.

BIRDS

LEGISLATION

Wild Birds, their nests and eggs are protected under the Wildlife and Countryside Act 1981 such that it is an offence to:

- Deliberately capture, injure or kill any wild bird
- Take damage or destroy the nest of any wild bird while that nest is in use or being built
- Obstruct or prevent any wild bird from using its nest
- Take or destroy an egg or any wild bird

MITIGATION

Any necessary clearance of trees, scrub and tall herbaceous vegetation will occur outside the bird-breeding/nesting season (i.e. vegetation clearance works to be carried out between September and the following February. For reference, the breeding bird season is generally taken as the 1st March until 31st August inclusive. However, it is also noted that birds can nest at any time of the year and are therefore protected when they do.

A sensitive lighting design will be promoted for the site. Whilst the site is currently well lit, there are opportunities to reduce the light spill whilst maintaining an appropriate level of lighting for safe use of the site. Lighting will be targeted only to areas where it is needed for safety and access. It will not be promoted away from buildings. Lighting will be highly directional to reduce light spill and skyglow and in accordance with best practice guidelines

ENHANCEMENT

A strategy outlining the approach to biodiversity net gain assessment across all phases of development will be submitted to and agreed in writing by the City Council as local planning authority, alongside the Reserved Matters Application.

The aim of the strategy would indicate the approach to the assessment across the site, how this is to be assessed per phase and how any improvements could be provided.

The strategy shall then be implemented across each phase of development and a verification report provided on the completion of the final phase of development to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved strategy.

3.4 Habitat Management Plan

HABITAT MANAGEMENT PLAN

EXISTING FEATURES

The site comprises numerous buildings associated with the western side of the campus that range in age from over 100 years to halls of residence constructed in the 1950s to 1990s, many with later additions and renovations.

Well maintained amenity grassland is present between the buildings and along the pedestrian walkways and car parks.

There are also areas of mixed woodland, predominately around the periphery of the site, together with introduced shrubs and ornamental planting, flower and raised beds. There is also a large number of mature trees across the site throughout the amenity grassland.

The mature tree line between the Ashburn Hill and Owen's Park areas are also likely to offer a green link across the site and to the wider area.

POTENTIAL IMPACTS

Land

- Loss or damage to woodland areas.
- Damage or destruction of unrecoverable habitats/landscapes.
- Reduction/loss of both flora and fauna species.
- Impacts on the natural ecology of local species such as bird nesting grounds, badger setts/wildlife corridors.

MITIGATION

Land

- The woodland areas will be retained, where possible, and protected throughout the duration of the site works.
- Development will be set back from the woodland edge, and tree lines, to ensure that it does not impact on the root protection areas and affect the longevity of the trees on site.
- Planting works will be undertaken on completion of works to ensure native species are replaced.
- Care will be taken to minimise the impact to existing vegetation and heavy plant will be confined to the site and working areas to avoid damaging soils outside the area. The removal of trees will be avoided where possible.
- A stout fence will be erected around any trees to be retained. As most damage usually occurs to the roots, the fence will enclose at least the area covered by the spread of the branches.

ENHANCEMENT

A strategy outlining the approach to biodiversity net gain assessment across all phases of development will be submitted to and agreed in writing by the City Council as local planning authority, alongside the Reserved Matters Application.

The aim of the strategy would indicate the approach to the assessment across the site, how this is to be assessed per phase and how any improvements could be provided.

The strategy shall then be implemented across each phase of development and a verification report provided on the completion of the final phase of development to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved strategy.

SECTION 4.0 Land Management Plan

Guidance Notes:

This section contains details of the steps required to safeguard the site from negative impacts in respect of Geology/ Ground Conditions/ contaminated land

4.1 Geology and Contaminated Land Issues
4.2 Site Geology and Ground Conditions
4.3 Potential sources of contamination not previously identified
4.4 Potential Pathways
4.5 Potential Receptors
4.6 Mitigation Measures
4.7 Discovery of Contaminated Land Emergency Procedure

4.1 Geology and Contaminated Land Issues

Ground contamination may be present on-site because of the current and historical land use(s) that have occurred. For ground contamination to present a risk to human health or the environment there must be a pollution pathway present comprising a source, pathway and receptor.

The CLR-11 document defines the three essential elements to any risk as:

- A contaminant (or hazard) that is in, on or under the land and has the potential to cause harm
- A receptor which in general terms is something that could be adversely affected by a contaminant or hazard, for example human health
- A pathway which is a means by which a receptor can be exposed to, or affected by a contaminant or hazard



Figure 5: Pollution Pathway

4.2 Site Geology and Ground Conditions

Site Geology
It is anticipated that the site is underlain by a sequence of Made Ground, underlain by Glacial Till, underlain by the Chester Formation.

A number of potential sources of contamination in near surface ground have been identified relating to the previous / historic uses (Made Ground). Low/moderate risk were assessed to people (demolition and construction workers, future site users and off-site users) associated with this potential contamination.

The potential risks associated with the possible presence of Unexploded Ordnance (UXO) were assessed as “Moderate”. Mitigation options are available to reduce all these risks to acceptable levels.

It is recommended that prior to the commencement of development, data is obtained from a site-specific ground investigation which is presented in a factual report suitable for submission to the Local Planning Authority to address part of the standard planning condition associated with site investigation.

Following on from this, an assessment of the data will need to be undertaken along with any subsequent recommendations on the need for any further investigation. Depending on the results of the ground investigation, more detailed risk assessment and / or requirements for remediation may be required.

4.3 Potential sources of contamination not previously identified

Primary Sources of contaminants include tanks, site processes/operations (including combustion processes), site spillages/leaks, waste storage areas, and drainage lines.

Secondary Sources of contaminants result from the release of substances or deposition of materials from the Primary Sources, including atmospheric deposition and waste disposal.

Made ground/fill deposits and soils containing naturally occurring substances are also considered as a potential source of contaminants.

Site activities have the potential to mobilize any contaminants that exist in the ground by creating pathways or simply by providing environmental conditions that assist their development to a more toxic form.

Contaminants of concern may include a range of organic and/or inorganic substances, namely heavy metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, volatile and semi-volatile organic compounds, polychlorinated biphenyls (PCB's), asbestos and other harmful or toxic materials not mentioned above.

4.4 Potential Pathways

- Soils leaching to groundwater
- Groundwater advection
- Surface water run-off
- Migration via services and service ducts
- Migration through strata of a permeable nature
- Dermal, inhalation or ingestion
- Increased dusting levels because of weather conditions or construction activities

4.5 Potential Receptors

- Ecological Receptors namely, flora, fauna and the water ecosystem
- Groundwater including Minor and Major Aquifers underlying the site
- Surface Waters (controlled water)
- Buildings, building materials and services (BBMS)
- Human receptors including demolition and construction workers.

4.6 Mitigation Measures

- Works will be completed in line with planning and site investigation mitigation measures
- Measures for storage of chemicals, fuels and hazardous materials will be implemented on site (as per section 5 of this CEMP)
- A watching brief will be provided to identify and segregate potential contaminated soil
- Where any unexpected contamination is discovered, we will liaise with the local authority and experienced consultants and agree a remediation strategy for dealing with contamination

4.7 Discovery of Contaminated Land Emergency Procedure

All site personnel will be vigilant during excavating for signs of unexpected contamination. Where contamination is suspected during the work the following action will be taken:

- All work must be stopped immediately.
- The Site Manager must notify the discovery to the Environmental Manager
- The area must be sealed off to contain the spread of contaminants.
- The site must be cleared to ensure there is nothing that could cause fire or explosion.
- The Site team must seek expert advice to identify, if appropriate and possible, the extent and cause of contamination (e.g. prior land use, spillage on site).
- If asbestos is uncovered, it should be re-covered temporarily to prevent release to atmosphere.
- A specialist contaminated land survey should be undertaken to determine the level of contamination and whether disposal or remediation methods are required.
- The Site Manager must complete an Environmental Incident Report on ONOS.
- Good practice must be followed to remediate the land.

SECTION 5.0 Water Management Plan

Guidance Notes:

This section contains details of the steps required in order to ensure best practice with regard to the protection of water quality and water efficiency

5.1 Water Management Issues
5.2 Existing Site Conditions
5.3 General Water Management Controls
5.4 Control Measures for Hazardous Substances
5.5 Control Measures for Plant and Equipment
5.6 Control Measures for Concrete, Cement and Grout
5.7 Control Measures for Oil Storage
5.8 Control Measures for Refuelling
5.9 Appointed Persons for Refuelling
5.10 Control Measures for Discharging Water
5.11 Control Measures for Abstracting Water from Excavations
5.12 Control Measures for Drainage
5.13 Control Measures for Flood Protection
5.14 Water Efficiency

5.1. Water Management Issues

The construction industry presents a major pollution threat to the water environment. Where harm has occurred or deemed likely to occur the regulator can either carry out works to clean up the pollution and recover costs from the Contractor or can serve a works notice requiring the polluter to clean up the discharge at their own expense. If water courses are polluted, or unacceptable waste is disposed of to the sewer system, the regulatory authorities have the powers to prosecute.

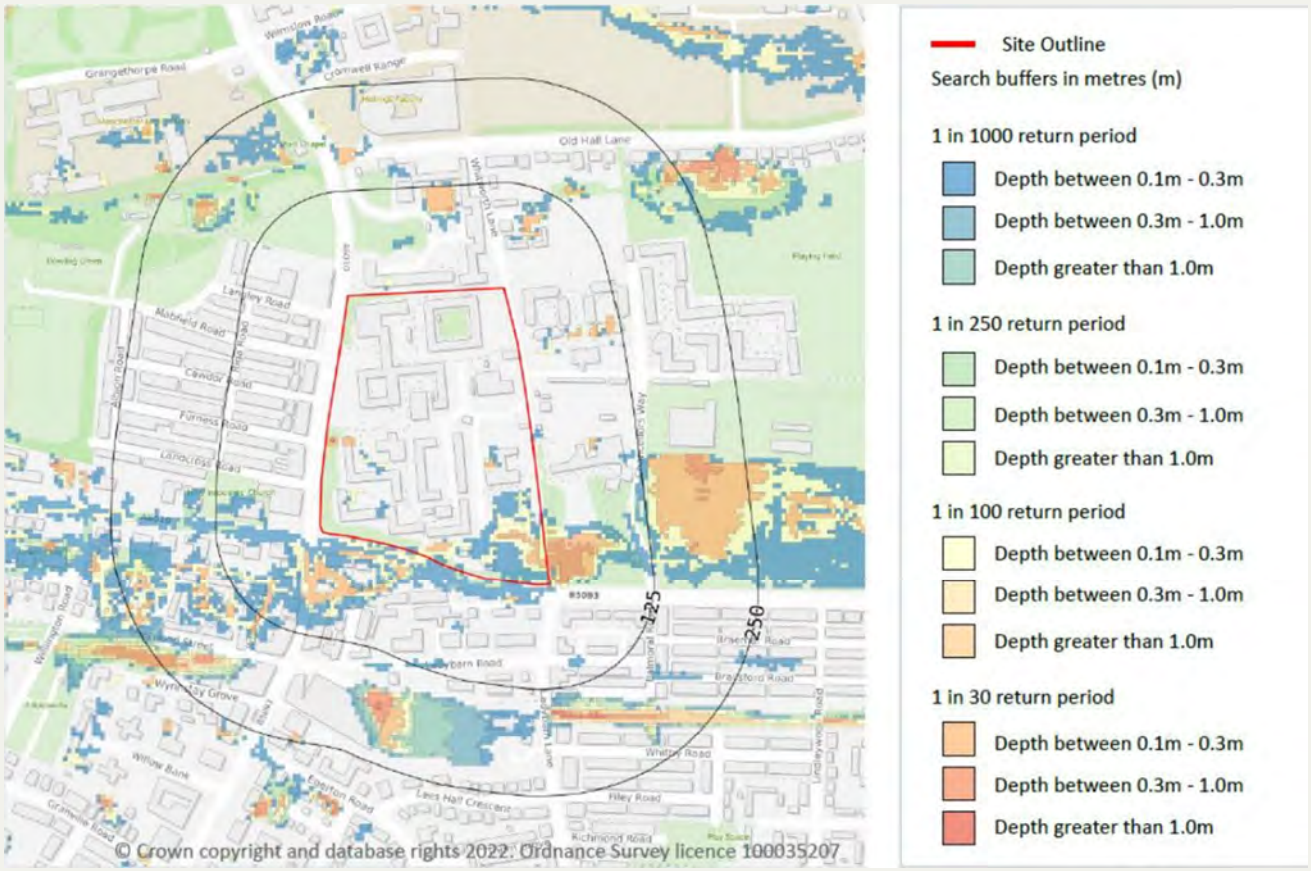
GRAHAM will always implement working methods to protect the water environment from pollution and other adverse impacts. Our objective is to protect water quality and the ecosystems the water resources support.

5.2. Existing Site Conditions

The main surface water features surrounding the site are the Fallowfield Brook located 62m south of the site. This is classified as an inland river not influenced by normal tidal actions and Platt Brook which is classified as an inland river not influenced by normal tidal action

Flood zone maps show that the site is located within Flood Zone 1. It is located outside of the 0.1% Annual Exceedance Provability (AEP) event.

The highest surface water flood risk due to areas likely to pond water during extreme rainfall events is located to the southeast of the site at the present location of Woolton Hall.
Flood flows are predicted to enter the site from the east via Whitworth Lane and flow through the site back to Moseley Road at the southern entrance to the site. See figure below.



Groundwater levels in made ground were observed between 0.51m and 1.94m below ground level. This was resulting from locally perched water located above more impermeable strata of Glacial Till.

5.3. General Water Management Controls

All work will be carried out in line with GPP5* “Works and Maintenance in or near water” in order to ensure best practice with regard to the protection of water quality.

The handling, use and storage of hazardous materials will be undertaken in line with Guidance for Pollution Prevention (e.g., GPP2* Above Ground Oil Storage Tanks).

5.4. Control Measures for Hazardous Substances

Hazardous substances are common pollutants of waterbodies and groundwater supplies which can be used for drinking water. The following control measures will be put in place on site in order to avoid the potential for contaminants from hazardous substances migrating to surface and groundwater.

All containers for hazardous substances (solid and liquid) will be leak-proof. Storage of such substances will be within impermeable, bunded, secure areas, with impervious walls and floors to remove the risk of migration to groundwater or a nearby watercourse. Such storage areas will be located away from sensitive areas of the site and will be covered to prevent ingress of water. Hazardous substance stores will be clearly marked with appropriate warning signs.

Storage areas for hazardous substances will be kept tidy and we will plan deliveries to keep the number of hazardous materials on site to a minimum

We will ensure that any water that has come into contact with hazardous materials, or is believed to be contaminated, will be stored, tested, classified and appropriately disposed of in accordance with relevant legislation.

The quantity and type of all environmentally hazardous materials will be recorded and updated weekly on the Materials Storage Inventory Form (IMS Ref: PF10-PR10-43-F006)





Figure 6: Examples of bunded and covered COSHH areas and containers

5.5. Control Measures for Plant and Equipment

Daily plant checks will be completed for all mobile plant and equipment. Particular attention will be made to checking engine fluids and hydraulic hoses. Any leaks or damage to the plant will be recorded and notified by the plant department/ hire company immediately so that the appropriate servicing can be arranged. Any items of plant/ equipment found to have any leaks will be removed from service until the fault is rectified.



Mobile Work Equipment - Pre-Use and Daily Inspection Checklist

PF10-PR10-38-F001

PROJECT & CODE:		WEEK COMMENCING:	
MACHINE OPERATORS NAME:		VEHICLE TYPE & FLEET NUMBER:	

Hours Run / Mileage End Week	
Hours Run / Mileage Start Week	
Total Hours Run For Week	

ALL FAULTS AND DEFECTS MUST BE REPORTED IMMEDIATELY TO YOUR SUPERVISOR DO NOT USE IF UNSAFE

✓ If in order X. If requires attention NA – If not applicable

	All checks should be conducted in accordance with the manufacturer's manual		Mon	Tue	Wed	Thurs	Fri	Sat	Sun
SAFETY CHECKS	1.	Horn	Working						
	2.	Tracks/ wheels and nuts	Free from splits, cracks, nails						
	3.	Running gear (where applicable)	Working						
	4.	Steps and handholds	Free from defects						
	5.	Lights Head/ stop/ side/ indicators	Working						
	6.	Windows	Clean and free from cracks						
	7.	Reversing aids (mirrors, cameras, radar)	Operating / clean & free from cracks						
	8.	Reversing alarm	Working						
	9.	Flashing beacon(s)	Working						
	10.	Brakes - foot	Working						
	11.	Brakes – hand brake parking	Working						
	12.	Emergency stops (if applicable)	Working						
	13.	Cab interior	Floor and controls free from objects						
	14.	Roll over protection/ securing pins	Working/ free from defects						
	15.	Seat belts	Working , clean, free from cuts						
	16.	Seat weight adjustment	Adjustable/ good condition						
	17.	Ground	Suitable for carrying loads during lift						
	18.	Slew restrictors	Working						
	19.	Passive warning systems	Working						
	20.	Safe load indicator/ anemometer	Working						
MAINTENANCE CHECKS	21.	Water levels	Within limits						
	22.	Engine oil levels	Within limits						
	23.	Fuel level	Adequate						
	24.	Radiator level	Within limits						
	25.	Hydraulic oil levels	Within limits						
	26.	Hydraulic hoses	Free from crack/ splits/ leaks						
	27.	Windscreen water bottles levels	Within limits						
	28.	Instrument gauges/ operation controls	Working						
	29.	Transmission	Working						
	30.	Steering	Free from loose movement						
	31.	Brakes	Air pressure/oil level within limits						
	32.	Greasing	*(as per operators handbook)*						
	33.	Wire rope and chain systems	Free from defects						
	34.	Check valves	Free from defects						
	35.	Quick hitch/safety pin/attachments	Working						
	36.	Boom	Free from obvious defects						
	37.	Outriggers/ pads	Free from obvious defects						
		Operator completing the inspection must initial here at end of each day							

Defect details		Date fitter contacted		Date defect(s) fixed	
Defect details		Date fitter contacted		Date defect(s) fixed	

Machine Operators Sign:		Only persons who are trained and authorised by their employer should operate this equipment.
Site Managers Sign: (at end of week)		

Version No: 1.0
Date Published: 04/04/2018

Page 1 of 1

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Figure 7 - GRAHAM Mobile Plant Daily Inspection Sheet



Figure 8 - Example of GRAHAM Enviropad in use

- Enviropads will be used under diesel pumps and standing plant.
- Effluent from wheels washers and plant washing facilities will be contained for proper treatment and disposal.

5.6. Control Measures for Concrete, Cement and Grout

Concrete, cement and grouts are highly alkaline and corrosive and can have a detrimental impact on watercourses. To minimise any impact:

CONCRETE WASHOUT FROM CONCRETE LORRIES

- Concrete wash water control measures will be planned and implemented before starting the project. A concrete washout risk assessment will be completed to assess the risk to receptors based upon site location and volume of concrete washout generated.
- The amount of wash water produced will be minimised and where possible and practicable, it will be returned to the batching plant
- For wash waters that cannot be returned to the batching plant, the concrete washout system utilised will (as a minimum) securely capture, contain and store the concrete solids and wash water in an impervious container/ bund.

- Washout arrangements will be located 10m away from drainage gullies, surface water drains and watercourses
- The washout area will be conveniently located for washing out equipment and adequately signposted.
- To minimise the amount of washout water generated, excess concrete will be scraped off the equipment before it is washed. These excess solids will be placed in a designated storage container.
- A high pressure, low volume water spray nozzle will be used to reduce water use
- The area will be monitored and maintained to ensure proper use and have adequate storage capacity
- Temporary concrete washouts will be designed with enough volume to contain all liquid and concrete waste.
- Plastic lining material will be a minimum of 10 mm polyethylene sheeting and will be free of holes, tears, or other defects that compromise the integrity of the material

CONCRETE WASHOUT SYSTEMS (EXAMPLES IN ORDER OF PREFERENCE)

A. Wash into geotextile bag, collect the filtered wash out water in separate tank and arrange with concrete supplier to extract tank contents following the last pour of the day. Concrete washout water can be reused at the batching plant making more concrete. **Note: Requires submersible pump, geotextile bags and agreement with concrete supplier**

B. Use integrated pump and waterhose to clean chute into the specific geotextile bag. This segregates the solids, and the collected high pH wash out water is stored for re-use to rinse out the next wagon's chute. **Note: Requires power connection to pump the water, geotextile bags and has capacity for 50 wagons**

C. Combined Concrete Washout and pH adjustment System - separates and dewaters the waste concrete solids and then its on-board automatic carbon dioxide pH adjustment system neutralises the high pH washwater down to (circa pH 6 to 9) limits set by the Environment Agency for discharge. **Requires: Power, consent to discharge, CO_2 gas, and water quality testing**

D. Washout into a holding tank / skip lined with an impermeable sheet to prevent ground contamination. Mixture is allowed to cure / water evaporate **Requires: dry weather / potentially a sacrificial bag of cement**



Figure 9 - Examples of Concrete Washout systems that may be utilised on site

ON-SITE BATCHING

- Batching and mixing activities will be located well away from watercourses and drains
- Material storage areas for all cementious materials will be protected and covered.
- Surface drainage in the area around the batching plant will be controlled as we are aware that it may be polluted.
- Spills of concrete, cement, grout and similar materials will be contained and ensured that they cannot reach surface water or drains.
- Concrete washout from mixing plant will be carried out in a designated contained impermeable area.

CONCRETE PLACEMENT

- We will discuss arrangements for deliveries to site with suppliers before work starts, agreeing routes, designated washout areas and emergency procedures.
- Bulk and bagged cement and concrete additives will be stored at least 10m away from watercourses, gullies and drains.
- A contingency plan will be put in place for uncontrolled releases.

5.7. Control Measures for Oil Storage

Oil is one of the most common pollutants in the UK and spilt oil can pollute waterbodies and groundwater supplies which can be used for drinking water.

TYPES OF OIL EXPECTED TO BE FOUND ON SITE

- Petrol
- Diesel
- Heating oils
- Biofuels
- Lubricating and hydraulic oils
- Synthetic and mineral oils
- Biodegradable
- Shuttering and cutting
- Waste oils

OIL STORAGE LOCATIONS

In all cases we will avoid storing oil in high-risk locations such as:

- Where there is risk of damage by impact or collision e.g. from site traffic
- Within 50M of a spring, well or borehole
- Within 10M of a watercourse, ditch or drainage channel
- Where spilt oil could enter open drains or soak into unmade ground where it could pollute groundwater

OIL STORAGE TANKS AND CONTAINMENT SYSTEMS

When storing more than 200litres of oil, a secondary containment system will be provided. The capacity of the secondary containment system will be either 110% of the largest drum or 25% of the total volume stored (whichever is greater). Additionally, all ancillary equipment will be kept contained within the bund.



Figure 10 - Illustration of oil storage with a secondary containment system

INSPECTION AND MAINTENANCE

All oil storage areas, containers and secondary containers will be frequently inspected and checked for signs of damage, corrosion, bulging, leaks or unauthorised use and interference. Any required maintenance, defects or faults will be repaired immediately.

5.8. Control Measures for Refuelling

A **designated refuelling** area will be established for the project. This area will consist of an impermeable surface, situated well away from watercourses. Signage (such as that illustrated below) will be erected to indicate the location of the refuelling area and an oil spillage kit will also be at hand at this area. All fuel deliveries to site will be supervised by a designated individual.



Figure 11 - Example of a protected refuelling area on handstand with spill kit

When refuelling has to be carried out away from the designated area, it will be carried out by using a drip tray or other secondary containment solution to prevent oil from spilling onto the ground. Where mobile refuelling is necessary, all bowsers will carry an emergency spill kit. All oil containers (including mobile bowsers) will be returned to the designated storage area after use.

5.9. Appointed Persons for Refuelling

A dedicated person(s) will be appointed and trained for the purpose of refuelling on site.

An “appointed persons” poster such as that shown below will be completed and displayed on site.

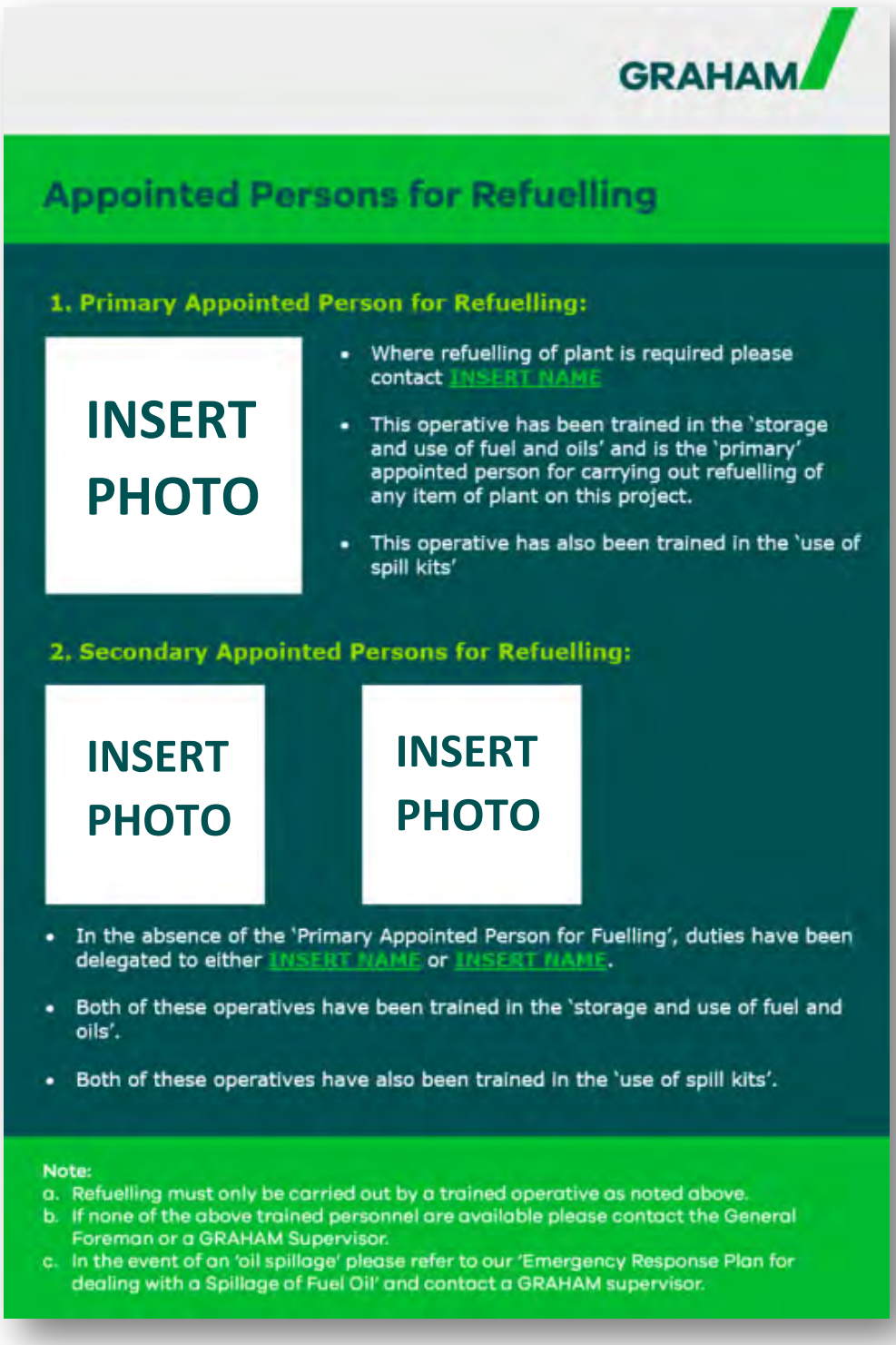


Figure 12 - Poster template (Appointed persons for refuelling)

5.10. Control measures for Discharging Water

- We will minimise the amount of waste water which needs to be discharged and find alternative means of disposal where possible.
- Any temporary stockpiling of materials will be prevented from eroding by rain water or surface water runoff.
- Water containing silt, or any other contaminating material will not be released directly to a watercourse of surface water drain. Treatment facilities, such as sediment traps will be used as appropriate, before water is discharged. These facilities will be regularly inspected and maintained. A full record will be kept of inspection, maintenance and measures employed to sustain performance.
- All site discharges will be of a quality, by a method and at a location acceptable to the regulator. This will be agreed (via written consent) in advance of works commencing on site.
- Prior to any discharge into a sewer, a Trade Effluent Consent will be obtained from the local Water Company
- A “permit to pump/ discharge” will be used to ensure that personnel discharging water are fully aware of the requirements.
- Where applicable, a Water Quality Monitoring Plan will be drawn up prior to construction commencing. This will detail the requirements and frequency of water quality sampling because of construction activities and will specify the parameters to be achieved relevant to the water quality objectives at the receiving site.

5.11. Control measures for Abstracting Water from Excavations

- The removal of water from an excavation is a high-risk activity.
- Prior to excavation below the water table, including site de-watering, we will inform the regulator and Water Company of the works to be conducted. Any de-watering, groundwater lowering and disposal measures will be agreed in advance with the regulator and if necessary, an Abstraction Licence obtained.
- A “permit to pump/ discharge” will be used for any abstraction activities
- A small sump will be dug in the excavation for the head of the pump. This will be surrounded by a perforate pipe and a suitable grade of clean stone.

5.12. Control measures for Drainage

Drainage systems can act as a pathway to spread pollutants. Drains can also make pollution invisible, so it is important to know where drains are located and where they lead in order to prevent polluting materials entering drains.

- All existing drainage on site (e.g. surface water, foul sewer) will be identified and a “drainage plan” will be made available
- All drain covers and gullies will be clearly marked to identify them (Recommendation is red for foul, blue for surface water)
- If any pollution enters a drain, the site spill response team will immediately stop the pollution with a physical block, stop the activity causing the pollution, then notify the Environmental Manager.

5.13. Control measures for Flood Protection

- A member of the site team will be designated with the responsibility for monitoring weather warnings and flood warnings.
- In the event of a storm being detected (and where it is likely to impact during the construction period), the designated site team member will inform management staff and procedures will be put in place to secure the site and evacuate the area.

5.14. Water Efficiency

A practical system will be put in place to minimise use of mains water during the construction process. Mains water consumption from the site offices and operations will be measured and monitored monthly with action for reduction of consumption implemented.

Water efficiency techniques employed on site will include the following actions (where relevant and feasible):

- Daily Visual Inspection for leaking pipes / taps / valves.

An unfixed leak can be the most significant water use on site. Leaks can come from damaged washers in taps, worn valves and corroded or damaged pipework.

- Fit Trigger Guns to Hoses

Hoses left running when not in use waste a lot of water in a short time. Fit robust trigger guns to hoses so that flow can be controlled at the point of use.

- Closed Loop Wheel Wash

A closed loop wheel wash reuses the water for the process. Waterless systems are another innovative option that use angled steel grids to clean debris from tyres.

- Dust Suppression

Most suppression techniques are very water inefficient. A fan misting system is a main fed electrically powered efficient alternative

- Washing Out Concrete Wagon Chutes

Mains pressure hoses with basic spray patterns are water inefficient. Use a high-pressure low volume efficient spray pattern to reduce water use. Wash out water can be re-used at concrete batching plants

- Commissioning Water Use

High volumes of water are used during building services commissioning and testing. Plan for these activities considering water recirculating and minimisation.

- Rainwater Harvesting

Where possible, rainwater will be harvested from the roofs of the site accommodation, to feed boot wash; or used to fill the water bottle of power saws and other similar power tools for dust suppression.

- Low flush toilets

Utilising a low flush toilet uses significantly less water than a full-flush toilet. Single or dual flush models are available.

- Taps of the aerated mixer type with flow restrictors

Tap aerators are water saving devices that control the amount of water that flows through the tap without affecting the water pressure as they mix the water with air.

SECTION 6.0 Dust and Air Quality Management Plan

Guidance Notes:

This section contains details of the steps required in order to ensure best practice with regard to the protection of air quality and dust prevention

6.1 Dust and Air Quality Issues

6.2 Site Conditions

6.3 Monitoring Protocols

6.4 Records of details and action taken in response to exceptional incidents or dust-causing episodes

6.5 Dust and Air Pollution Mitigation Measures

6.6 Highway Condition Surveys

6.7 NRMM Compliance

6.1. Dust and Air Quality Issues

Dust and air pollution, including odors, can cause nuisance affecting properties. In addition, there are statutory objectives in relation to nitrogen dioxide (NO2) and fine particulate matter (PM10) which have known health impacts.

Section 79 of the Environmental Protection Act 1990 defines several factors relating to dust and air pollution which constitute a statutory nuisance. This includes:

- Smoke emitted from premises so as to be prejudicial to health or a nuisance
- Fumes or gases emitted from premises so as to be prejudicial to health or a nuisance
- Any dust, steam, smell or other effluvia arising on industrial, trade or business premise and being prejudicial to health or a nuisance
- Any accumulation or deposit which is prejudicial to health or a nuisance

Our objective is to carry out the works in such a way that emissions of dust and other air pollutants including odour are limited and to use the best practicable means to avoid the creation of nuisance.

6.2. Site Conditions

Summary of work activities that may give rise to dust and air pollution

- Demolition
- Excavations and earthworks
- Construction plant and vehicles
- Transportation and storage of materials
- Operation of the construction site or undertaking construction activities which results in odours being generated from, for example, smoke, fumes or gases

Results from the Construction Dust Assessment indicate there will be a large dust emission magnitude from the above work activities

Summary of receptors relevant to the works

Receptors include residential housing to the west and south, student accommodation to the north and east, Manchester High School for Girls and several religious buildings, including South Manchester Synagogue and Holy Innocents' Church.

Results from the Construction Dust Assessment indicated there is a high sensitivity to the receptors from all the above work activities

6.3. Monitoring Protocols

The inspection and monitoring procedures to be implemented to monitor the effectiveness of measures to prevent dust and air pollutant emissions and to avoid detrimental effects on the health of workers or nuisance to sensitive receptors due to exposure to dust and air pollution are as follows:

- Daily inspection of areas adjacent to the construction site to monitor any dust and air pollution which may be generated despite the use of best practicable means to prevent dust and air quality emissions. This will include dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the site boundary
- Daily inspection of construction vehicles, plant and machinery.
- Daily inspection of the level of trafficking, use and condition of access routes to site.

Should inspections show a nuisance arising, work will be stopped until prevention and remediation measures are implemented.

6.4. Records of details and action taken in response to exceptional incidents or dust-causing episodes

Records will be made within the site diary where action was taken in response to exceptional incidents or dust-causing episodes.

Full details of any complaints in relation to dust will be recorded by the Site Management Team on Onos.

6.5. Dust and Air Pollution Mitigation Measures

GENERAL

- The GRAHAM Site Management Team will use best practicable means to prevent nuisance as a result of dust through design and different work methods
- Scheme has been divided into two halves construction to the north and demolition from the south to ease traffic entering from one gate and exiting from one gate. [see demolition plan]
- Site operatives will receive training as part of site induction, toolbox talks and through communication of relevant environmental risk assessments and method statements
- The site will be laid out such that machinery and dust-causing activities will be located away from sensitive receptors, were reasonably practicable
- Hoardings and other barriers will be erected along the site boundary, to mitigate the spread of dust to any sensitive buildings or other environmental receptors

DEMOLITION STAGE

- Appropriate handling and storage of materials, especially stockpiled materials.
- Covering materials stockpiles, deliveries or loads entering and leaving the construction site for the purposes of preventing materials and dust spillage.
- Stockpiles and mounds will be maintained to avoid material slippage.
- Material processing areas will be located centrally within sites, to maximize distance to sensitive receptors.
- Materials stockpiles likely to generate dust should be enclosed or securely sheeted, kept watered or stabilized as appropriate.
- Use of wheel washing, limiting vehicle speeds to 5 mph, avoidance of unnecessary idling of engines and routing of Site traffic as far from residential, educational and commercial properties as possible.
- Demolition stage site entrance will be Mossley Road to avoid congestion with construction traffic access from Wilmslow Road all site entrances have guard huts with Traffic management lights fitted on green as priority to get construction vehicles off highway and Red to release vehicles when highway is safe to do so
- Fit all equipment (e.g. for cutting, grinding, crushing) with dust control measures such as water sprays wherever possible.

CONSTRUCTION PLANT AND VEHICLES

- Construction plant will be operated in accordance with the manufacturer's written recommendations
- All vehicles and plant will be switched off when not in use – NO IDLING
- Vehicle and construction plant exhausts will be directed away from the ground where possible and be positioned at a height to facilitate appropriate dispersal of exhaust emissions
- Enclosing, shielding or provision of filters on plant likely to generate excessive quantities of dust beyond the site boundaries will be employed
- The movement of construction traffic around the site will be kept to the minimum reasonable for the effective and efficient operation of the site and construction of the Project
- Construction plant will be located away from site boundaries which are close to sensitive receptors where reasonable and practicable

- We will avoid use of diesel- or petrol-powered generators by using mains electricity or battery powered equipment where reasonable and practicable
- We will keep vehicle, plant and equipment maintenance records on site, and these will be made available to the Employer's Representative upon request

TRAFFIC/ ACCESS ROUTES

- On-site parking will be designated for staff and [visitors by appointment]
- Inspection of vehicle movement area site conditions will be undertaken by the Site Manager
- Delivery drivers will be made aware of site restrictions [delivery drivers induction sent to supplier chain and booking in system]
- Vehicle speeds will be restricted to 10m/h to prevent high levels of dust being released
- Vehicles either delivering or removing material from Site, which have a dust potential, will be covered with tarpaulin or the like to minimise the release of dust
- The site access and egress routes are controlled by Traffic light system and traffic marshals to release construction vehicles onto the highway

TRAFFIC IMPACTS ON PUBLIC ROADS

- Vehicle wheel washing facilities will be provided and there will be a road sweeper on hand at the site to clear up any material deposited on the public highway by vehicles accessing/egressing the site and site compounds.
- Public roads outside of the site will be regularly inspected for cleanliness and cleaned as necessary
- Site Management will liaise with relevant authorities regarding any road or lane closures
- Delivery drivers to adhere to public road restrictions. [Delivery drivers/supply chain inductions]
- Neighbours will be advised of unusual traffic movements (e.g., concrete wagons for continuous large concrete pours/ abnormal loads etc.) round robin communications to neighbours if concrete pours are going to over run

6.6. Highway Condition Surveys

Prior to the commencement of the demolition works, an updated photographic survey of the conditions of the highways surrounding the site will be completed, including but not limited to affected areas on Chancellors Way, Gunnery Lane, Wilmslow Road, Moseley Road, Old Hall Lane, and Whitworth Lane. The survey shall then be repeated monthly by SMT to ensure the roads are unaffected by the demolition works. Should the highways be deemed to be negatively impacted because of the demolition work, the contractor will remedy the identified defects as soon as practicable. Upon completion of the demolition works, the contractor will undertake a photographic survey to ensure any identified defects attributable to the demolition works have been resolved, and that the highways have been left in a satisfactory condition.

Note: A copy of the recent Dilapidation Survey supporting the Demolition Environmental Management Plan for Phases 2 & 3 (undertaken 25-01-2025) can be accessed via the following link:

https://download.4projects.com?LinkID=0ebfc3d5-c289-4cb9-b4e8-394791664297

Demolition Access & Egress Plan



Version No: 7.0
Date Published: 14/10/2024

SECTION 7.0 Noise and Vibration Management Plan

Guidance Notes:

Details of control measures in respect of noise and vibration are contained within this section.

7.1 Noise and Vibration Issues
7.2 Site Conditions
7.3 Noise Control Measures (General)
7.4 Operating Hours
7.5 Establishment of Baseline Conditions
7.6 Noise Monitoring Plan
7.7 Liaison with the Local Community during the Contract
7.8 Establishment of Working Relationship with the Local Authority
7.9 Section 61 of the Control of Pollution Act (COPA), 1974
7.10 Programming of Works
7.11 Distancing from Sensitive Receptors
7.12 Plant and Equipment
7.13 Traffic Noise during Construction
7.14 Noise Screening
7.15 Vibration

7.1. Noise and Vibration Issues

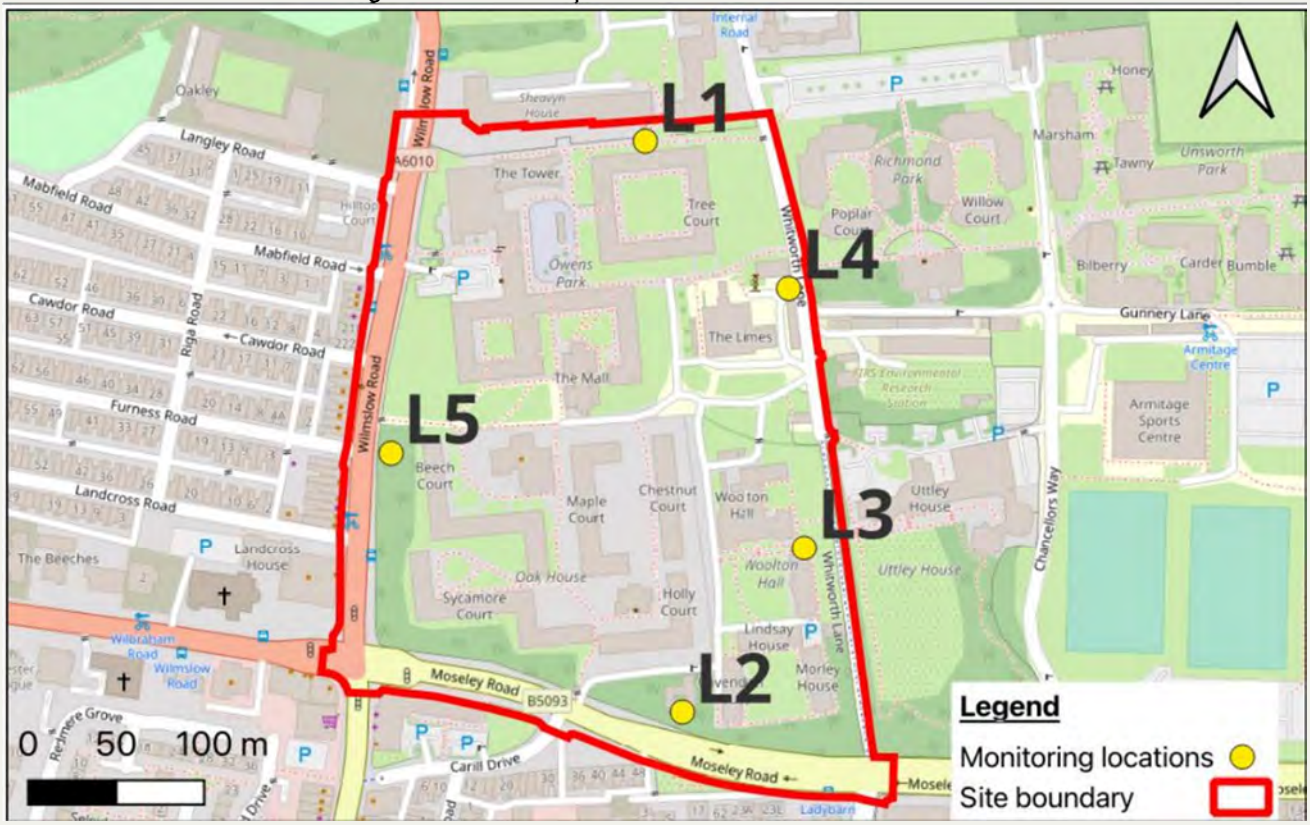
Excessive noise and vibration on site not only represent a major hazard to site workers but it can also annoy neighbours and in some cases disturb adjacent wildlife. Best practice will therefore be implemented in order to minimise noise and vibration and comply with the contents and recommendations of the "Code of Practice for Noise Control on Construction and Open sites" (BS5228-1: 2009+A1:2014).

7.2. Site Conditions

Details of baseline surveys

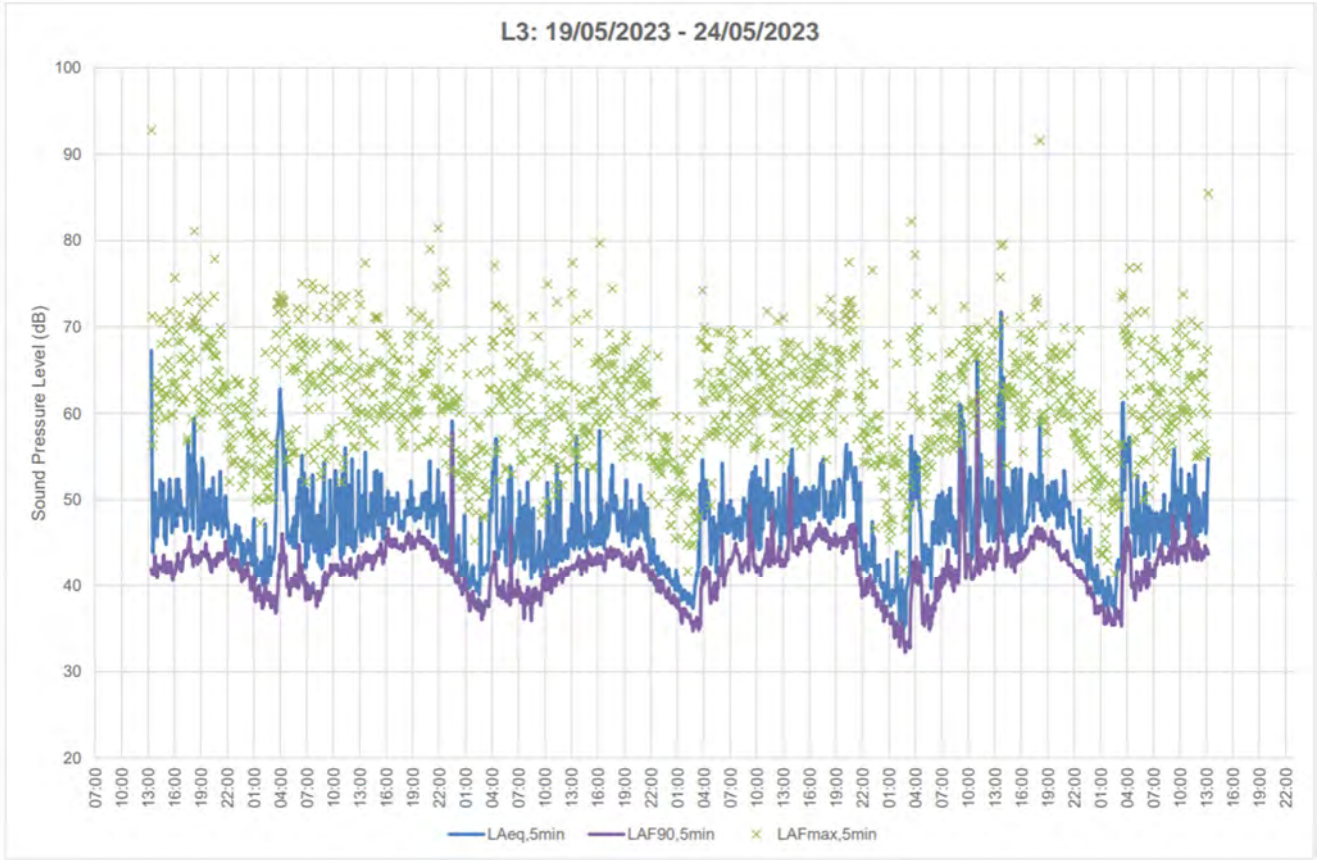
- Baseline noise surveys were undertaken between Friday 19th and Wednesday 24th May 2023

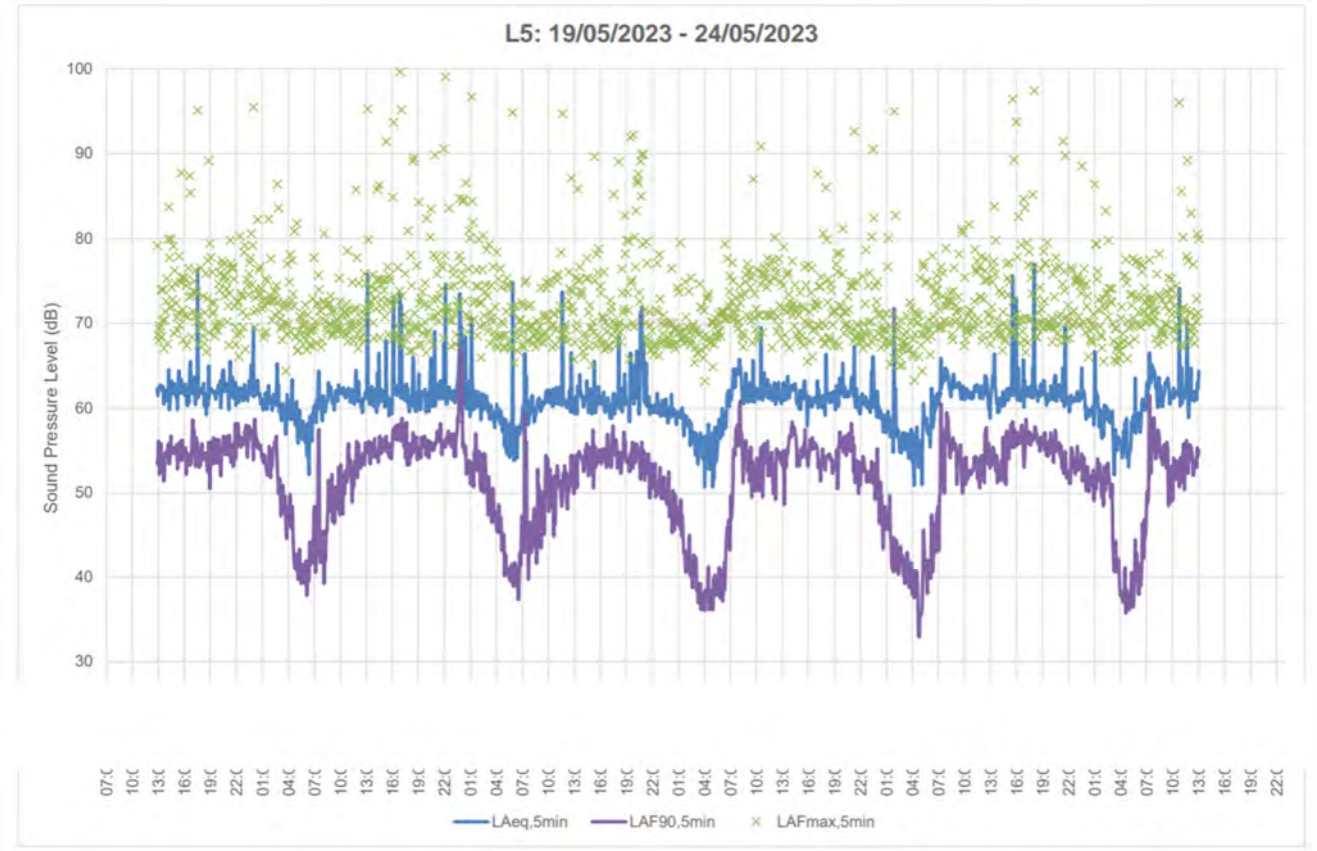
- The noise monitoring locations are presented below



- L2, L3 and L5 were continuous unattended monitoring
- L1 was a short-term attended noise monitoring during the morning of Friday 19th May 2023.
- L4 was found to be dominated by noise from local fixed plant, which is to be removed as part of the works, and therefore was not used to measure noise levels
- During the noise survey, it was observed that the noise dominated by road traffic noise, with the A6010 Wilmslow Road dominant on the north and west sides of the site, the B5093 Mosely Road at the south of the site, and contributions from both roads at the east of the site. Other noise sources noted included occasional aircraft overhead and fixed plant noise.

- The results of the baseline noise measurements are presented below


L3: 19/05/2023 - 24/05/2023
Sound Pressure Level (dB)
100
90
80
70
60
50
40
30
20
LAeq,5min
LAF90,5min
LAFmax,5min


L5: 19/05/2023 - 24/05/2023
Sound Pressure Level (dB)
100
90
80
70
60
50
40
30
LAeq,5min
LAF90,5min
LAFmax,5min

Details of noise and vibration receptors

- The site has existing residential accommodation in proximity to the boundary on all sides, both private dwellings and student residences.

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

Details of possible noise and vibration impacts and assessment

The Main Noise and Vibration sources relevant to the works are:

- Building soft strip
- Demolition of building and foundations
- Crushing of arisings
- Filling of voids and site levelling
- Construction Noise
- Construction Traffic Noise
- Construction Vibration

According to baseline noise survey the Noise effects during demolition are likely to result in significant adverse effects at the closet receptors to the site

7.3. Noise Control Measures (General)

No part of the works will be carried out in such a manner as to cause unnecessary noise except in cases of an emergency when the work is absolutely necessary for the saving of life or property or the safety of the works.

All operatives will receive training and advice on noise minimisation and general good site practice through site-specific training and briefings.

7.4. Operating Hours

The working hours on this project are restricted to:

08.30-18.00 Mon- Fri and

08.00-13.00 Saturday

No working on Sundays or Bank Holidays

These hours are set out within planning requirements and will be strictly adhered to.

Prior agreement will be sought from both the Local Authority and the client if occasions arise where it is necessary to work beyond these times.

Working hours and contact details will be displayed on external site hoarding using the environmental noise information poster.

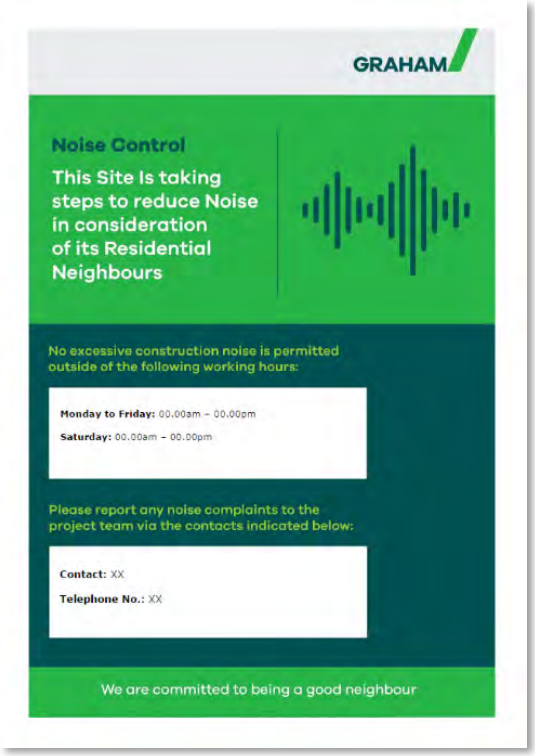


Figure 13 - Noise Control Poster

7.5. Establishment of Baseline Conditions

Prior to work commencing the site team will ensure that baseline noise measurements have been taken in order to understand the dominant noise sources and extent in the vicinity of the site area. The location of key noise and vibration sensitive residential receptors will also be identified.

7.6. Noise Monitoring Plan

A Noise Monitoring Plan has been drawn up prior to construction commencing and is provided in Appendix A of this CEMP. This plan provides details of the predicted noise levels as a result of construction activities and advises of the typical noise levels for construction plant intended to be used. These are set against appropriate construction noise impact criteria. Anticipated noise monitoring positions will also be set out.

Mitigation measures will be undertaken if the results of noise monitoring indicate that excessive noise impacts are arising from the activities associated with the works.

7.7. Liaison with the Local Community during the Contract

The effect of noise and vibration on nearby sensitive receptors will be minimised through a good communication strategy. Prior to works being undertaken, consultation with occupiers of sensitive

receptors that may be adversely affected by construction noise and vibration will be undertaken. We will provide information of construction works and notice of when high noise and/or vibration generating activities are taking place. It is intended that this will increase the tolerance of receptors and thus minimising adverse effects. All communications will contain contact details to direct any questions or complaints to.

7.8. Establishment of working relationship with the Local Authority

The site team will make contact with the local authority at the earliest opportunity. Agreement with the local authority will be sought on appropriate controls for undertaking significantly noisy works close to receptors.

7.9. Section 61 of the Control of Pollution Act (COPA), 1974

Consideration will be given to the merit in applying to the local authority for a section 61 prior consent. Section 61 is in effect an agreement between the developer and the local authority which allows a reasonable level of noise to occur. This offers protection from any subsequent action by the local authority under section 60 or 66 of COPA or under the Environmental Protection Act to impose further controls on noise from the site. It also allows the local authority to (a) Attach any conditions (b) Limit or qualify a consent to allow for any change in circumstances (c) Limit the duration of a consent. Any person who knowingly carries out the works, or permits the works to be carried out, in contravention of any conditions attached to the Prior Consent will be guilty of an offence.

7.10. Programming of Works

Information will be sought from the community concerning sensitive periods so works can be planned to occur outside these times.

7.11. Distancing from Sensitive Receptors

- Noisy work activities will be planned in order to maximise the distance from the noise source to sensitive receptors
- Work compounds will be laid out so that access and loading areas are located as far away from sensitive neighbours as practicably possible
- Shouting and raised voices will be kept to a minimum. The use of tannoys and radios will be prohibited within close proximity of sensitive residential receptors.

7.12. Plant and Equipment

- Modern installation techniques will be adopted that utilise high frequency pile drivers which significantly limit noise and vibration. Pile dampers will also be utilised where deemed necessary.
- Selection of equipment will be carried out with the objective of reducing noise and vibration wherever possible. Only equipment conforming to relevant national or international standards, directives and recommendations on noise and vibration emissions will be used
- Plant and equipment will be maintained and operated following manufacturer's instructions to run efficiently generating minimal noise
- Where possible plant producing less noise will be used
- Pneumatic tools will be fitted with silencers or mufflers
- Plant will be switched off when not in use
- Mobile compressors and generators will be fitted with appropriate silencers and/ or proprietary acoustic enclosures
- Plant and equipment supplied with acoustic enclosures will be operated with all panels closed
- Site staff will enforce a policy whereby all plant is shut down when not in use
- All stationary equipment with significant noise outfall will be sited to minimise noise nuisance to local residents

- As far as possible generation of power will be via a permanent power supply as opposed to generators
- Using electrically powered equipment run from the mains supply where available is preferred to using generators to power plant and equipment
- Care will be taken when erecting or striking scaffolds to avoid impact noise from banging steel. Scaffold deliveries will be programmed to arrive during normal working hours only.
- Crane spindles, pulley wheels, telescopic sections and moving parts of mobile working platforms will be adequately lubricated in order to prevent undue screeching.

7.13. Traffic Noise during Construction

- Delivery vehicles will, where reasonably practicable, be fitted with effective exhaust silencers and will be maintained in good working order and operated in a manner such that noise emissions are controlled and limited as far as reasonably practicable
- Time slots will be adopted for deliveries to ensure that convoys of vehicles do not arrive simultaneously and to avoid unnecessary idling on-site
- Strict controls will be implemented to prevent temporary parking on kerbside in the vicinity of noise sensitive receptors near the site
- Sufficient clear signage will be utilised to ensure that demolition and construction vehicles use only designated routes.
- Care will be taken when unloading vehicles to minimise noise

7.14. Noise Screening

Where appropriate, screenings will be utilised in order to reduce noise levels between the source and the receiver. Materials used for screening may include earth bunds, existing buildings, site security hoarding or purpose-built noise screens. Holes/ openings in the screen material will be kept to a strict minimum and the density of the material will also be given due consideration in order to be as effective as possible.

7.15. Vibration

The projects “Environmental Risk and Opportunities Register” has concluded the vibration risk upon site wide elements such as, underground utilities, buildings and related structures surrounding the works is not significant with a minor adverse effect and therefore protection from damage is deemed not required at this stage.

Should operations or activities on site change or inform of such a like / potential risk, then the activities will be re-assed with appropriate measures put in place as deemed to be required.

A copy of the projects “Environmental Risk and Opportunities Register” along with the outputs of the references Environmental Statement can be found in Appendix B and Appendix C respectively.

SECTION 8.0 Energy and Carbon: Management and Reduction Plan

Guidance Notes:

This section contains details of company policy on energy management and how energy efficiency is incorporated within site operations.

8.1 Energy and Carbon Issues
8.2 Climate Action Targets
8.3 Site Context
8.4 Decarbonising Roles and Responsibilities
8.5 Decarbonising Activities
8.6 Communication, Campaigning and Training
8.7 Measurement and Reporting
8.8 Carbon Offsetting
8.9 Nature Based Solutions

8.1 Energy and Carbon Issues

GRAHAM are at the forefront of action on the climate emergency and to demonstrate our commitment we are signatories to “Contractors Declare”, the “Pledge to Net Zero” and BITC’s “Climate Action Pledge”. We are also a “Business champion” within the Construct Zero framework and have established science-based targets through the Science Based Targets Initiative. We recognise that climate change is one of the most serious environmental challenges currently threatening the global community. We understand the need to minimise greenhouse gas emissions produced because of fossil fuel consumption and acknowledge our role in tackling these issues.

This Energy and Carbon Management and Reduction Plan (ECMRP) outlines the GRAHAM targets and strategy for energy and carbon reduction and defines the steps that the Project will take to contribute to these outcomes by specifying key actions. These actions include specific technical interventions leading directly to emissions reduction as well as management, policy and enabling actions. The ECMRP is intended to provide a practical and formal basis for implementing carbon emission reduction throughout project delivery.

The objectives of the ECMRP on a site-specific basis are to:

- Implement practices so that, over the short to medium-term, carbon emissions become one of the issues that are automatically considered in regular decision making across the full scope of site works.
- To undertake a series of interventions that will lead directly to measurable emissions reductions.

Implementing low-carbon initiatives on site is expected to achieve social, economic and environmental benefits.

8.2 Climate Action Targets

The key Climate Action target that GRAHAM have set is as follows:

Achieve Net Zero by 2030 (direct emissions) &

Achieve Net zero by 2040 (full value chain)

- The GRAHAM Project Specific carbon reduction target (A5) is measured on Onos in tCO2e/£1M

The GRAHAM whole life or embodied carbon target is agreed following an initial whole life carbon workshop and detailed within the project Carbon Data Tracker

Through implementing the ECMRP on the Project we intend to:

- Reduce carbon emissions
- Improve energy efficiency in work practices
- Reduce water consumption
- Reduce waste, increase recycling and reduce the volume of waste sent to landfill
- Promote and enable environmentally sound transport and travel practices
- Maximise fuel efficiency and minimise as far as practicable carbon emissions from all plant and equipment
- Run an energy efficiency programme through our Anti Idling initiative, “Don’t be Fuelish”
- Identify opportunities for using energy derived from renewable resources where practicable
- Promote energy awareness amongst staff, encouraging and enabling good environmental practice

8.3 Site Context

- The project will support the clients 'zero carbon future' utilising an off-site form of modern construction that, collectively, will drive quality, air tightness and waste and carbon reduction.
- The project will maximise the use of on-site renewables and developed a highly efficient low energy project that has taken cognisance of our responsibilities towards future climate change
- Carbon reduction actions will be explored within the Environmental Sustainability Action Plan (PF10-PR10-43-F037).

8.4 Decarbonising Roles and Responsibilities

Key roles within the GRAHAM central team to support decarbonisation activities are detailed below:

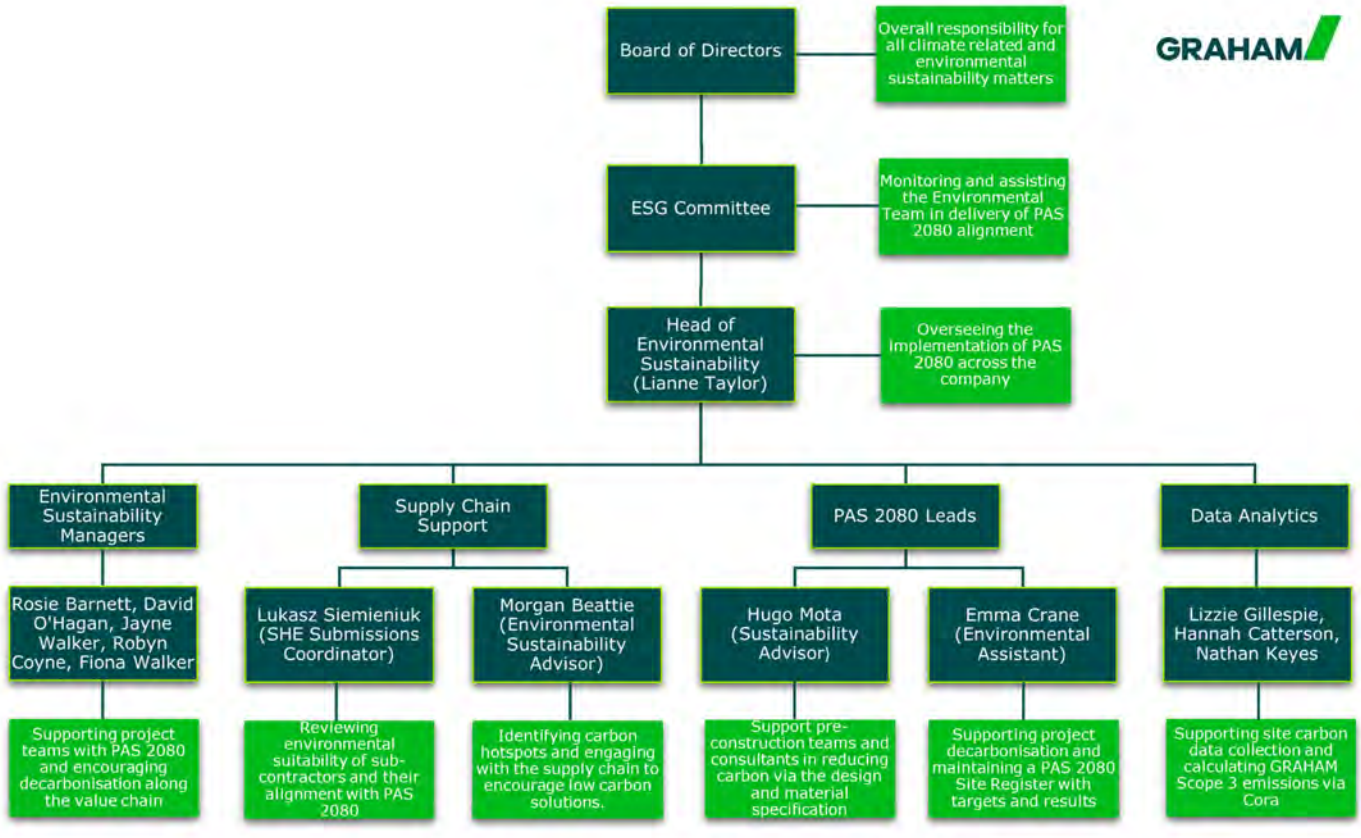


Figure 1: Strategic roles to support decarbonisation

Specific project-based roles and responsibilities are outlined below.

Stakeholder	Responsibility
GRAHAM Bid Team	Initiate discussion with Client representative to determine if alternative solutions can be provided.
GRAHAM Design Team	Responsible for coordinating the development of designs that minimise carbon emissions and ensure that all potential carbon reduction opportunities are identified, captured and optimised, where possible within the parameters of the project.
GRAHAM Environmental Sustainability Team	Collaborate with project team, design team, supply chain and other stakeholders to identify, and prioritise low carbon solutions. Communicate lessons learned, experience and best practice with regards to low carbon materials and energy used on site. The Environmental Sustainability team are also responsible for co-ordinating carbon assessments, setting targets and advising site teams of the carbon data capture requirements.
GRAHAM Commercial & Estimation	Ensure that appropriate allowances are made for carbon mitigation measures within pricing and contract management. Support the production of the carbon assessment by providing relevant data to inform low carbon opportunities. Collaborate with GRAHAM project team, supply chain & designers to ensure proposed solutions are costed correctly and communicated to client.
GRAHAM Building Service Engineering	Collaborate with GRAHAM internal team and external (Supply chain & designers) to review energy strategies and propose alternatives which offer operational energy savings.
GRAHAM Site Management Team	Responsible for supporting on-site carbon reduction solutions and collaborating with the Environmental Champion and Environmental Team to capture and provide carbon data.
Site Environmental Champion	The Site Environmental Champion will ensure that information regarding the ECMRP, its aims and successes are regularly communicated to all personnel involved in the project. The Site Environmental Champion will gather relevant data for measuring and monitoring the carbon impacts of the project. This may include: **Embodied Carbon:** Material delivery information (as per specification), details of material quantities and photographic evidence of installation on site. **A4-A5 Site Carbon:** GRAHAM fuel delivery notes and Subcontractor fuel delivery notes to be captured and data uploaded to Onos. GRAHAM waste and Subcontractor waste data to be uploaded to Onos. Transport Mileage data will be obtained either digitally via biometric systems or via manual recording of data. The Site Environmental Champion will record and display monthly measurements of site energy usage and display graphical analysis of carbon emissions on site noticeboards of how consumption over the project duration compares to the targets.
External Design Teams & Consultants	Collaborate with GRAHAM internal team providing technical advice on proposed solutions.
Supply Chain	Collaborate with GRAHAM internal team providing technical advice, costings, availability and experience. Provide low-carbon solutions throughout the project timeline as discussed via workshops.

8.5 Decarbonising Activities

In order to achieve our internal target of Net Zero by 2030, collaboration across the value chain is required. GRAHAM carbon mitigation strategies are outlined in the table below:

Project Opportunities	Carbon Reduction Strategies
Design	• We will prioritise the specification of low carbon or net zero products for use where viable
Procurement	• We acknowledge that supporting our supply chain plays a key role in achieving our carbon targets. We recognise that we must promote, challenge and support supply chain partners in adopting low-carbon solutions • We will undertake a periodic review of our supply chain partners to identify and prioritise those with highest material carbon impact • Information including Climate Action Strategy, Organisational Emissions and Targets will be collected via a Supply Chain Evaluation Questionnaire (SEQ) • We will assess the selection of suppliers on their ability to deliver low-carbon solutions and encourage the integration of low-carbon solutions into their tender responses • Prior to supplier selection we will engage with the supply chain at the Sub-Contract Negotiation Meeting. The '*GRAHAM Environmental Sustainability Requirements for our Supply Chain*' will be issued to promote low-carbon solutions, communicate our carbon targets and the role the supply chain has in achieving these carbon targets • Periodically we will host Supply Chain Briefings to reaffirm our carbon targets and our commitment to low carbon solutions. This forum allows a round table discussion on how low-carbon techniques or products can supported across our projects • In partnership with the Supply Chain Sustainability School we will offer an Environmental Sustainability Learning Pathway to upskill our supply chain capability to develop their low carbon skills
Low Carbon Plant and Equipment	• Telematics will be utilised to monitor the performance of machinery and plant to ensure that it is effective and efficient in maximising productivity and reducing carbon • Due consideration will be given to energy efficiency and emissions when plant and vehicles are researched for potential use on site. We will continue to work with plant manufacturers and trial available electric, hybrid and hydrogen plant as the technology evolves and comes to market. • We will explore the viability of alternative sources of energy including fuel cell modules and HVO biofuels which are compatible with existing diesel engines and equipment • All plant and vehicles will be serviced at designated intervals, so they run efficiently, reducing carbon emissions. Where subcontracted or hired plant and vehicles are utilised on our sites, evidence of testing, inspection, and regular maintenance is required prior to any permitted use on site • Anti idling material - posters, toolbox talks, performance data will be regularly refreshed to minimise idling on GRAHAM sites.
Low Carbon Site Compound	• Welfare accommodation will be required to meet the GRAHAM eco specification standard to include energy saving devices and technologies • On site renewable energy solutions for site accommodation will be implemented where feasible • GRAHAM have partnered with energy management broker Sustainable Advantage to assist sites in procuring electricity/ gas. By operating through a broker we can ensure that sites/ offices utilise 100% REGO backed renewable electricity.

Project Opportunities	Carbon Reduction Strategies
	• Where feasible we will install Electric Vehicle charging infrastructure within site compound areas
Green Transport	• We recognise that the travel associated with our business has a direct impact on the environment, particularly through vehicle emissions, fuel consumption and our impact on local congestion. We are committed to reducing the need for unnecessary business travel and encouraging the uptake of more sustainable transport across our operations • The specific Green Travel practices which will be implemented on site are as follows: • The Carbon Trusts eco driving training will be mandatory training for high mileage drivers • Promote the Green Travel policy initiatives - Raise awareness on site of the need to reduce transport emissions • Consider the location of meetings to minimise travel distances and promote the use of video conferencing and tele-conferencing to replace some work trips • Encourage car sharing and the use of work vans & minibuses to minimise collective distances travelled • Encourage sub-contractors to use work vans & minibuses to travel to site to minimise collective distances travelled
Managing Behaviours	• Energy awareness will be encouraged amongst employees through energy saving posters and training • Energy usage will be monitored against agreed targets • Energy Audits will be regularly conducted by the SHE team, with opportunities for improvement implemented • Subcontractors and suppliers will be encouraged to adopt energy efficient systems of work in their operations • All staff and subcontractors will be reminded that appliances must be switched off when not in use

8.6 Communication, Campaigning and Training

Communication Strategy

- In order to ensure the success of the ECMRP it is essential that all relevant parties are kept informed as to how they can contribute to reaching the emissions reduction targets as well as communicating success stories on what has already been achieved. The table below outlines the proposed communication strategy.
- The objective of the Communication Strategy is to promote energy awareness, to encourage a low carbon culture and to disseminate information on the ECMRP and performance against emission targets.

Method	Description	Target	Involvement
Site Induction	Verbal instruction given at Site Induction	Site Operatives, Site Visitors	Site Manager
Posters, Resource Management Summary, Advice Notes	Printed material for distribution on site and displayed on notice boards in site compound and offices.	Site Operatives, Site Visitors	Site/ Project Manager, Environmental Manager/ Advisor and SHE Team members

Challenging the Value Chain for Low-Carbon Solutions

In order to encourage communication across the supply chain, we will continue to challenge our clients, designers and suppliers to provide low-carbon solutions throughout the project timeline via workshops.

Carbon Training

Carbon training will be provided to all GRAHAM staff and suppliers in line with section 1.10 of this CEMP and the GRAHAM Environmental Training Matrix, version 6.

8.7 Measurement and Reporting

As per the project lifecycle stages defined in PAS 2080 below, project carbon emissions will be assessed as follows:

Product Stage			Construction Process Stage		Use Stage							End-of-Life Stage				Benefits and loads beyond the system boundary		
Raw material supply	Transport	Manufacturing	Transport to building site	Installation into building	Use/application	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/demoliti	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D

Construction Emissions (A5)

We have invested in and improved the mechanism for monitoring energy and carbon in order to streamline and improve the visibility of the information for sites and all interested parties, including clients.

Emissions data relating to construction impacts (A4 & A5) will be uploaded to Onos on a monthly basis, including upstream transport, electricity, fuel, water and waste. The software will be used to convert the data into tCO2e by applying an appropriate emission factor as determined by UK Government conversion factors and checked annually.

A5 data sources will include: Electricity usage, both renewable and non-renewable; Fuel, including gas oil, HVO and diesel using fuel receipts from fuel deliveries; Water consumption, including grey water will be measured using meter readings; Waste will be measured through waste transfer notes and the percentage recycled will be confirmed using recycling reports from waste broker portals. A4 data will be collected from upstream transport relating to material deliveries and will be recorded on Onos. It will be ensured that all A4-A5 carbon emissions on this project are accounted for.

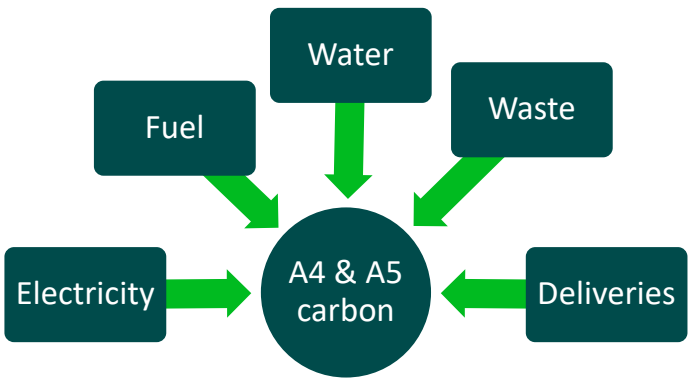


Figure 15: Contributors to site carbon emissions

Life Cycle Emissions

The Lifecycle assessment process for the project will be assessed in line with BS 15978:2011 and the RICS Professional Statement: Whole Life Carbon assessment for the built environment (2nd edition), where required for PAS 2080 alignment.

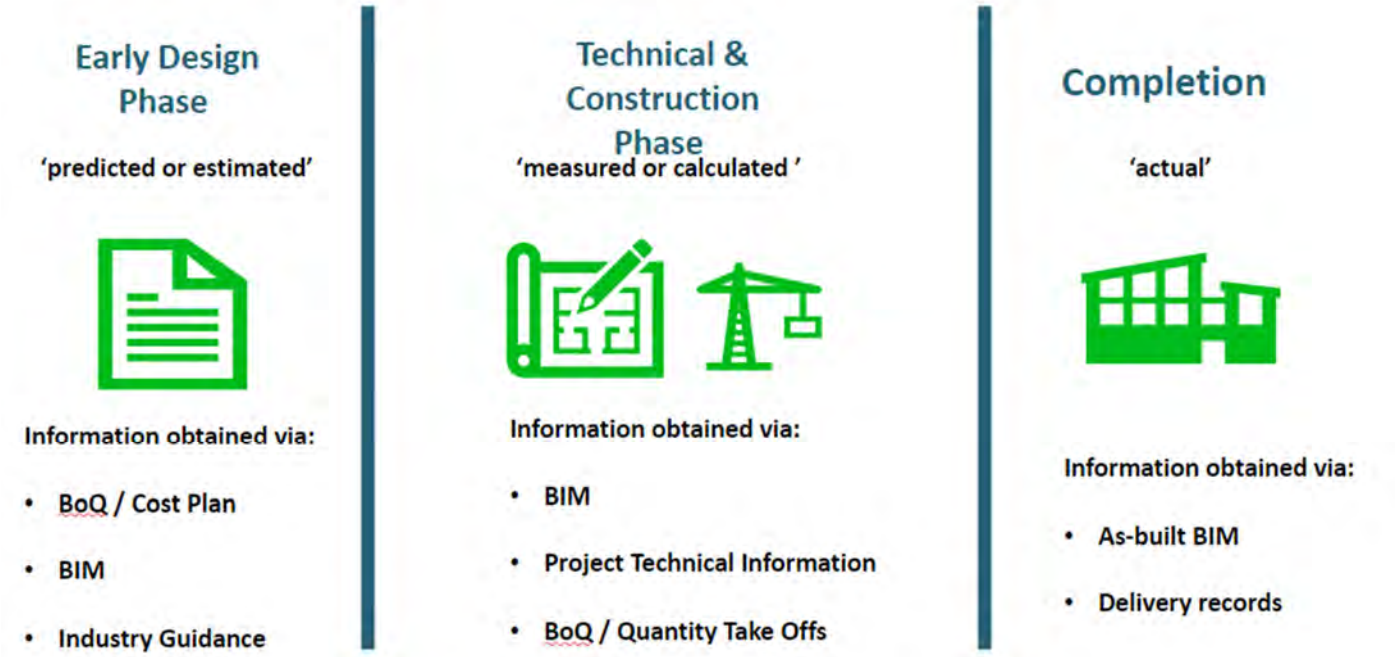
In all instances the lifecycle assessment scope and system boundaries will be defined and set out within the project carbon tracker (PF10-PR10-43-F039).

It is acknowledged that the stage within which GRAHAM have been engaged/ involved in the project will impact on the effectiveness of LCA data and our ability to influence carbon reduction.

Whole life carbon on this project will be assessed by Buro Happold using One Click LCA software.

Collecting and Processing WLC Emissions

Data will be gathered at key project stages from various sources including:



In all instances the data will be collated using reliable and auditable sources.

At each project stage calculated carbon emissions will be compared to the project target to track progress and inform future assessments. The final material quantities will be used to calculate the as-built WLC assessment.

We will ensure due diligence in verifying the accuracy of reported emissions. A Carbon Data Verification Checklist (below) will be maintained at each stage of the assessment

Verifying WLC Data

It is necessary to verify the accuracy of reported emissions for PAS 2080 aligned projects, and therefore regular submission of the Carbon Data Verification Checklist will be required. The submission schedule should be adaptable based on the requirements of the task and the data collected will be processed as described above. The quantities must be confirmed by the responsible person for these materials.

During the pre-construction stage:

- The quantities and specification of materials will be based on the information provided by the design consultants and Bill of Quantities.
- Transportation distances will be based on assumptions which align with the RICS methodology for A5.

During the construction stage:

- The evidence of quantities and specification of materials shall be as per the table below. A periodic review of the data will be carried out against the Bill of quantities to ensure that the data aligns.
- The transportation distances must be recorded to ensure accuracy of A4 (Transport) emissions.
- This information will be provided to allow sufficient time for review before submission, according to the submission schedule.

Emissions from Site Activities

	Evidence	Responsible Party	Responsible Person
Fuel	Delivery Note / Invoice / ONOS	Environmental Champion	TBC
Water	Meter Readings / ONOS	Environmental Champion	TBC
Electricity	Meter Readings / ONOS	Environmental Champion	TBC
Waste	Waste Transfer Notes / Waste Reports from Broker / ONOS	Environmental Champion	TBC

Other Project-Related Data

	Evidence	Responsible Party	Responsible Person
Business Mileage	Telematics from Plant	Works Manager	TBC
Commuting	Biometric Systems	Biometric System	TBC
Transportation	GRN Register	Procurement Manager	TBC
Project Monthly Spend	Provided by Quantity Surveyor	Quantity Surveyor	TBC

Building Material Quantities

Building Category (RICS)	Evidence	Responsible Party	Responsible Person
Demolition			
0.1 Toxic/hazardous/contaminated material treatment	N/A	Subcontractor	TBC
0.2 Major demolition works	N/A	Subcontractor	TBC
0 Facilitating works			

0.3 and 0.5 Temporary/enabling works	N/A	Subcontractor	TBC
0.4 Specialist groundworks	N/A	Subcontractor	TBC

1 Substructure

1.1 Substructure	Delivery Note or Invoice	Subcontractor	TBC

2 Superstructure

2.1 Frame	Delivery Note or Invoice	Subcontractor	TBC
2.2 Upper floors incl. balconies	Delivery Note or Invoice	Subcontractor	TBC
2.3 Roof	Delivery Note or Invoice	Subcontractor	TBC
2.4 Stairs and ramps	Delivery Note or Invoice	Subcontractor	TBC
2.5 External walls	Delivery Note or Invoice	Subcontractor	TBC
2.6 Windows and external doors	Delivery Note or Invoice	Subcontractor	TBC
2.7 Internal walls and partitions	Delivery Note or Invoice	Subcontractor	TBC
2.8 Internal doors	Delivery Note or Invoice	Subcontractor	TBC

3 Finishes

3.1 Wall finishes	Delivery Note or Invoice	Subcontractor	TBC
3.2 Floor finishes	Delivery Note or Invoice	Subcontractor	TBC
3.3 Ceiling finishes	Delivery Note or Invoice	Subcontractor	TBC

4 Fittings, furnishings and equipment (FFE)

4.1 FFE	Delivery Note or Invoice	Subcontractor	TBC

5 Building services / MEP

5.1–5.14 Services	Delivery Note or Invoice	Subcontractor	TBC

6 Prefabricated buildings and building units

6.1 Prefabricated buildings and building units	Delivery Note or Invoice	Subcontractor	TBC

7 Work to existing building

7.1 Minor demolition and alteration works	N/A	Subcontractor	TBC

8 External works

8.1 Site preparation works	Delivery Note or Invoice	Subcontractor	TBC
8.2 Roads, paths, paving's and surfacing's	Delivery Note or Invoice	Subcontractor	TBC
8.3 Soft landscaping, planting and irrigation systems	Delivery Note or Invoice	Subcontractor	TBC

8.4 Fencing, railings and walls	Delivery Note or Invoice	Subcontractor	TBC
8.5 External fixtures	Delivery Note or Invoice	Subcontractor	TBC
8.6 External drainage	Delivery Note or Invoice	Subcontractor	TBC
8.7 External services	Delivery Note or Invoice	Subcontractor	TBC
8.8 Minor building works and ancillary buildings	Delivery Note or Invoice	Subcontractor	TBC

The Person Responsible for Completing the Carbon Data Verification Checklist is: TBC

The Person Responsible for Checking the Carbon Data Verification Checklist is: TBC

In the absence of the Responsible Persons, TBC will complete the Carbon Data Verification Checklist and carry out the checks.

8.8 Carbon Offsetting

Carbon offsetting in general is a controversial area of carbon management both because of the risk that it distracts from the pressing need to reduce emissions at source and because the claimed savings can be difficult to monitor and verify. However, it is acknowledged that as part of the GRAHAM overarching target to achieve “Net Zero Carbon”, we are likely to need offsetting.

Sites have the option to offset their carbon and may do so using GRAHAM supply chain partner “Natural Capital Partners” or another provider. However, offsetting is only permitted when the following criteria (aligned to the Oxford Offsetting Principles) have been met:

- Reduction of emissions must be prioritised first – Minimise the need for offsets in the first place
- Ensure Environmental Integrity – Only use offsets that are verifiable and correctly accounted for and have a low risk of non-additionality, reversal, and creating negative unintended consequences for people and the environment
- Maintain transparency – disclosure current emissions, targets and the type of offsets employed

In addition, carbon removal offsetting (rather than emissions reductions) should be prioritised and long-lived storage (rather than short-lived) should be prioritised where practicable.

Site teams should consult with their Environmental Sustainability Manager prior to the purchase of all carbon credits.

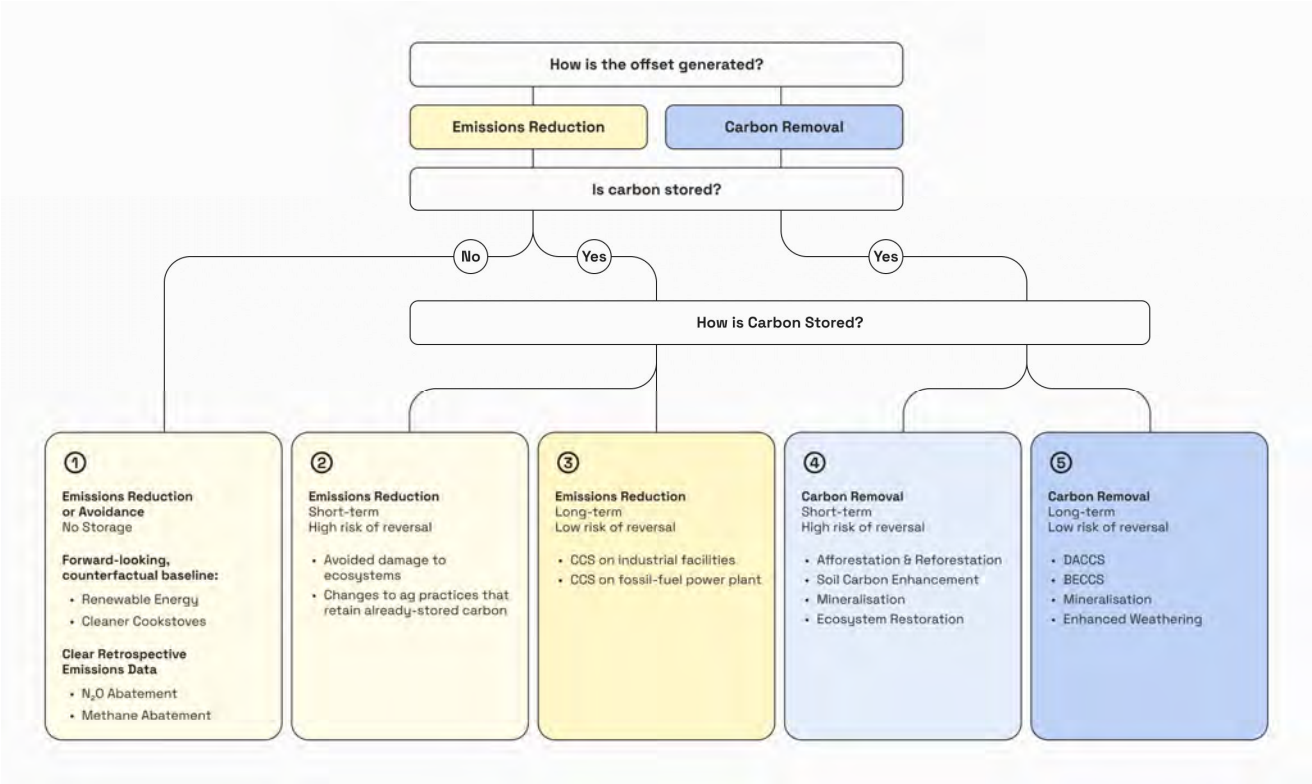
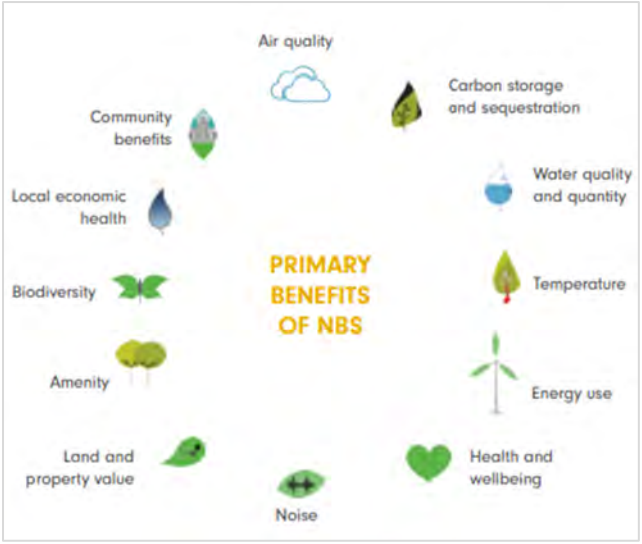


Figure 2: Carbon Offsetting Principles

8.9 Nature Based Solutions

Nature-based solutions (NBS) can be an effective way to tackle both the climate and ecological crises simultaneously. NBS offer a means of adapting to the impacts of climate change, whilst protecting and enhancing biodiversity, acting as carbon sinks in some circumstances. Natural capital including wetlands, peatlands, grasslands and forest are essential for sequestering carbon from the atmosphere, alongside engineered sequestration solutions.

NBS, including green walls, green roofs, urban parks, SUDs and street trees, when done well, can deliver many different advantages including improved temperature regulation, better air & water quality, carbon storage, biodiversity hotspots, increased footfall to commercial areas and improved health & wellbeing for residents among many others. They deliver climate resilience alongside carbon reduction and where possible, NBS should be researched and integrated into projects to maximise benefits.



At GRAHAM we recognise the need for NBS to enhance the resilience of our ecosystems, built environments, and communities. At project level, proportionate solutions should therefore be planned, designed and implemented to deliver those benefits. Depending on the stage of the decision-making process, a qualitative or quantitative approach may be required.

We must ensure that; natural capital assessments follow DEFRA's Enabling a Natural Capital Approach (ENCA) guidance; adherence to standards; third party assurance or peer review for high profile projects.

Figure 17: Primary benefits of NBS.

SECTION 9.0 Site Waste and Resource Management Plan

Guidance Notes:

This section contains details of the processes and opportunities to reduce waste, reuse or recycle products, components and buildings, and for materials to move up the waste hierarchy so that material resources can flow around a circular economy.

9.1 Purpose and Description of the Project

9.2 Responsibilities and Declarations

9.3 Description of Waste Management Roles

9.4 Waste Management Policy

9.5 Benchmarks for Conserving Resources

9.6 Proposals for Waste Minimisation

9.7 Identification of Waste and Proposals for Waste Reuse and Recycling

9.8 Organisations which may be used to facilitate reuse

9.9 Waste Storage Arrangements

9.10 Office Waste Arrangements

9.11 Duty of Care and Waste Transfer Procedures

9.12 Waste Transfer Note Detail

9.13 UK SIC CODES - Excerpts from UK Standard Industrial Classification of Economic Activities

9.14 Minimisation of Hazardous Waste

9.15 Typical Hazardous Outputs

9.16 Management of Hazardous Waste

9.17 Hazardous Waste Consignment Note Detail

9.18 Training

9.19 Subcontractor Requirements

9.20 Management of Subcontractors

9.21 Waste Management Supplier Requirements

9.22 Waste Monitoring and Reporting

9.1 Purpose and Description of the Project

Project Name	University of Manchester, Fallowfield's Campus
Project Location	293 Wilmslow Rd, Fallowfield, Manchester M14 6HD 
Project Cost (estimated)*	TBC

Project Start Date	**Date**	**Month**	**Year**
	TBC		

Project End Date	**Date**	**Month**	**Year**
	TBC		

Description of the Project	University of Manchester Redevelopment of Fallowfield campus Construction of 29new student blocks and neighborhood Hubs, giving 3361 new bedrooms and facilities
Project Footprint (Sq/M)	TBC
Client	University of Manchester
Principal Contractor	GRAHAM
Version Number and Date	01.20.11.24

9.2 Responsibilities and Declarations

	Name	Contact details
Who is responsible for drafting the SWMP?	David O'Hagan	David.OHagan@graham.co.uk
Who is responsible for implementing SWMP on site?	Site Management Team	TBC
Who is the waste champion?	To be elected from the workforce	To be elected from the workforce
Who is the person in charge of the project?	Project Director	TBC
Where will this SWMP be kept?	The site office	

Declaration statement: We the 'Client' and the 'Principal contractor' will take reasonable steps to ensure that all waste from the site is dealt with in accordance with the waste duty of care in section 34 of the Environmental Protection Act 1990 and the Environmental Protection (Duty of Care) Regulations. All reasonable steps will also be taken to ensure that the waste materials are handled efficiently, and waste managed appropriately.
Client signature:
Signature of Principal Contractor Representative:
Signature of S/C Representative(s):

9.3 Description of Waste Management Roles

Project Manager / Site Manager: TBC	• Ensure plan meets client's approval and is signed off accordingly • Implementing and managing the plan on site • Arranging for full details of all arising's, movements and treatment of waste to be accurately recorded and reported in a timely manner • Distinguish reusable materials from materials suitable for recycling • Ensure maximum segregation at the source and separate materials for recovery • Appointment of a suitable "Waste Champion" for the site
Environmental Manager: **David O'Hagan**	• Implementing the plan within GRAHAM • Providing training • Providing advice and guidance to the Site Manager and ensure that best practice is transferred across the organisation • Conducting waste audits
Procurement Manager: TBC	• Ensure that materials are ordered so that the quantity delivered, the timing of the delivery and storage of materials does not generate unnecessary waste • Ensure that the waste management requirements within the GRAHAM procurement documents are communicated to our supply chain • To undertake early engagement with our Waste Management Contractor to discuss our waste forecasts and to ensure an optimal skip strategy which maximises recycling
Environmental Champion: TBC	• Overseeing management of waste records • Periodic reviews of SWMP • Regular inspection of waste recycling areas on site • Ensuring that regular toolbox talks on waste management and minimisation are carried out • Encourage and motivate site personnel to implement best practices
Appointed Operatives:	• Ensure that discrete operations stated in the SWMP are performed on an on-going basis

9.4 Waste Management Policy

GRAHAM operate an Environmental Management System which is certified by National Quality Assurance (NQA) against the requirements of BS EN ISO 14001:2015. Our EMS will be utilised to assist in the employment of waste reduction techniques on the project

This Site Waste Management Plan has been prepared in accordance with the GRAHAM Environmental Policy, Waste Management Policy and Waste Management Procedure **PF10-PR10-44**

GRAHAM are committed to the Circular Economy, where products and materials are kept in high value use for as long as possible. This includes minimising waste, reducing consumption, and designing for reuse, repair and recycling. This commitment has driven the adoption of an approach which prioritises the reuse of all materials and products.

9.5 Benchmarks for Conserving Resources

GRAHAM WASTE TARGETS

	KPI/Metric	Target
A	Tonnes of Construction waste generated per £1M construction value	**Refer to Onos**
B	Diversion of Construction waste from landfill	**Refer to Onos**

SECONDARY WASTE TARGETS

	KPI/Metric	Target
C	Tonnes of Construction and Demolition waste generated per £1M construction value	**Project Specific**
D	Tonnes of Construction waste per 100m2 GIFA	**Project Specific**

- The site construction waste reduction target has been derived using GRAHAM data relating to construction waste generated on all construction sites during our baseline accounting year (2014/15). This waste reduction target aligns with the GRAHAM Company Target to reduce the quantity of avoidable Construction Waste generated by 65% by 2030 and 100% by 2040*
- Projects within the building division also benchmark against BREEAM KPIs for construction and waste demolition and waste diversion (Target D).

* Avoidable construction waste is interpreted as materials, products or components that can be prevented from becoming waste. At every stage of a project lifecycle, from the manufacture of materials and products, the design, specification and assembly of buildings through to deconstruction there are opportunities to avoid waste and reuse or recycle products.

9.6 Proposals for Waste Minimisation

At early design stage, GRAHAM will partner with an expert circular economy consultant to work through practical implementation of circular economy thinking throughout the construction supply chain and provide evidence-based support and advice.

The following exercises will be undertaken.

- Pre-demolition audit - identify material for reuse and recycle on/off site. This information will be fed into the demolition phase of the project and form the base of conservations. The report produced will follow an approved methodology, the code of practice for pre-redevelopment audits.
- Circular Economy Implementation – Resources Tracker - provision of a 'resources tracker' to ensure that opportunities are maximised for reuse in the new development or reused off-site or sent for high value recycling.
- Circular Economy Implementation – Rehoming and Reuse. This involves using networks alongside advertising products and materials on exchange platforms as being available for reuse and/or high-level recycling.

9.7 Identification of Waste and Proposals for Waste Reuse and Recycling

A report will be produced once the demolition works have been undertaken to compare the forecasted waste from the audit and the actual works undertaken. This will require information from the contractor in a form that is comparable with the audit. This will include, if the targets have been met and the reasons, if there are any significant deviations. This report will assist with BREEAM requirements if needed.

Quantities of forecast construction wastes have been derived by multiplying the total material quantity by standard wastage rate data provided by the Waste and Resources Action Programme (WRAP).

9.8 Organisations which may be used to facilitate reuse

- **The National Community Wood Recycling Project**

www.communitywoodrecycling.org.uk

The National Community Wood Recycling Project (NCWRP) is a network of wood recycling social enterprises. The aim of the enterprise is to

- Save resources by rescuing and re-using waste timber that would otherwise by landfilled
- Create sustainable jobs, as well as training and volunteering opportunities, for local people – especially those who might find it difficult to get into or back to employment.

- **Reciprocal**

www.recipro-uk.com

Suppliers and contractors donate unwanted, surplus building materials to the Recipro social enterprise. The products are then sold on at hugely discounted rates. Customers range from charities to schools, churches to shops as well as the local community

- **Community Repaint**

www.communityrepaint.org.uk

Community Repaint is a network of paint reuse schemes across England, Scotland, Wales and Northern Ireland. The purpose of the scheme is to collect leftover reusable paint and redistribute it to those who need paint but cannot afford it.

- **International Synergies**

www.international-synergies.com

International Synergies can be utilised to identify any waste which may have a value to other member companies with a view to third party re-use of these materials.

- **Reuse Network**

www.reuse-network.org.uk

Surplus furniture and household items can be donated for reuse through the Reuse Network. This is a national coordinating body for 300 furniture and appliance re-use and recycling organisations which exist across the UK.

Note - this list is non-exhaustive and may be added to as new opportunities are sought and implemented.

9.9 Waste Storage Arrangements

In line with best practice for the recycling of waste, we will segregate waste on site and to facilitate this, an appropriate number of waste handling and segregation areas will be set up. At these areas, waste streams will be segregated into separate skips and then removed to an approved material recycling facility. Each skip will be clearly labelled indicating type of waste contained within.



Figure 18: Waste Storage Arrangements

The segregation of skip wastes will be of the following types:

- Metal
- Packaging
- Timber
- Gypsum
- Inert
- Mixed (for all other wastes)

Additional skips and bins will also be provided for office derived waste including:

- Paper & Cardboard
- Plastic
- Cardboard
- Food waste

All skips utilised on site will:

- Prevent spillages or leakages
- Be corrosive resistant (to the weather elements)
- Will prevent scavenging from animals
- Prevent materials from being blown away

9.10 Office Waste Arrangements

Site offices and canteens often generate a significant quantity of wastes, many of which are recyclable. Opportunities should be sought to recycle as many of these items as possible and separate waste bins should be available in the site offices to facilitate collection of recyclables such as paper, cardboard, aluminium cans and plastic bottles. Site Operatives should be regularly reminded of the office/ canteen waste recycling procedures and bins should be labelled to assist in their correct usage.



Figure 19 - Office Waste Segregation

9.11 Duty of Care and Waste Transfer Procedures

Throughout construction of the Project, it will be ensured that all site staff, subcontractors and waste management contractors will act in accordance with all environmental legislation in relation to waste management. All movements of waste will be accompanied by waste transfer notes. GRAHAM site staff will ensure that the waste is described as accurately as possible and that the waste transfer note is signed by both the waste producer and the waste carrier. The waste carrier will hand over a copy of the note to a member of GRAHAM site staff prior to leaving the site.

- Waste Transfer Notes will be stored in this plan
- A log of each waste movement will be completed. This can be done via Onos or by using the GRAHAM waste log and stored in this plan

Only registered carriers of waste will be employed for transport purposes and copies of all waste management permits, licences and exemptions will also be obtained and held on site prior to any movement of waste taking place. For all waste transfers, GRAHAM will obtain a copy of the receipt, or a copy of the invoice, from the authorised disposal site as proof that the waste reached the proposed destination.

- Details of Waste Management Carriers for Transporting Waste will be stored in this plan
- Details of Permitted, Licenced or Exempt Sites will be stored in this plan

GRAHAM will retain all controlled waste transfer notes for a minimum of two years and hazardous waste transfer notes for a minimum of three years. Waste transfer notes will initially be retained on site and upon project completion will be transferred to a document store in head office. Each consignment of waste taken from the site will be subject to documentation, which will conform to the table below to ensure full traceability of the material to its final destination.

Waste Transfer Note Detail

1. State the name of the waste producer.
2. Signature of the waste producer.
3. Signature of the waste carrier.
4. A combination of:
   (i) a description of the waste (inert, non-hazardous or hazardous) and
   (ii) the relevant the European Waste Catalogue (EWC) code classification.
5. State the quantity of waste in cubic metres (m3).
6. How the waste is stored and any processes the waste has been through
7. State the name of the site where the waste is being created.
8. State the date and time that the waste was taken off site by the waste carrier.
9. State the name and address of the waste carrier.
10. Waste carrier licence number
11. State the name and address of where the waste is being taken to and the site licence/ permit or exemption
    number
12. State whether the waste carrier is the producer or carrier of the waste (in most cases it will be the latter).
13. Highlight on the waste transfer note the certificate number
14. Standard Industry code (SIC) of your business
15. Include a statement that you have applied the waste hierarchy

9.12 Waste Transfer Note Detail

Written Description of the Waste e.g. concrete, timber, mixed construction waste

European Waste Code (EWC) E.G.

17 09 04 Mixed Construction

The Standard Industry Classification (SIC) Code See list of common GRAHAM SIC Codes (section 9.13 of SWRMP)

Details of the place where the waste is transferred from the transferor (waste producer) to the transferee (carrier) this is the location the waste is being collected from

Date of the waste transfer (date or period the collection was made)

The Waste Carriers Registration Number

Duty of Care – Waste Transfer Note

PF10-PR10-44-F008

Project:

Section A – Description of Waste

1. Description of the waste being transferred: _____
2. European Waste Catalogue/ List of Waste Code [ ] [ ] [ ] e.g. 17 01 01
3. How is the waste contained?
   Loose ☐ Sacks ☐ Skip ☐ Drum ☐ Other ☐ *Please describe*
4. How much waste? For example, number of sacks, weight etc: _____

Section B – Current holder of the waste (Transferor)

By signing in section D below I confirm that I have fulfilled my duty to apply the waste hierarchy

1. Full Name: Graham Construction
2. Company name and address: Ballygowan Road, Hillsborough, BT26 6HX
3. SIC code (2007):
4. Which of the following are you: (*Please tick one or more boxes*)
   Producer of the Waste ☐ Importer of the Waste ☐ Registered Waste Carrier ☐
5. Please state how has the waste been treated:
   Segregation/ separate collection/ screening/ hand picking (*Delete as appropriate*)
6. If treatment has not been carried out please state why this is not considered necessary. (E.g. The waste is inert waste which cannot be treated because it is not technically feasible to do so):
   _____

Section C – Person collecting the waste (Transferee)

1. Full Name: _____
2. Company name and address: _____
   _____
3. Which of the following are you?

	Tick	*Licence/ permit number*	*Expiry date*
Holder of a valid exemption		N/A	N/A
A registered waste carrier/ broker/ dealer			

Section D – The Transfer

1. Address of transfer/collection point (*SITE*): _____
2. Date of transfer: _____
   (For multiple consignments/ "Season Tickets" give "between" dates)
3. Time(s) of transfer: _____
4. Destination of Waste, give address: _____
   _____
5. Destination of Waste, give licence/ permit number: _____
6. Name and address of broker who arranged this waste transfer (*if applicable*):
   _____

Transferor's signature	Transferee's signature
Print Name: _____	Print Name: _____
Representing: _____	Representing: _____

Details of the container and the quantity of waste Skip, size, Volume or weight and whether waste is in bags, drums etc

The Waste Hierarchy Declaration confirming that the waste producer has considered prevention, reuse, recycle, recover and disposal in that order.

Details of the person transferring the waste (transferor) this is usually the waste producer – GRAHAM. If subcontractors are arranging waste disposal it may be named.

Details of the person the waste is being transferred to (the transferee) this is the waste carrier e.g. skip company, haulage contractor, road sweeper.

Destination details including permit or exemption reference for that facility GRAHAM requirement for waste destination to be on the waste transfer note

Signatures of the transferee (waste producer) and the transferor (waste Carrier) both signatures are needed on all WTN

Note: Legible copies of waste transfer notes must be available at all times and must be kept for two years from the date of the waste collection

9.13 UK SIC CODES - Excerpts from UK Standard Industrial Classification of Economic Activities

Section F Construction

41100	Development of building projects

Common SIC CODES for GRAHAM operations

41201	**Construction of commercial buildings**
41202	**Construction of domestic buildings**
42110	**Construction of roads and motorways**
42120	**Construction of railways and underground railways**
42130	**Construction of bridges and tunnels**
42210	**Construction of utility projects for fluids**
42220	Construction of utility projects for electricity and telecommunications
42910	Construction of water projects
42990	Construction of other civil engineering projects
43110	Demolition
43120	Site preparation
43130	Test drilling and boring
43210	Electrical installations
43220	Plumbing, heat and air-conditioning installation
43290	Other construction installation
43310	Plastering
43320	Joinery installation
43330	Floor and wall covering
43341	Painting
43342	Glazing
43390	Other building completion and finishing
43910	Roofing activities
43991	Scaffold erection
43999	Other specialised construction activities

Short Enforcement Guide

- You will be committing an offence if you give waste to an unregistered waste carrier
- You will be committing an offence if you do not have valid waste transfer notes and or consignment notes for the movement of waste
- You will be committing an offence if you transport waste, and you are not registered to do so
- You will be committing an offence if you transport waste and do not have a complete waste transfer note with you
- You will be committing an offence if you accept waste without holding the relevant waste authorization
- You will be committing an offence, if you keep, treat or dispose of waste without the relevant waste authorization

9.14 Minimisation of Hazardous Waste

Hazardous Waste Minimisation

Eliminating the use of hazardous materials will eliminate the generation of hazardous waste from these products. Therefore, it is important that designers and architects are involved in any plan to reduce hazardous waste as they may specify materials which we (as a contractor) are bound by. However, GRAHAM also have an element of choice in the products we purchase, and we also have further opportunities to reduce the amount of hazardous waste produced through better handling, segregation and identification of re-use and recycling options.

The following table is a list of potential opportunities that may be applied to the construction project in order to reduce the generation.

Hazardous waste management/ minimisation measures				
	Material	***Measure***	***Indicative Cost***	***Anticipated Benefits***
1.	Solvents	Purchase only low-VOC paints, solvents and adhesives	Low	Reduced VOC emissions to atmospheres, less residual solvent in containers, easier disposal
2.	Various	Brief all site workers on likely hazardous wastes. Identify and clearly mark recovery & disposal storage arrangements	Low	Less cross-contamination, increased hazardous waste segregation, raised levels of awareness, reduced disposal costs
3.	Paints & Solvent	Increase level of accountability for hazardous materials – single point of issue, with nominated person responsible	Low	Less hazardous raw materials used, greater accountability and control/understanding of material usage (benchmarking).
4.	Packaging	Clean and sort packaging to reduce hazardous component prior to disposal	Low - Medium	Reduced volume of packaging being consigned as hazardous (disposal costs reduced)
5.	Treated wood	Reduce disposal of treated waste wood to landfill – minimise off-cuts and increase re-use where applicable.	Low - Medium	Increased level of beneficial wood re-use (or energy recovery), reduced landfill, potential future revenue source
6.	Oils, fuels & lubricants	Ensure all materials are stored in bunded areas and allocate central accountancy for oil wastes	Low - Medium	Reduce the frequency of spills to ground, increase collection of waste oils/rags.

9.15 Typical Hazardous Outputs

Storage of Hazardous Wastes

All Hazardous waste streams will be stored separately from other Hazardous wastes and will be stored separately from controlled waste in secure and labelled containers.

Typical Hazardous Waste Streams

Typical hazardous waste streams occurring on site will include

Activities	Hazardous Inputs	Hazardous Outputs
Site clearance and demolition	N/A	Asbestos, treated wood, electrical and electronic items containing hazardous components (including cables and switches); refrigerants and foams; drums of hazardous materials, potentially fly-tipped hazardous materials
Excavation	N/A	Potentially contaminated soils, asphalt containing tar products from paving and driveways
General construction works (including cementing, grouting etc.)	Grout, cement, resins, hardeners, various COSHH materials	Spent resins and hardeners, concrete and grout wash-out, un-set cement/grout, contaminated shuttering, spent COSHH materials and contaminated packaging
Building installation (e.g. electrical wiring and fittings, insulation, plumbing)	Fluorescent tubes/bulbs, electrical and electronic equipment and cabling	Spent fluorescent tubes and bulbs, off-cuts of electrical wiring etc.
Floor and wall covering (including plastering)	Adhesives, solvents, coatings, polishes, varnishes, resins, treated wood, plasterboard	Spent coatings and adhesives, empty containers containing residue, contaminated packaging, spent solvents, asbestos, plasterboard off-cuts, plaster washout
Painting (including paint preparation)	Solvent-based paints, paint thinners, enamels, lacquers, epoxies, primers, acrylics, brush cleaners	Spent solvent-based paints, empty solvent-based paint tins containing residue, spent solvent cleaners
Asphalting (roofing, paving)	Asphalt	Unused asphalt containing tar products, contaminated containers and equipment
General maintenance and power generation	Oils, greases, degreasers, batteries	Oily rags, oil filters etc. from maintenance of plant and machinery; waste oil; spent batteries; greases and lubricants; spent COSHH materials; oil contaminated absorbent spill material; contaminated PPE; oil contaminated water from bunds etc.

9.16 Management of Hazardous Waste

How to determine if waste is Hazardous

To determine whether waste is hazardous or not, the European List of Wastes (Low) should be consulted. Within the Low, Hazardous Waste is classified as “Absolute, Mirror or Non-Hazardous”. Absolute (A*) is considered hazardous irrespective of the concentration of levels of dangerous substances present. A Mirror entry (*) can be either hazardous or not, depending on whether it contains certain levels of “*dangerous substances*”.

Unexpected discovery of Hazardous Waste

Unexpected hazardous waste not previously anticipated will be identified as early as possible into the duration of the project. Appropriate facilities and remediation or disposal arrangements will be made at the earliest possible opportunity. Examples of unexpected hazardous waste include the discovery of contaminated land.

Moving and Transporting Hazardous Waste

Hazardous waste must be:

- Transported by a registered or exempt waste carrier
- Accompanied by a consignment note
- Transferred to a facility that holds a suitable environmental permit or pollution prevention and control (PPC) permit

Consignment Notes

A consignment note should be completed every time hazardous waste is removed from the site. The consignment note will then accompany the hazardous waste whilst it is being moved or transferred. In line with our legal requirements copies of completed hazardous waste consignment notes should be kept for three years.

Consignment notes can be purchased/ obtained from the relevant statutory authority. The type of consignment note you need to complete depends on how and where the waste is transported. You can use single or multiple collection forms.

Pre-notification / Premise Registration

ENGLAND

A Consignment Note must accompany all movements of hazardous waste. The CN contains more information than a standard Waste Transfer Note and should be retained for 3 years. There is no requirement to pre-notify the regulator of such waste movements.

9.17 Hazardous Waste Consignment Note Detail

Consignment Note Code Unique code generated by the waste producer

Details of the site the waste is being collected from GRAHAM site / premises address

European Waste Code (EWC) 17 03 01* bituminous mixtures containing coal tar

17 05 03* soil and stones containing hazardous substances 17 06 01* Insulation containing asbestos 17 06 05* construction materials containing asbestos 13 05 03* interceptor sludges 13 05 07* oily water from oil / water separators 13 07 01* fuel oil and diesel 160601*lead batteries 20 01 21* fluorescent tubes 20 01 27* paint, inks, adhesives and resins containing hazardous substances

Details of the waste carrier including the carrier registration number and vehicle registration number must be signed and dated by the waste

The Hazardous Waste Regulations 2005: Consignment Note

Environment Agency

PRODUCER'S/HOLDER'S/CONSIGNOR'S COPY (Delete as appropriate)

PART A Notification details

1 Consignment note code: / 3 The waste will be taken to (name, address and postcode):

2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile):

4 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):

PART B Description of the waste If continuation sheet used, tick here ☐

1 The process giving rise to the waste(s) was: 2 SIC (2007) for the process giving rise to the waste: /

3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code)(6 digits)	Quantity (kg)	The chemical/biological components in the waste and their concentrations are: Component	Concentration (% or mg/kg)	Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard code(s)	Container type, number and size

The information given below is to be completed for each EWC identified

EWC code	UN identification number(s)	Proper shipping name(s)	UN class(es)	Packing group(s)	Special handling requirements

PART C Carrier's certificate

(If more than one carrier is used, please attach schedule for subsequent carriers. If schedule of carriers is attached tick here. ☐)

I certify that I today collected the consignment and that the details in A2, A3 and B3 are correct and I have been advised of any specific handling requirements.

Where this note comprises part of a multiple collection the round number and collection number are: /

1 Carrier name:

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

2 Carrier registration no./reason for exemption:

3 Vehicle registration no. (or mode of transport, if not road):

Signature

Date Time

PART D Consignor's certificate

I certify that the information in A, B and C has been completed and is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011.

1 Consignor name:

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

Signature

Date Time

PART E Consignee's certificate (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)

1 I received this waste at the address given in A3 on: Date Time

2 Vehicle registration no. (or mode of transport if not road):

3 Where waste is rejected please provide details:

I certify that waste permit/exempt waste operation number:

authorises the management of the waste described in B at the address given in A3.

Where the consignment forms part of a multiple collection, as identified in Part C, I certify that the total number of consignments forming the collection are:

Name:

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

Signature

Date Time

Details of the waste destination the receiving waste facility must hold a permit that allows it to accept the hazardous

The Standard Industry Classification (SIC) Code Construction: 41.20

Demolition 43.11

The Hazardous Property (HP) code and or identity of Persistent Organic Pollutant (POP) (COSHH Assessment)

H1 – Explosive
H2 – Oxidising
H3 – Flammable
And / or
Hexaclorobenzene
Chlorodocone
Aldrine

Details of the container and the quantity of waste

Details of the person transferring the waste (consignor)

This is usually the waste producer, GRAHAM or a subcontractor if they have arranged the waste collection.

Note: A copy of the HWCN must be taken when the waste is removed and a further copy with Part E signed must be obtained. Part E is signed by the waste facility when they receive the waste from the carrier. The final copy with Part E must be obtained from the waste carrier and returned to GRAHAM. Legible copies of hazardous waste consignment notes must be available on site and must be kept for three years from the date of the waste collection.

Confirmation that the waste facility has received the waste from the carrier. A copy of the HWCN with this section signed by the waste facility must be obtained within 3 months

9.18 Training

Everyone on site will receive training which will include the following waste and environmental issues:

- The Site Waste and Resource Management Plan
- Roles and responsibilities
- Waste procedures on site – including segregation, recycling, reuse and return methods
- Hazardous waste
- Duty of care/ responsibilities
- Materials storage and handling

Waste and environmental training on site will consist of:

- Induction training will incorporate a section on waste management on site
- Toolbox talks will be carried out on waste issues and all site operatives and subcontractors will be expected to attend
- Various employees attend workshops and seminars delivered by External providers such as WRAP in order to further advance knowledge and best practice in relation to waste issues.
- A training course for the elected “Site Environmental Champion” is delivered in house to relevant operatives by the Environmental Manager.

Communication:

- Communication of the progress of the SWRMP is carried out during monthly progress meetings involving site staff, senior management, and the client
- Posters are displayed throughout the site to ensure that everyone is aware of the importance of the Site Waste and Resource Management Plan and adheres to the site waste management procedures



Figure 20 - Posters

9.19 Subcontractor Requirements

All Subcontractors are required to fulfil the following responsibilities in relation to waste management:

- Provide to the project team a forecast of the key waste streams that you will create and an identification of what actions you plan to take to reduce waste.
- Minimise the use of materials and the production of waste through, efficient design, handling, transportation, stock control, the use of prefabricated / pre-sized materials, minimise packaging and efficient construction techniques.
- Segregate waste, use specific waste containers and waste management areas.
- Fulfil all statutory waste handling requirements such as Duty of Care Regulations
- Manage the collection, storage, segregation and treatment/disposal of the different types of waste you produce

In addition, a small number of subcontract work packages may be **responsible for the disposal of their own waste.** Where this is the case, the Site Team will ensure that these Subcontractors undertake the following responsibilities:

- Complete the "Expectations for removal of Excavated Material from Site by a Sub-Contractor" form (REF: PF10-PR10-44-F007)
- Provide the waste carriers licence (collection permit in ROI) for the haulier removing the waste
- Provide the waste management licence /permit/ exemption certificate or permit for the site receiving the waste
- Provide any other relevant licence / permit / exemption such as that required for reprocessing or waste storage
- Provide a monthly report (using the standard GRAHAM format) with the quantities of the different types of waste removed from site. This must be provided with the split of each different type of waste managed, according to waste management method – re-use, recycling, recovery, landfill and other, and, in the case of re-use, recycling and recovery, whether this has taken place on- or off- site; and the quantity of waste materials sent to landfill.

9.20 Management of Subcontractors

Illustration of Type A and Type B Subcontractors

The nature of Subcontractor work activities will assist in determining whether a Subcontractor should be responsible for their own wastes (as illustrated below). This arrangement can only be finalised following receipt of relevant documentation illustrated below. Where relevant documentation has not been provided, GRAHAM will arrange the waste removal and contra-charge the Subcontractor as appropriate.

<table>
<tr><th>Site Activity / Sub-contractor Work Package</th><th>Primary Waste Stream</th><th>Waste Management Responsibility</th></tr>
<tr><td>Demolition and site clearance</td><td>Hardcore, spoil, timber, plastics</td><td rowspan="6"><u>Type A Subcontractor</u>
Subcontractors have full responsibility for their own waste and must collect, store, segregate and dispose of all waste materials in accordance with industry's best practice and current legislation.

<u>MUST</u> provide the Site Team with copies of the following for all waste leaving the site:
Waste Carriers Licenses
Waste Management Licenses/ permits
Waste Exemption Certificates
Waste Transfer Notes
Hazardous/ Special Waste Consignment Notes
Monthly figures of all waste removed from site to include type of material, total quantity of waste, waste management option i.e. landfill, reuse, recycling and the percentage of each waste material recycled or reused.</td></tr>
<tr><td>Groundworks</td><td>Spoil</td></tr>
<tr><td>Foundations/piling</td><td>Spoil and hardcore</td></tr>
<tr><td>Structure</td><td>Bulk concrete, miscellaneous hardcore & metal</td></tr>
<tr><td>Drylining</td><td>Plasterboard, metal studwork and insulation off cuts</td></tr>
<tr><td>Brick/ blockwork</td><td>Bricks (crushed and incorporated into works)</td></tr>
<tr><td>Building envelope</td><td>Timber, plastic, cardboard, hardcore/ rubble,
Metal, Hazardous Waste</td><td rowspan="7"><u>Type B Subcontractor</u>
The Waste Management Contractor has responsibility for overall waste management and removal of waste from site.

Individual subcontractors have local

responsibility for segregation and distribution of waste on site to the waste compound.</td></tr>
<tr><td>Mechanical & Electrical</td><td>Cables, metal, timber, plastic, cardboard,
plastic packaging, Hazardous waste</td></tr>
<tr><td>Trades (Joinery, Painting, Timber, cardboard, plastic packaging,
Plastering, etc.)</td><td>Timber, paint, renders, cardboard, plastic packaging, Hazardous waste</td></tr>
<tr><td>Landscaping habitat restoration/creation</td><td>Green Waste and Topsoil</td></tr>
<tr><td>Site re-instatement, removal of site offices and final clear away</td><td>Timber, hardcore, metal, office waste</td></tr>
<tr><td>Office activities</td><td>Paper, cardboard, plastic packaging,
general office waste</td></tr>
</table>

9.21 Waste Management Supplier Requirements

To actively help achieve the waste reduction, reuse and recycling targets that have been set out for the project, requirements for Waste Management Suppliers are as follows:

- Agreement to work in accordance with GRAHAM Waste Supplier KPIs
- Fulfil all statutory waste handling requirements.
- Work with the project team to plan and implement suitable on-site waste management processes
- Monthly waste analysis reports to be made available to the GRAHAM site team by the 3rd of each month
- The tonnage of each waste material must be recorded within the waste report and the percentage recovery rates for each material illustrated.
- Waste log to be made available to the GRAHAM site team by the 3rd of each month
- Facilitate site visits/ audits by GRAHAM were requested
- GRAHAM are to be informed immediately of any changes to the operator's conditions, licence suspensions or pending prosecutions
- Delivery of at least 99% diversion of non-hazardous waste from landfill
- Contribute to the development and implementation of the Site Waste and Resource Management Plan as required.

GRAHAM Approved/ Preferred List of Waste Management Suppliers

The GRAHAM SHE team maintain a list of approved/ preferred Waste Management Contractors. Suppliers not on the "approved/ preferred and unapproved list" will be asked to complete the "Waste Management Supplier Pre-Appointment Assessment" .

The returned information will be forwarded to the SHE Team to review details and ensure that the supplier meets relevant GRAHAM environmental requirements.

Reporting and Documentation

The Waste Management Contractor shall provide the following information:

- Waste Transfer Notes and Hazardous Waste Consignment Notes.
- Copies of the Carriers Licence for all carriers used.
- Copies of the Waste Management Licences / Permits (or exemptions) for all destinations of waste.
- A register of containers logged.

On a monthly basis the Waste Management Contractor will supply the following information:

- The quantity (weight) of waste produced for each waste type together with the destination of that waste (reused, recycled, land filled, etc.).
- Recommendations for improved waste management/minimisation.

9.22 Waste Monitoring and Reporting

Waste quantities and data should be recorded within the waste management section of Onos. Data should be uploaded each month by the 5th of the month.

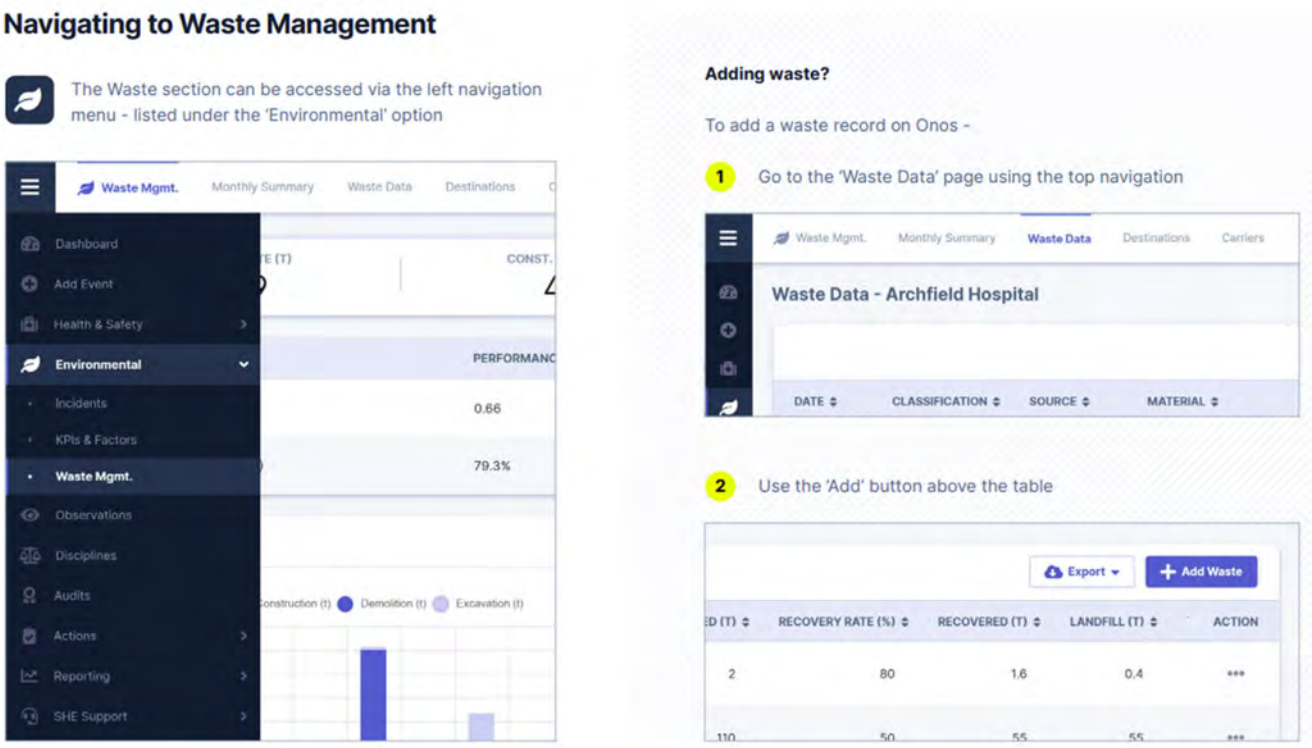


Figure 21 - Onos (waste section)

Use Onos to input project waste data. The software will automatically calculate the total waste, and waste to landfill.

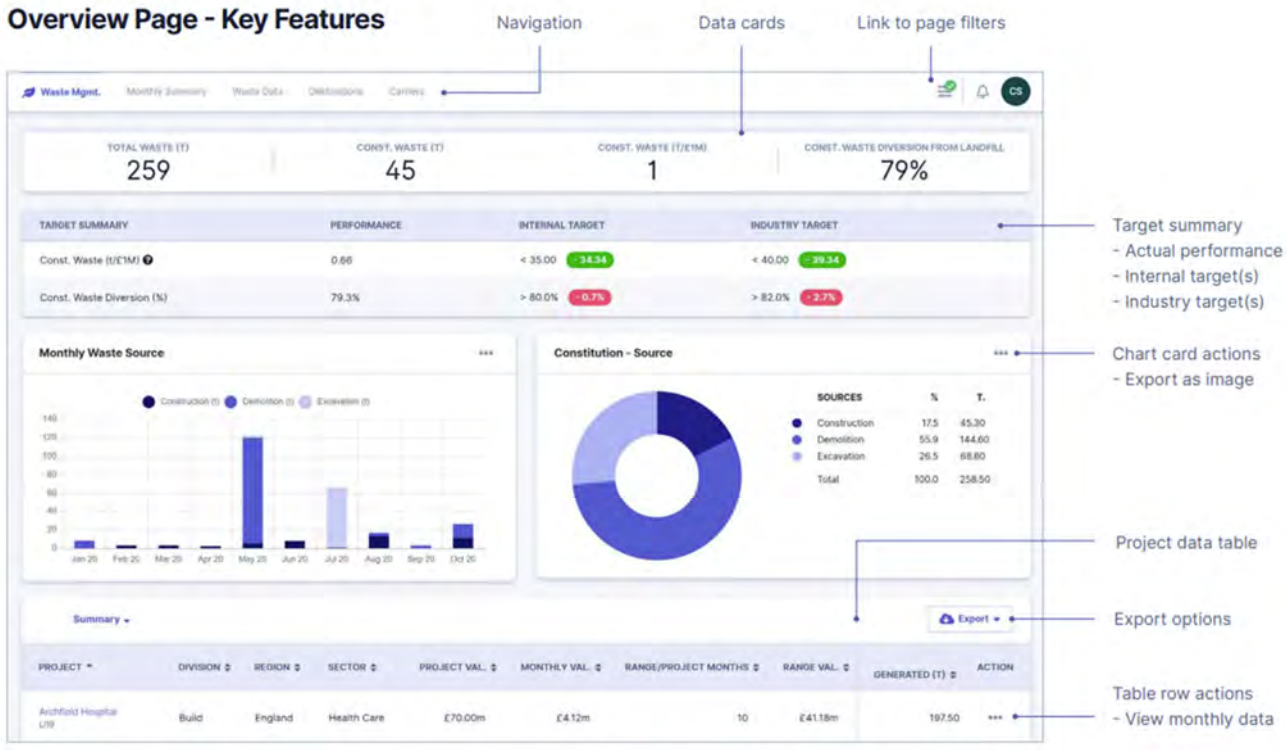


Figure 22: Onos (overview)

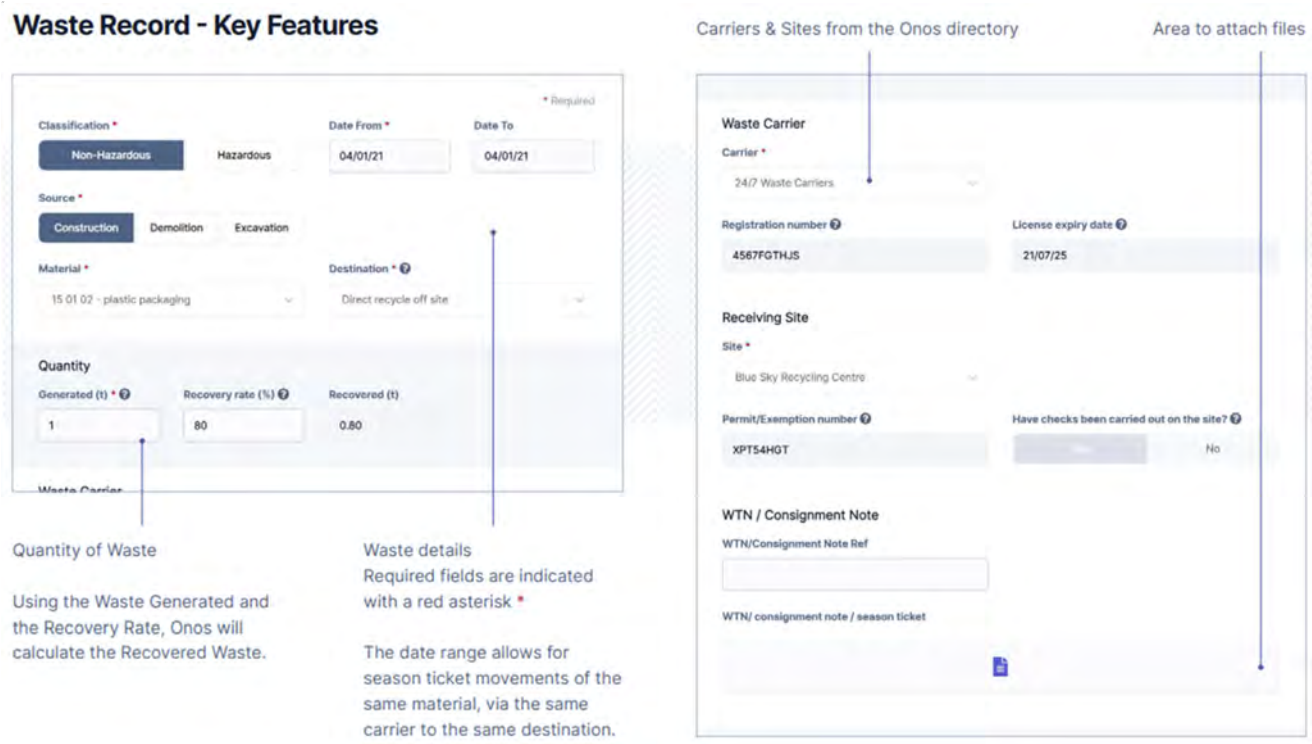


Figure 33: Onos (Waste Records)

Waste Types Included in the Measurement

- Record ALL construction, demolition and excavation wastes – including that generated by subcontractors (where this is part of the main contact of works)
- Record waste in Tons only. Volumes of waste should be converted using standardized conversion factors
- For skip wastes – find out from your waste management contractor, the total tonnage of waste generated and the percentage that has been recycled and record this within the spreadsheet
- Record ALL reuse of waste on site e.g. reuse of topsoil in landscaping

Note:

- Guidance from the Department of Communities and Local Government identified that List of Waste **17 05 04 (soil and stones not containing dangerous substances)** is non-exempt and when sent to landfills should be allocated a 50% recovery rate. All sites should therefore ensure that where excavation waste classified under the European Waste Code 17 05 04 is taken to landfill, that it is allocated a 50% recovery rate.
- Where EWC 17 05 04 is "beneficially reused" e.g. used as capping as part of a landfill closure or restoration or sent to an "exempt" site, it should be allocated a 100% recovery rate.

SECTION 10 Invasive Species

Guidance Notes:

This section contains details of the steps required to safeguard the site from negative impacts in respect of contaminated land and invasive plants.

10.1 Invasive Species Issues
10.2 Identification and Survey
10.3 Site Conditions
10.4 Invasive Species Management
10.5 Invasive Species Control and Eradication

10.1 Invasive Species Issues

Non-native, or invasive, species are described as 'organisms introduced by man into places outside of their natural range of distribution, where they become established and disperse, generating a negative impact on the local ecosystem and species' (International Union for Conservation of Nature (IUCN), 2011). The ecological impacts of such 'biological invasions' are the second largest threat to biodiversity worldwide, after habitat loss and destruction.

The UK is bound by international agreements such as the Convention on Biological Diversity, the United Nations Convention on the Law of the Sea, the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979), the Convention on the Conservation of European Wildlife and Natural Habitat (Bern, 1979) and the Habitats and Birds Directives. All of these include provisions requiring measures to prevent the introduction of, or control of, non-native species, especially those that threaten native or protected species (JNCC, 2004). Additionally, Section 14 of the Wildlife and Countryside Act (WCA) (1981) makes it illegal to release, or allow to escape into the wild, certain plants or animals which may cause ecological, environmental or socio-economic harm. These commitments are expected to be subject to greater international enforcement over time.

Those invasive plant species most found in the UK are:

- Himalayan Balsam
- Japanese Knotweed
- Common Ragwort
- Giant Hogweed

10.2 Identification and Survey

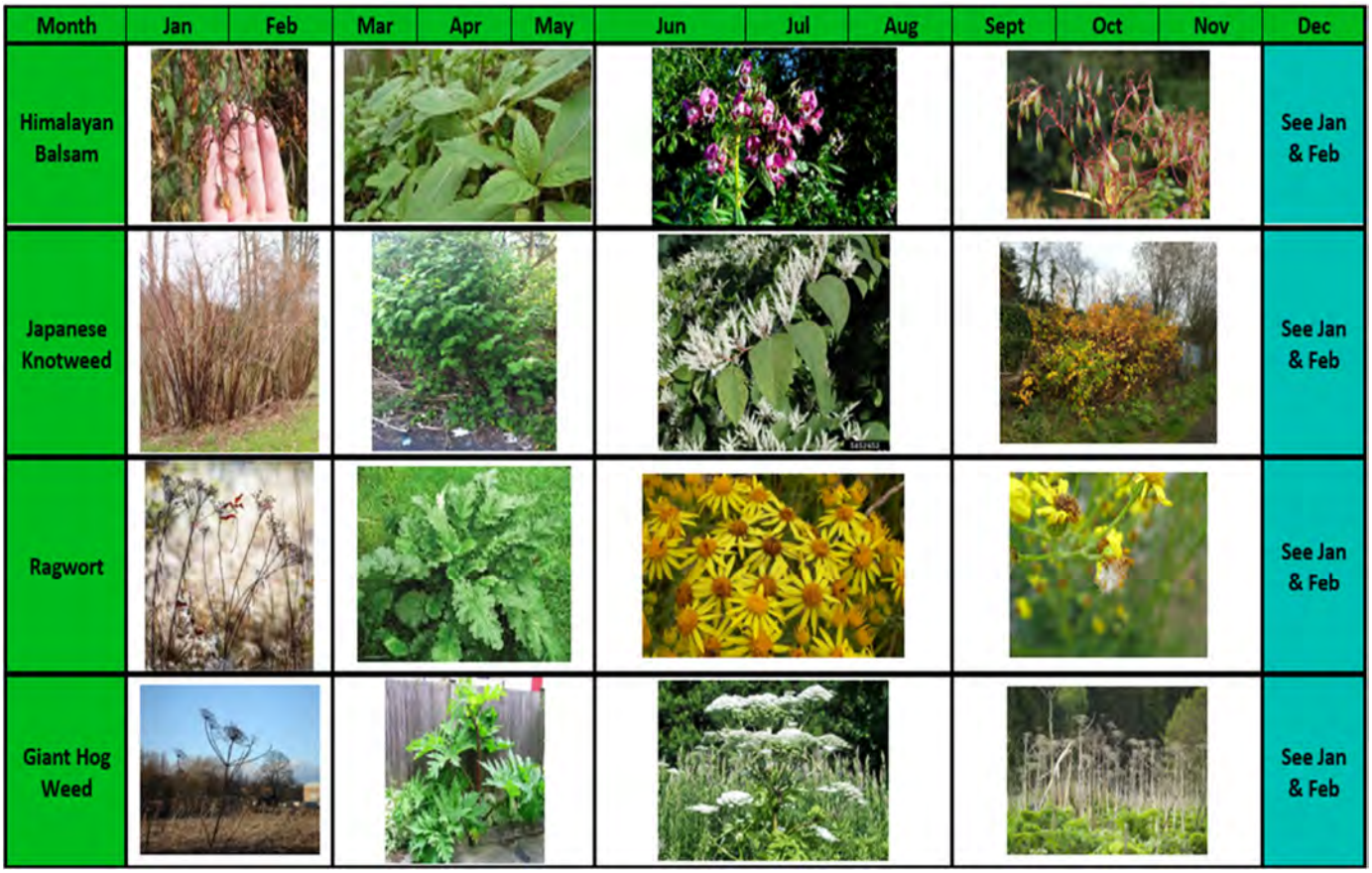


Figure 44 - Invasive Plant Identification

Where pre-construction information and investigations indicate a potential for the presence of invasive plant species, a survey will be carried out by a competent person and a distribution map drawn up to indicate specific locations of the plant on site.

Where survey information identifies that invasive plants are present on site, an invasive plant management plan/ method statement to outline controls must be put in place.

10.3 Site Conditions

Invasive non-native plant species Japanese Knotweed was present on site between buildings B18 and B22.

Details of pathways for the potential introduction of non-native species

- Accidental imports from materials were brought into the system as a result of the development.

Details of pathways for the potential introduction of non-native plant species

- Human transport (plant) routes
- Human movement via footwear
- Incorrect disposal methods

10.4 Invasive Species Management

- An invasive plant management plan/ method statement to outline controls will be put in place.
- The plant and the surrounding area will be fenced off. The fence will be at least 4 metres away from the outer perimeter of the plant
- Signage will be installed at the area – e.g., Environmentally sensitive area – Keep Out
- Information and basic requirements with regards to the invasive plant will be identified as part of the induction training so that everyone is aware of the requirements
- The control and management of the invasive weed will be regularly monitored for any spread, regrowth or reintroduction. The "Invasive Plants – Record of Monitoring" form and the "Invasive Plants – Record of Treatment" will be completed as required
- If plant and machinery are working in a contaminated area, wheels will be washed on exit
- Double handling of the contaminated materials will be avoided to reduce the risk of spreading the plant

10.5 Invasive Species Control and Eradication

Currently there are various means by which invasive plants can be eradicated from sites. These include:

- Long-term treatment with herbicides.
- Excavation and disposal at a licensed landfill site. (If invasive plants are disposed of offsite, they will be dealt with as waste in accordance with the Duty of Care Requirements)
- Excavation, deep burial and/or bunding on site prior to treatment with herbicide.

Due to site specific variations in soil type, topography, adjacent sensitivities and degree of invasive weed infestations, combinations of various control methods may be used. These methods will be detailed within the invasive plant management plan/ method statement.

SECTION 11 Archaeology & Cultural Heritage

Guidance Notes:

This section contains details of archaeological considerations and steps required to safeguard archaeology and cultural heritage during construction.

11.1 Archaeological Monitoring

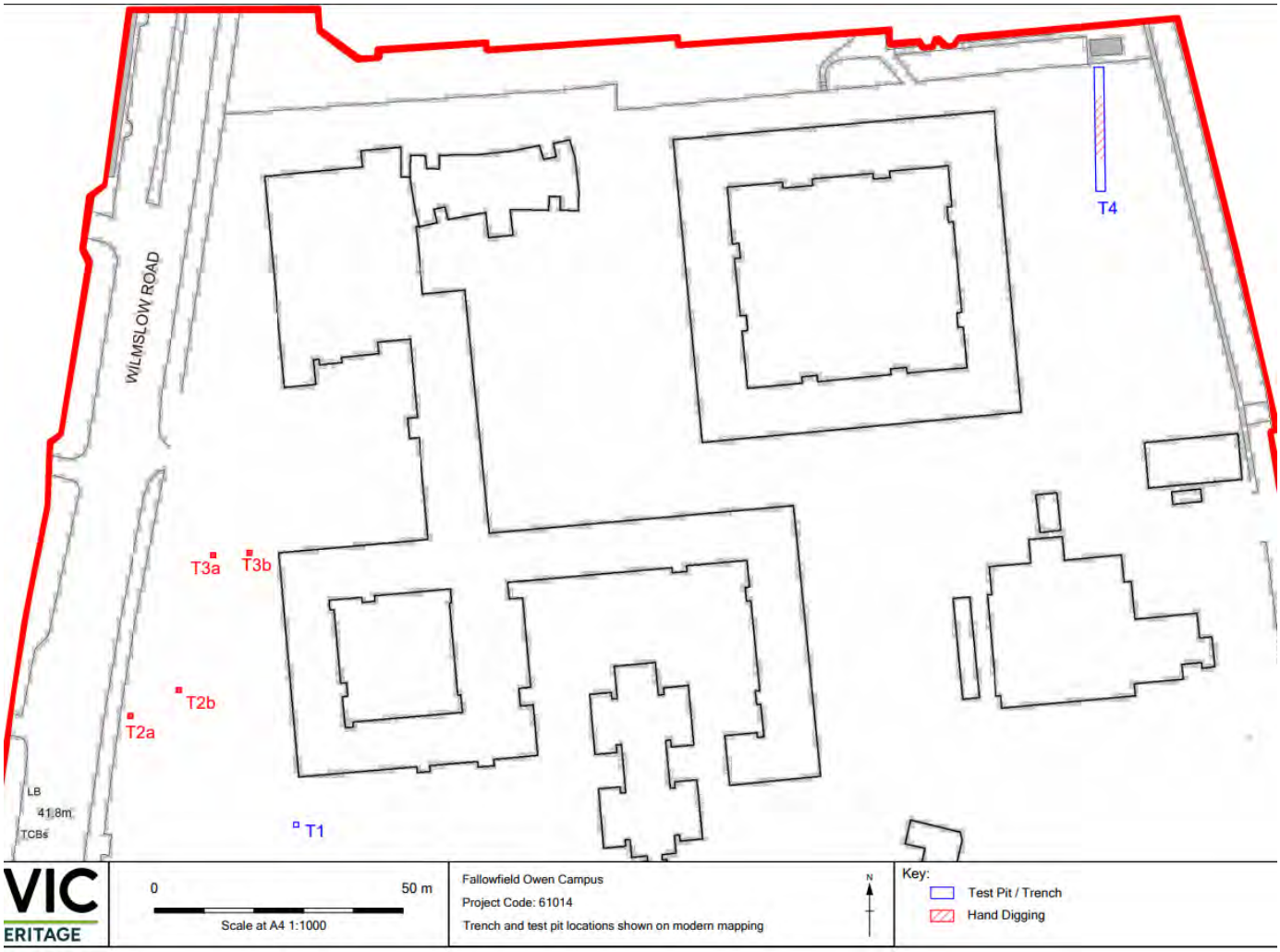
11.2 Discovery of Unexpected Archaeological Finds

11.1. Archaeological Monitoring

Access will be afforded to the site at all reasonable times to any nominated Archaeologist to observe the operations and to monitor the implementation of archaeological requirements.

11.2. Discovery of Unexpected Archaeological Finds

- STOP work immediately.
- IMMEDIATELY PROTECT the find by fencing/blocking off.
- NOTIFY the discovery to the project team
- Access to the area by machinery and personnel is to be prevented.
- Time is to be allowed for the archaeologist to undertake the appropriate level of recording.
- Archaeological objects and treasure discovered must be reported to the regulator



SECTION 12 Emergency Response

Guidance Notes:

This section contains details of the procedure to follow in the event of an environmental complaint, spill or incident.

12.1 Emergency Response Equipment and Resources
12.2 Environmental Incident Response Plan
12.3 Incident Response Reporting

12.1 Emergency Response Equipment and Resources

Oil spillage kits will always be available on site and a team of operatives will be trained on how to maintain, position and use them properly. Training may be carried out in-house by the Environmental Manager or by the site team.

The trained Emergency Spill Response team will be identified on the site's environmental noticeboard.



Figure 25: Spill kits



Figure 26: Spill Response Team Poster

Spill kits should be appropriate and adequate for risk on site

If the nature of the incident necessitates external spill response provision, the Emergency Response Team will be contacted using the contact details below:

Response Team	Phone	Availability
OHES Environmental	0333 333 1123	24hr Service

SECTION 13 Environmental Incident Response Plan

13.0 Environmental Incident Response Plan

The Environmental Incident Response Plan describes the actions to take to deal with any unexpected environmental incidents and details simple guidance on the immediate action to be taken in order to prevent and minimise pollution resulting from an environmental incident. The response actions are detailed according to the specific pollutant and the receiving receptor.

The Environmental Incident Response Plan also describes environmental incident reporting and investigation processes.

The Environmental Incident Response Plan will be displayed on site and communicated to all operatives. (IMS Ref: PF10-PR10-43-F013)

SECTION 14 Incident Response Reporting

14.0 Incident Response Reporting

- All operatives will be made aware that any environmental incident, spillage or complaint must be reported to the GRAHAM site staff as soon as it happens
- Environmental Events because of the Works will be recorded by adding an “Environmental Incident”, “Environmental Complaint” or “Other” event record on Onos.
- Every effort will be made to establish the cause of the issue leading to a complaint/ spill/ incident. Assuming the issue arose from the failure of a control system, the issue will be put right at the earliest opportunity
- The response action will be recorded on Onos by the Site Manager
- A lot of complaints/ spills/ incidents and follow-up actions will be maintained
- The Environmental Manager will undertake an investigation of all major incidents and will notify relevant agencies as required. Any reference numbers will be recorded and notified to the Employers Representative.

SECTION 15 Appendices

15.0 Appendices.

Appendix A – Noise Management Plan

Appendix B – Project Environmental Risk and Opportunities Register

Appendix C – Extract from Environmental Statement.

Appendix D – Swept Path Analysis Drawings

Appendix A – Noise Management Plan

Noise Monitoring Plan

PF10-PR10-10-F026

Project: University of Manchester, Fallowfield Campus

This Noise Monitoring Plan should be utilised for the purpose of streamlining Noise Monitoring on site, with the ultimate objective of achieving effective management of nuisance noise. The Plan should be completed by a member of the Site Management Team, with advice and assistance obtained from the Project Environmental Manager.

1.0 NOISE RISK CLASSIFICATION: MEDIUM RISK

Insert a noise risk classification, based on the risk classification diagram detailed below

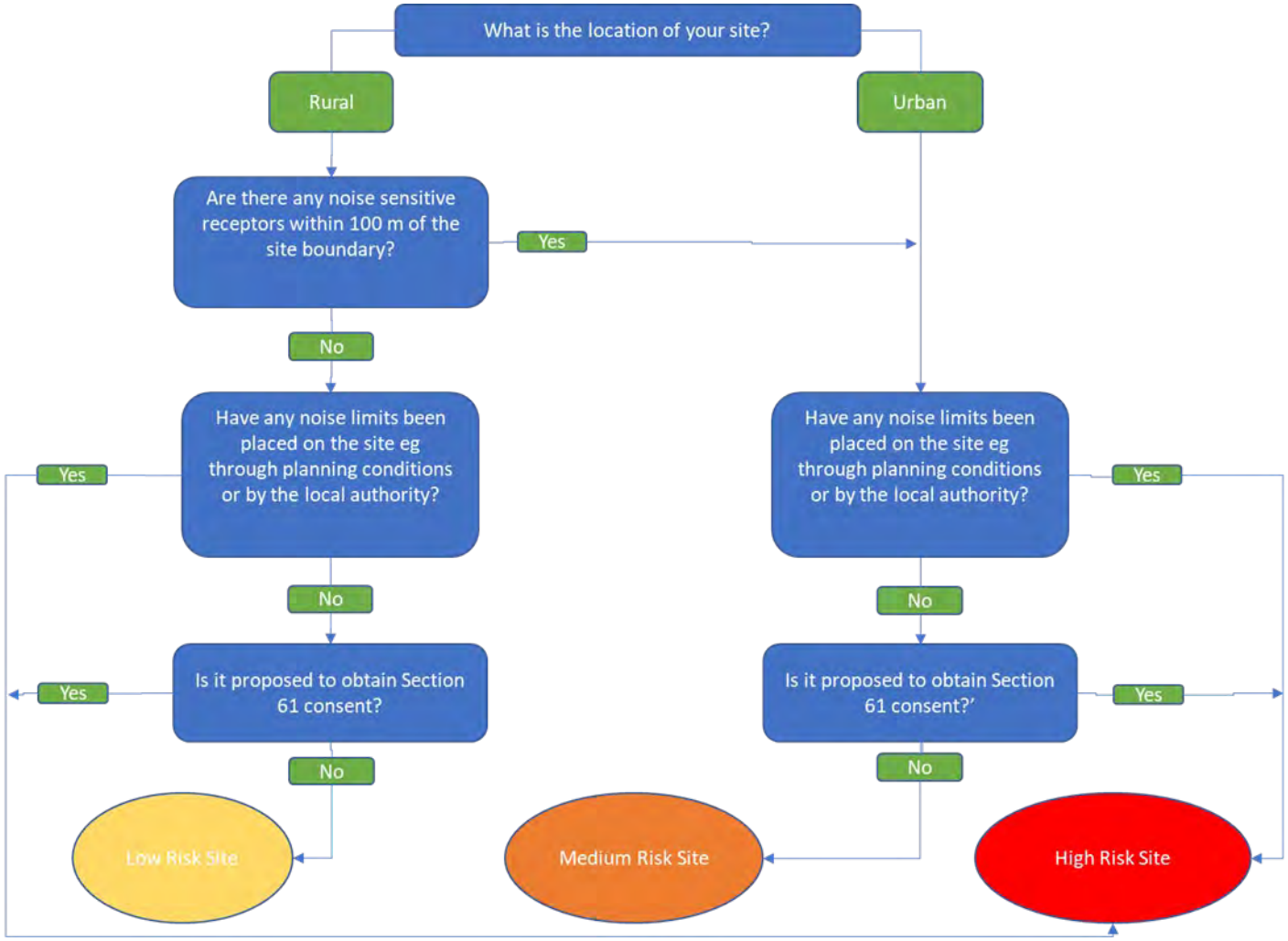


Figure 1 - Noise risk classification diagram

2.0 NOISE FORECAST:

Construction noise can have effects on the surrounding neighbourhood. The effects are varied and are complicated further by the nature of the Site works. Activities on site which could give rise to construction related noise impacts include (but are not limited to).

- Site preparation i.e. ground excavation, levelling of ground, trenching, trench filling, unloading and levelling of hardcore and compacting filling
- Construction of the Proposed Development including piling, construction of access roads, fabrication processes e.g. planning, sanding, routing, cutting, frilling and laying foundations

The predicted noise levels for the demolition works at each receptor and the subsequent assessment against the relevant LOAEL and SOAEL thresholds were presented within the Environmental Statement for Fallowfield's Campus Redevelopment Project (Buro Happold).
LOAEL is defined as the lowest observed adverse effect level, where as SOAEL is defined as the significant observed adverse effect level. The effect level thresholds and significance criteria for construction noise are;

Effect Level	Time Period	Threshold value (dB $L_{Aeq,T}$ dB)[2]
LOAEL	Working day	65
SOAEL	Working day	75

The noise predictions for works at each receptor and the subsequent assessment against the LOAEL and SOAEL are outlined below.

Receptor	Predicted Noise level for demolition activity (dB $L_{Aeq.T}$ façade)			Exceedances of LOAEL?	Exceedances of SOAEL?
	Soft Strip	Demolition	Filling & Leveling		
North	73	85	84	Yes	Yes
East/South	64	77	75	Yes	Yes
West	63	76	74	Yes	Yes
On-Site (North/South)	70	83	82	Yes	Yes

Several of the predicted worst-case demolition noise levels exceed the SOAEL, particularly in the case of the demolition activity itself.
As the noise levels represent the worst-case in terms of distance to receptors, it is reasonable to assume that they would occur for a relatively short time and be lower for most of the time when the works are further away.
However, based on the available information, it is considered likely that demolition noise will result in significant adverse effects at the closest receptors to the site.

3.0 PRE-CONSTRUCTION BASELINE NOISE MONITORING:

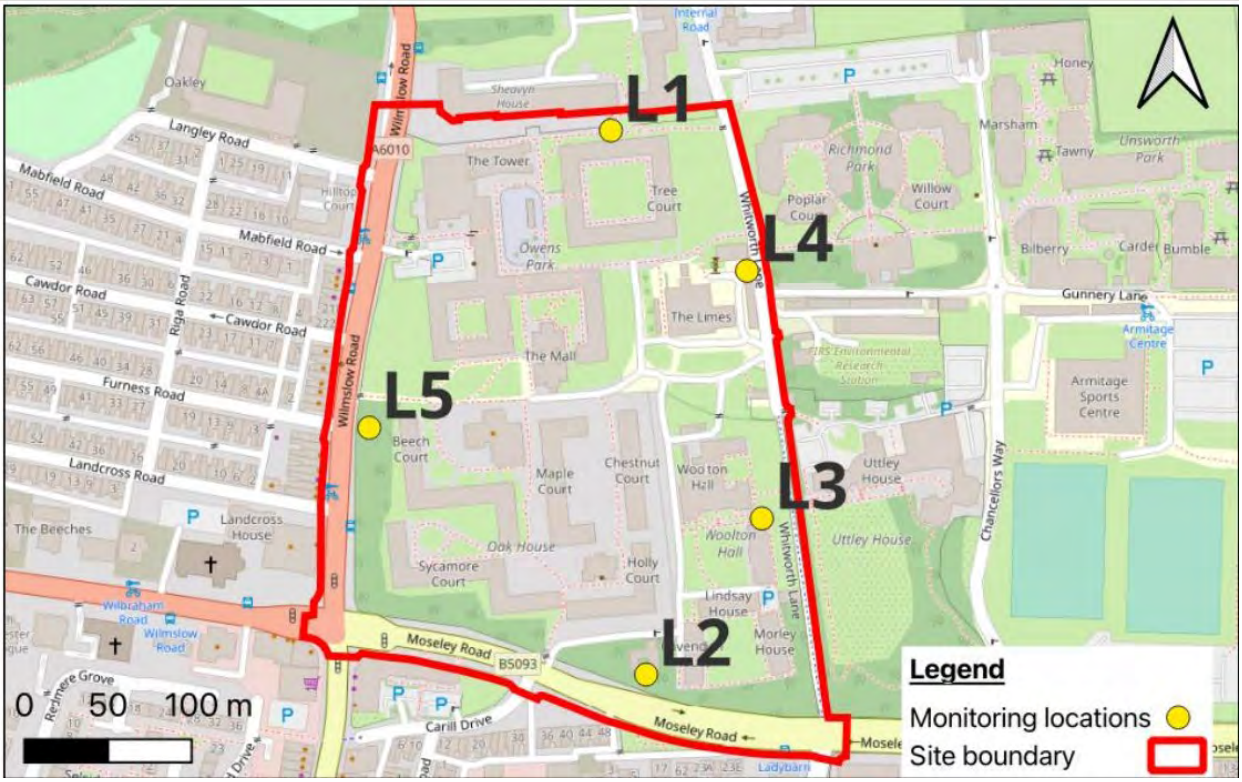
In order to provide a baseline from which to determine the impact of construction related noise, pre-construction noise monitoring should be undertaken at the site boundary and any other relevant locations i.e., closest noise sensitive receptors.

Should a Noise Impact Assessment or Environmental Impact Assessment have been completed as part of the planning process, baseline data may be available within this documentation.

Details of baseline surveys

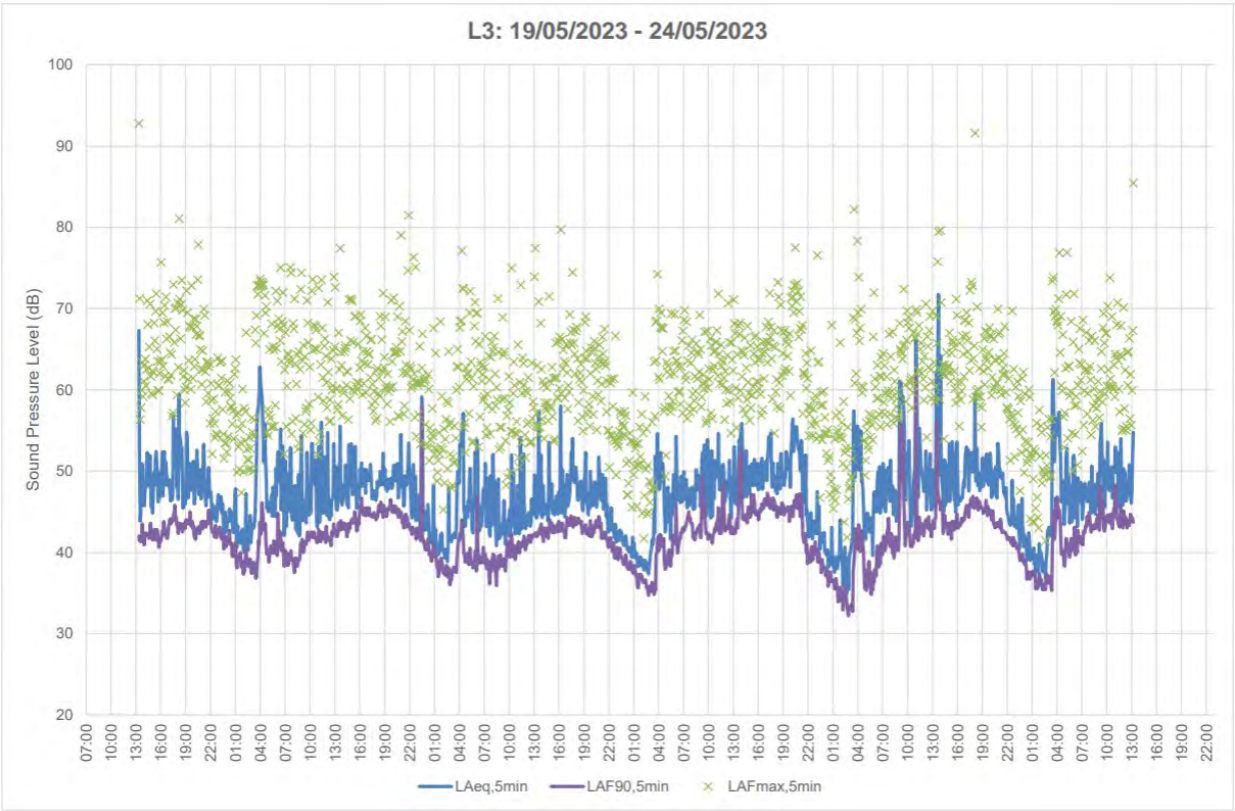
- Baseline noise surveys were undertaken between Friday 19th and Wednesday 24th May 2023 by Buro Happold and between Wednesday 10th and Friday 11th September 2024 by Cundall.

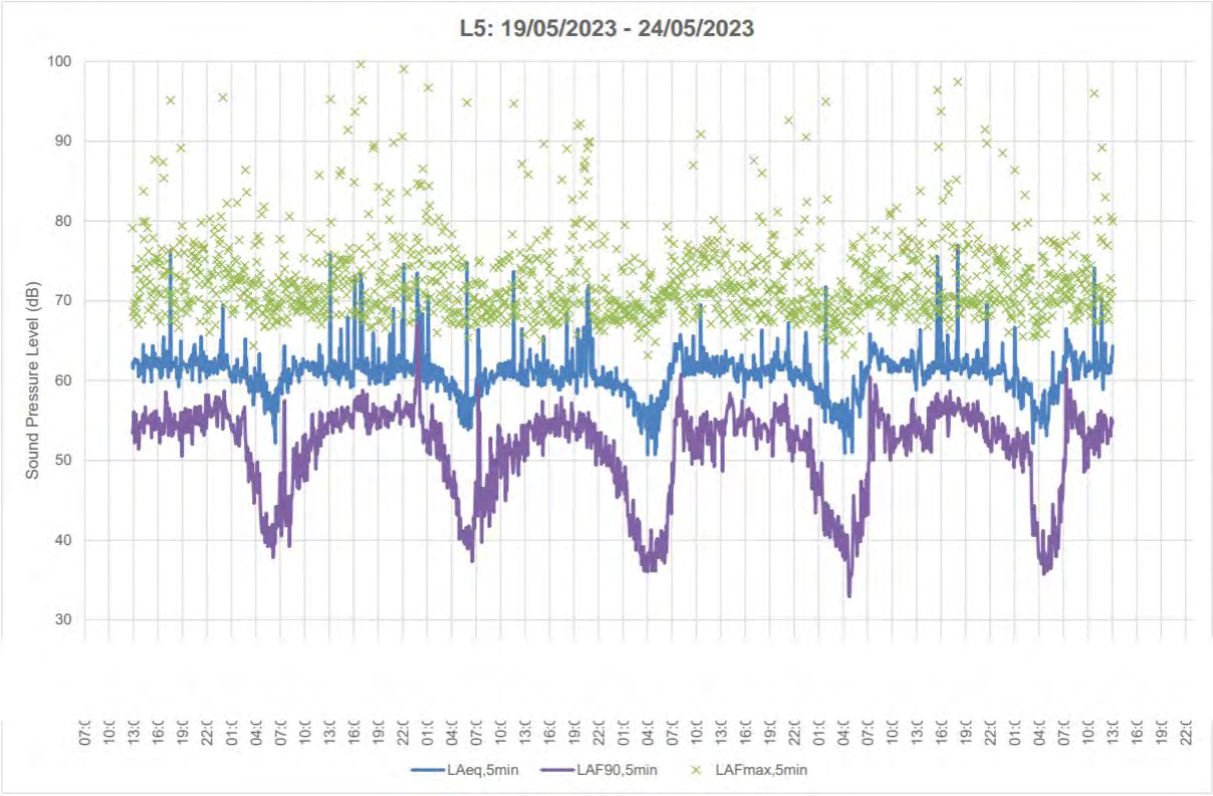
- The noise monitoring locations for the Buro Happold Survey are presented below



- L2, L3 and L5 were continuous unattended monitoring
- L1 was a short-term attended noise monitoring during the morning of Friday 19th May 2023.
- L4 was found to be dominated by noise from local fixed plant, which is to be removed as part of the works, and therefore was not used to measure noise levels
- During the noise survey, it was observed that the noise dominated by road traffic noise, with the A6010 Wimslow Road dominant on the north and west sides of the site, the B5093 Mosely Road at the south of the site, and contributions from both roads at the east of the site. Other noise sources noted included occasional aircraft overhead and fixed plant noise.

- The results of the baseline noise measurements are presented below

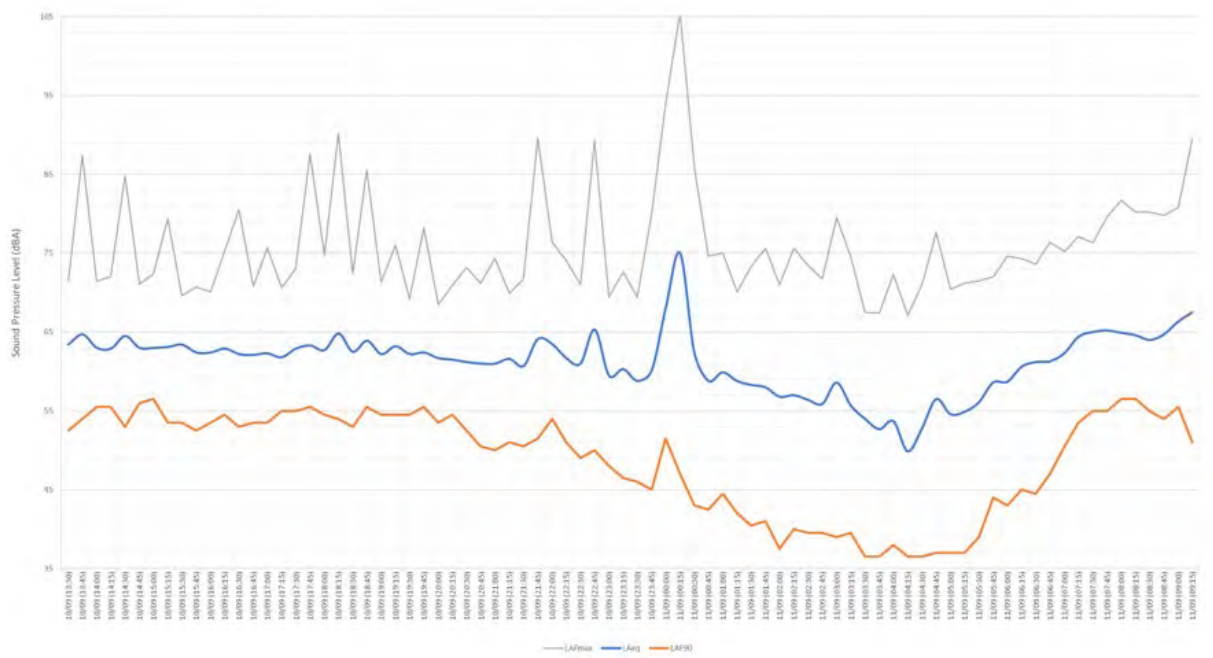

L3: 19/05/2023 - 24/05/2023
Sound Pressure Level (dB)
LAeq,5min
LAF90,5min
LAFmax,5min

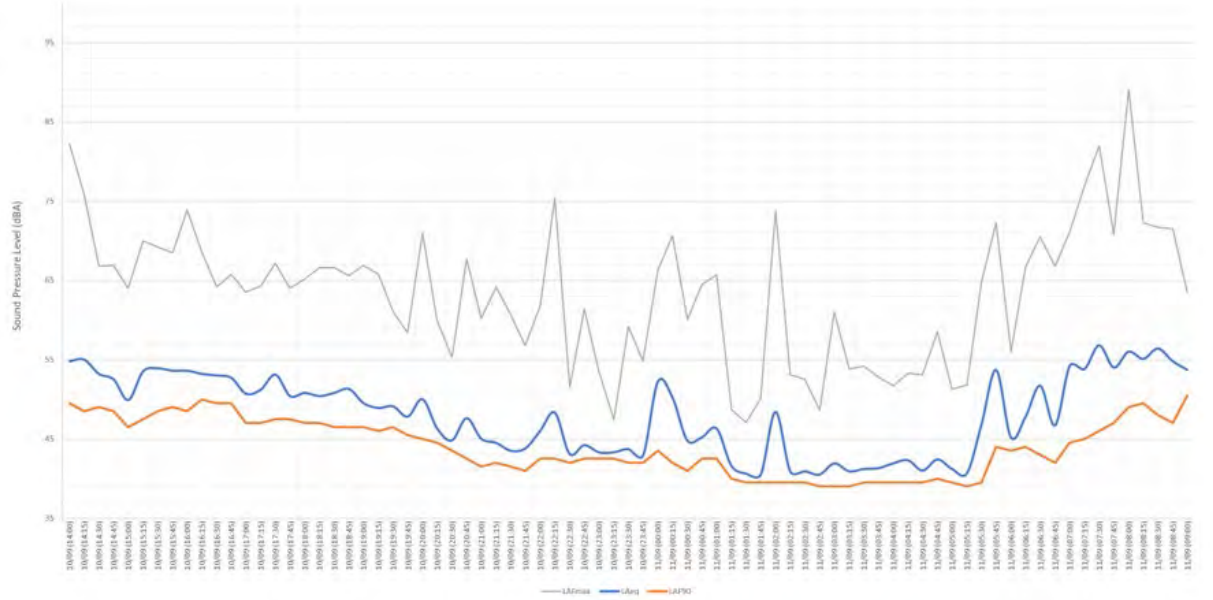

L5: 19/05/2023 - 24/05/2023
Sound Pressure Level (dB)
LAeq,5min
LAF90,5min
LAFmax,5min

- The noise monitoring locations for the Cundall Survey are presented below



- Both position MP1 and MP2 were continuous unattended monitoring
- Position MP1 was positioned out of a first floor window of Woolton Hall, overlooking Mosley Road. Road traffic along Mosley Road was noted to be the dominant noise source at this position.
- Position MP2 was positioned out of a first floor window of Richmond Park to the north east of the proposed development boundary. Distant road traffic from the surrounding network, primarily Wilmslow Road and Mosley Road was noted to be the dominant noise source at this position.
- The results of the baseline noise measurements are presented below





Details of noise and vibration receptors

- The site has existing residential accommodation in proximity to the boundary on all sides, both private dwellings and student residences.

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

Details of possible noise and vibration impacts and assessment

The Main Noise and Vibration sources relevant to the works are:

- Building soft strip
- Demolition of building and foundations
- Crushing of arisings
- Filling of voids and site levelling
- Construction Noise
- Construction Traffic Noise
- Construction Vibration

According to baseline noise survey the Noise effects during demolition are likely to result in significant adverse effects at the closet receptors to the site

4.0 CONSTRUCTION NOISE LIMIT THRESHOLD LEVELS:

There are no construction noise limit threshold levels specified within the contract documents or included within the planning conditions provided by Manchester City Council

In the absence of any contractual or consented noise limits, BS5228-1 provides guidance on significance criteria for assessing the potential noise impacts associated with the construction phase of large projects (for daytime works only). Where no other significance criteria has been set by the local authority, the BS5228-1 ABC Method (outlined below) can be utilised.

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

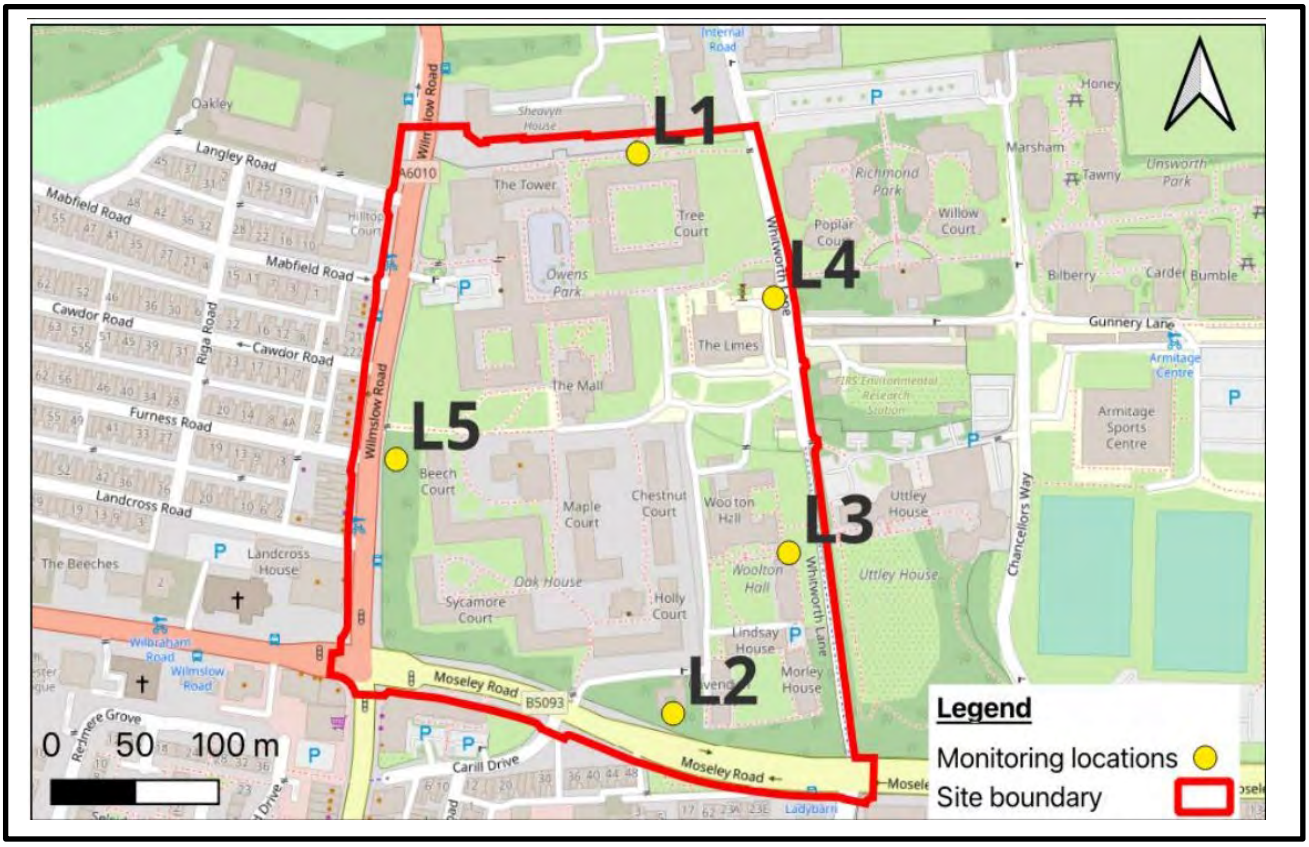
Assessment Category and Threshold Value Period (LAeq)	Threshold Value, in decibels (dB)		
	Category A *1	Category B *2	Category C *3
Daytime (0700 to 1900 hours) and Saturdays (0700 to 1300 hours)	65	70	75
*1 Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than this value.			
*2 Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.			
*3 Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category B values.			

The above noise threshold values are intended as a guide to indicate when construction related noise has potential to cause a nuisance to local noise sensitive receptors.

Where predicted or monitored construction noise levels are in exceedance of the noise threshold levels above, enhanced noise mitigation must be considered for implementation on site.

5.0 CONSTRUCTION PHASE NOISE MONITORING:

No site is completely without risk of complaint of nuisance arising from construction activities, particularly if there are noisy or night time works taking place. Implementation of Best Practicable Means as detailed in the Construction Environmental Management Plan will help to minimise the risk. However we must also undertake noise monitoring in order to be in a position to robustly defend ourselves against any enforcement action.



5.1 Low risk sites

For sites that have been classified as low risk, site teams can opt to undertake noise monitoring internally. Noise monitoring should be undertaken periodically during noisy and night time works. Results should be recorded on the Noise Monitoring Report and records retained on site.

5.2 Medium risk sites

For sites that have been classified as medium risk, site teams can opt to undertake noise monitoring internally. Noise monitoring should be undertaken regularly throughout normal construction activities and during noisy and night time works. It is recommended that daily noise monitoring is undertaken at identified noise sensitive receptors and this frequency should be increased during noisy and night time works. Results should be recorded on the Noise Monitoring Report (IMS Ref: PF10-PR10-43-F030 Noise Monitoring Report Form) and records retained on site.

5.3 High risk sites

High risk sites are defined by a contractual or legal requirement to abide by specific noise conditions at all times unless stated as an exemption. As such the risk of prosecution or enforcement action at these sites is greatest and for that reason sites must have a robust monitoring system in place should a defence to any alleged breach of condition be required.

It is recommended that noise monitoring at high risk sites is continuous and outsourced. Monitoring equipment should be setup at pre-defined locations that are representative of the closest noise sensitive receptors. Should a Noise Impact Assessment or Environmental Impact Assessment have been completed at planning stage this may be used as a guide to identify relevant locations. Alternatively monitoring locations may be pre-determined by planning condition or as a condition of Section 61 consent.

6.0 ENVIRONMENTAL NOISE MONITORING GUIDELINES (For monitoring undertaken by site or SHE teams)

- Follow manufacturer's instructions for the correct use of the noise meter
- Ensure the site is operating under normal conditions during monitoring e.g. not during meal breaks.
- Use the Fast time weighting on the Noise meter
- Noise meter should be mounted on a tripod at a height of approximately 1.5 m from the ground.
- The microphone of the noise meter should be directed towards the noise source i.e the construction works.
- Where possible the noise meter should be placed at least 3 meters from any hard surface eg a wall or façade of a building. If this is not possible this should be recorded on the record proforma as façade (as opposed to free-field)
- Noise measurements should be undertaken for a time period of 20 minutes per location. At the end of the measurement period the LAeq, LA Max and LA01 parameters should be recorded in the GRAHAM Noise Monitoring Report Form (IMS Ref: PF10-PR10-43-F030 Noise Monitoring Report Form)
- The portable calibrator should be used to check the calibration of the meter prior to and after each measurement. The noise level from the calibrator should be recorded in the proforma. If the reading from the portable calibrator is +/- 1.0 dB difference from the specified level (usually 94dB or 104 dB – specific to the calibrator model) then the sound level meter should be manually calibrated following the instructions in the user manual.

7.0 MINIMUM STANDARDS FOR NOISE MONITORING EQUIPMENT

7.1 Minimum Standard Noise Monitoring Equipment (Low and Medium Risk Sites)

- Class 1 or class 2 integrating sound level meter (Lab calibrated every 2 years)
- Compatible portable calibrator (Lab calibrated every year)
- Tripod

7.2 Minimum Standard Noise Monitoring Equipment (High Risk Sites)

- 1 or more permanent unmanned noise meter erected in appropriate locations
- The capability for text or email alerts of breaches of specific noise limits to allow for immediate intervention.
- Data collated on an online portal such as Sonitus Cloud or equivalent. Any equivalent system should be comparable to the Sonitus system and allow for:
  - Viewing real-time data
  - The processing of hourly and daily averages
  - Customizable data output in line with the noise limit requirements of the site
  - The ability to generate reports
  - A user-friendly interface.

8.0 SUPPLIERS

Suppliers of Suppliers of Noise Monitoring Services include (GB): RVT, SRL, Campbell Associates, John F Hunt (London only): (NI/ROI) Sonitis, NVM Ltd. In addition, a small number of Class 1 Noise Monitors are available from GRAHAM Small Tools. These are suitable for use on high-risk sites when utilised in co-ordination with an online web-based platform providing suitable data analysis.

Appendix B – Project Environmental Risk and Opportunities Register

Project Environmental Risk and Opportunities Register

PF10-PR10-43-F003

Project: University of Manchester, Fallowfields Campus

Brief description of the project

The University of Manchester would like to procure a Student Housing Partner ("SHP") to design, build, finance and operate new-build student accommodation at the Fallowfield Campus which should have minimal impact on the University's balance sheet.
The University envisages that, as a minimum, the first 2 phases at Fallowfield, a total of c. 2,300 – 2,500 beds, will be procured as a single transaction. The University intends to carry out some demolition while procuring the SHP (and prior to Financial Close) in order to create a first-phase development site. The University's preference is that once the first phase is operational, either the University or the SHP will demolish further buildings and commence subsequent phases, in order to maximise the number of beds that remain available before new ones are built. Total number of beds c 3,300.
The University will grant long-term property interests to the relevant project party (being either the SHP or its funder). The SHP will be entitled to earn rental income under the terms of a Project Agreement for an expected operation period of c. 50 years. The SHP will be required to finance and deliver the relevant facilities

INFORMATION:

- This Project Environmental Risk and Opportunities Register (PEROR) has been completed by the Regional Environmental Manager in cooperation with the Project Manager.
- This PEROR lists the Noise & Vibration Aspect and identifies the significant Environment Impacts created as a result of the construction activities, specific to this project. In determining the Noise and Vibration aspect, we have considered a life cycle perspective and we have identified those lifecycle stages over which we have greatest control and/ or influence. We have also considered whether these aspects occur in normal, abnormal or emergency conditions. In addition, this document describes the environmental control measures that are to be used to eliminate or minimise these Impacts.

- This PEROR is the first phase of the assessment of environmental risk on this project. Additional construction activity Environmental Risk Assessments will be completed throughout the duration of the project.

DETERMINING SIGNIFICANT NOISE & VIBRATION ASPECTS AND ASSOCIATED ENVIRONMENTAL IMPACTS:

- Significance assessment score or scale of impact, is determined by the product of **"Likelihood of the environmental impact"** and **"severity of consequences"** to give a maximum possible score of 9.

- Risk Rating Values are grouped into three broad classes: 4 - 9: HIGH RISK; 2 - 3: MODERATE RISK; 1: LOW RISK

- The Likelihood of the Environmental Impact is grouped into the following categories (Unlikely; Likely; Near Certain). The scoring for each category is as listed within table 1 below.

- The Severity of Consequences is grouped into the following categories: Minor- (Should not result in serious environmental damage); Serious - (Could result in serious environmental damage); Extreme- (Could cause serious environmental damage). The scoring for each category is as listed within table 1 below.

Table 1	LIKELIHOOD OF ENVIRONMENTAL IMPACT (L)			
SEVERITY OF ENVIRONMENTAL IMPACT (S)		1. (Unlikely)	2. (Likely)	3. (Near certain)
	1. Minor	1	2	3
	2. Serious	2	4	6
	3. Extreme	3	6	9

- Risk control measures are listed for environmental hazards graded 2 and above
- Residual risk is the level of risk that remains after suitable and sufficient control measures are introduced.

Source of Aspect	Aspect	Actual and Potential Environmental Impacts	Actual and Potential Risks	Actual and Potential Opportunities	Risk			Risk Controls and Opportunities	Residual Risk		
					L	S	L*S		L	S	L*S
• Building soft strip • Demolition of building and foundations • Crushing of arisings • Filling of voids and site levelling • Construction Noise • Construction Traffic Noise • Construction Vibration	Noise	Nuisance noise impacts on the local residential community, both private dwellings and student residences, and wildlife Health problems linked to noise exposure	Potential for non-compliance to relevant legislation and requirements	Reputation enhancement as an environmentally focused organisation	3	3	9	According to the Environmental Statement for the Fallowfield Campus Redevelopment Project, noise affects during construction are likely to have a significant; major adverse effect. Implement a site-specific Noise Management Plan in order to outline the steps required in order to ensure best practice with regard to the minimisation of noise. This will include details of measures to mitigate and manage noise from the demolition and construction works based on the concept of best practicable means (BPM) Mitigation measures will include the selection of plant and methods producing lower levels of noise, and the use of localised screening and enclosures around noisy plant and activities. It is anticipated that implementation of such measures would reduce noise levels by up to 10 dB.	2	2	4
• Vibratory rolling associated with the filing of voids • Site levelling activity • Construction Vibration associated with vehicle movement	Vibration	Nuisance vibration impacts on the local residential community, both private dwellings and student residences and wildlife Health problems linked to vibration exposure Damage to buildings and retained services from excessive vibration	Potential for non-compliance to relevant legislation and requirements	Reputation enhancement as an environmentally focused organisation	2	2	4	The Environmental Statement provided for the Fallowfield Campus Redevelopment confirms that any project vibration affects during construction are likely not to have significant but minor adverse effect. Works with a vibration risk will be undertaken inline with best practice for vibration control. E.g. Piling will be CFA hydraulic piling instead of impact piling Speeds of site levelling will be reduced	1	1	1

Appendix C – Extract from Environmental Statement.

7 NOISE AND VIBRATION

7.1 INTRODUCTION

7.1.1 This chapter of the ES assesses the likely environmental effects of the proposed development with respect to noise and vibration. This chapter also describes the methods used to assess the effects; the baseline conditions currently existing at the site and surrounding area; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been adopted.

7.1.2 An assessment of the suitability of the site for the proposed noise sensitive uses, including consideration of glazing, ventilation and overheating strategies with respect to noise, is provided in Appendix 7-F.

7.1.3 Interactive effects associated with noise and vibration have additionally been considered within the ES and can be found in Chapter 10 Interactive Effects.

7.1.4 A short glossary of acoustic terms is provided at the end of this chapter in section 7.9, with further details provided in Appendix 7-A.

7.2 METHODOLOGY AND ASSESSMENT CRITERIA

EIA Scoping

7.2.1 An Environmental Impact Assessment (EIA) Scoping report was submitted for comment to Manchester City Council (MCC) including the proposed approach to the assessment of potential noise and vibration effects from the proposed development. In summary, the proposed scope covered the undertaking of a baseline noise survey and the consideration of the potential effects of construction noise and vibration, as well as the definition of target noise levels for fixed plant installations (e.g., for ventilation or heating/cooling) and entertainment premises.

7.2.2 The Scoping opinion issued by MCC in response contained several comments relating to noise and vibration. These are presented in Table 7—1 together with responses on how these have been addressed, if required at this stage of the scheme.

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

Scoping opinion comment	Response
The applicant/consultant will need to provide a noise assessment for residential sound insulation, based on MCC criteria. The applicant and consultant will need to be aware that any plant associated with the residential properties as part of the development such as ASHP / GSHP/ ventilation etc will also need to be considered within these noise sources as well as any other fixed plant. In addition, other buildings such as commercial or office will also need to be considered as sensitive receptors with regard to the criteria and not just existing and proposed residential uses.	This chapter is accompanied by a site suitability assessment that includes indicative sound insulation requirements for the proposed student accommodation based on existing noise levels. As this is an outline planning application, the sound insulation requirements are not detailed/final, and do not factor in noise from proposed fixed plant as details of this are not yet known. Should consent be granted, it is proposed a planning condition is included requiring that final details of the sound insulation scheme are submitted prior to construction. Furthermore, as details of proposed fixed plant are not yet available, noise from this source has not been assessed in this chapter. Target noise levels for fixed plant have been defined at the nearest noise-sensitive receptors based on the results of the noise survey and MCC guidance. Should consent be granted, it is proposed that a planning condition is included requiring a noise assessment of the final fixed plant selections is submitted prior to construction.
The applicant/consultant will need to be aware that an AVO overheating assessment will be required and assessment / recommendations will be required to ensure the internal noise criteria will be met without residents relying on openable windows for ventilation. Assessment of any alterative scheme of ventilation will also be required and also assessment and recommendations with regard to insulation of any façade penetrations for air intake / extract for example.	This chapter is accompanied by a site suitability assessment that includes consideration of the requirements of ventilation and overheating with respect to noise. As this is an outline planning application, this will provide potential design solutions. Should consent be granted, it is proposed that a planning condition is included requiring that final details of the approach to ventilation/overheating are submitted prior to construction (it is expected that this would be part of the submission of sound insulation requirements discussed in the previous response).

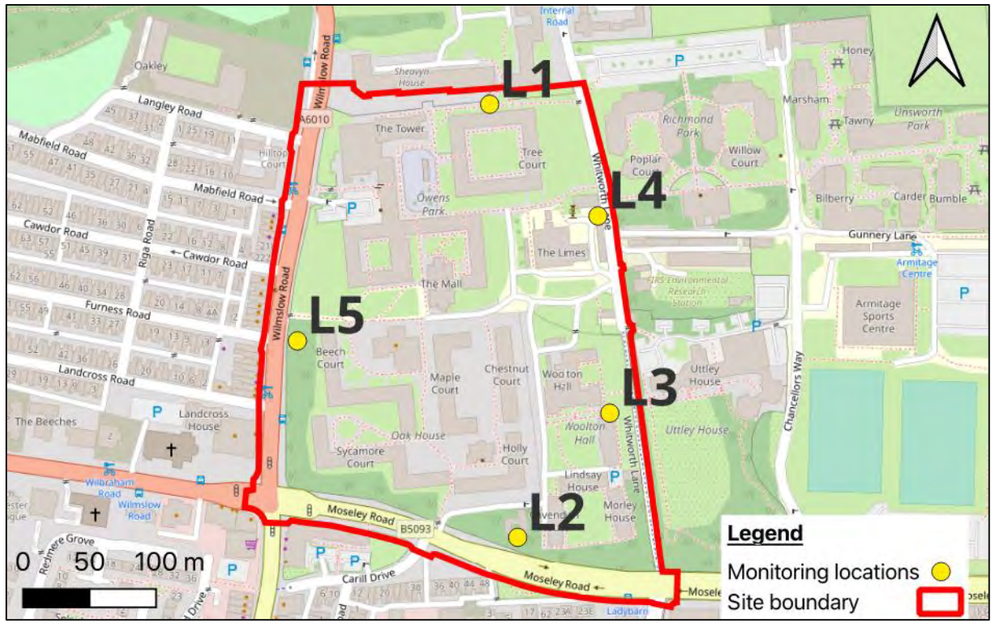
7.2.3 In addition, the relevant officer from the MCC Environmental Protection Section was contacted by email on Thursday 11th May 2023 to request comments on the proposed baseline noise survey methodology as well as the overall approach to the assessment. Comments were received on 19th May 2023 requesting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

Baseline study methodology

7.2.4 To characterise and quantify the existing noise environment around the site, a baseline noise survey was undertaken at locations selected to be representative of both the closest noise sensitive receptors to the site, and the proposed buildings within the site that will be most exposed to existing sources of noise, which are primarily the adjacent roads. Consequently, all monitoring locations are close to the boundary of the site where the interface with noise sensitive receptors and existing noise sources is located.

7.2.5 The noise monitoring locations are shown in Figure 7—1 together with the site boundary. It is noted there were technical problems at some locations which are discussed further below.

Figure 7—1 Baseline noise survey monitoring locations



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7.2.6 The noise survey was conducted between Friday 19th and Wednesday 24th May 2023 and comprised three locations where continuous unattended monitoring was undertaken (L2, L3 and L5), supplemented by short-term attended monitoring during the morning of Friday 19th May 2023 at the L1 position. Note that originally there was a position L4 on the eastern side of the boundary between L1 and L3; however, this was found to be dominated by noise from local fixed plant, which would be removed as part of the proposed development, and therefore this measurement location was not used. Measurements were made at 5 minute intervals.

7.2.7 Monitoring was undertaken using Class 1 monitoring equipment at a height of 1.5 m above local ground level under free-field conditions (i.e., measuring free-field levels), except at L3 which was at a height of 6 m under façade conditions (i.e., measuring façade levels). All sound level meters were field calibrated prior to and following the measurements using a Class 1 acoustic calibrator. No significant change in sensitivity was noted. All microphones were fitted with a windshield. Further details of the equipment used for positions L3 and L5[1] together with the relevant laboratory calibration certificates are provided in Appendix 7-B.

7.2.8 Regarding weather during the survey period, following a review of local weather stations[2], there were relatively low winds (below 5 m/s) and minimal rainfall. On this basis, no noise data has been excluded due to adverse weather conditions.

7.2.9 As mentioned above, technical problems with the monitoring equipment occurred at the L1 position on the northern boundary, and the L2 position on the southern boundary. Upon review, the data from these locations was found to be potentially unreliable, and therefore was excluded from further consideration.

7.2.10 With respect to the southern boundary of the site, following a review of observations from the survey, traffic data published by the government[3] and noise measurements undertaken for a previous application at the site[4], it was confirmed that noise at both the western and southern boundaries are dominated by similar levels of road traffic noise. Therefore, the noise levels measured at L5 are also considered representative of the southern boundary. Regarding the northern boundary, a similar review exercise indicated that noise levels measured at L3 can be considered representative of those experienced at the northern boundary. Therefore, for the purpose of the assessment, the monitored levels from L5 and L3 have been referenced when considering the noise exposure at the southern and northern boundaries of the site respectively.

7.2.11 Due to the high volumes of road traffic using the roads surrounding the site, it is considered unlikely that the measured baseline noise levels will materially change prior to completion of the proposed development.

Assessment approach

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

Construction noise and vibration

7.2.13 Regarding temporary noise and vibration arising from the construction of the proposed development, following a review of the information available at the time of writing, there is only sufficient detail to assess the demolition works as the construction programme and methodologies are not sufficiently developed. It is anticipated that the assessment of demolition will represent the worst-case in terms of the potential effects of noise and vibration from the overall construction process, and that any further assessment, if required, can be addressed in a Construction Environmental Management Plan (CEMP).

7.2.14 It is understood that the demolition of the existing buildings will be phased. The indicative phasing plan states that the northern half of the site will be demolished as part of Phase A between Q4 2023 and Q4 2024, while the southern half of the site remains occupied. The indicative plan then shows the subsequent construction works on the northern half of the site being completed by Q3 2027. Demolition of the southern half of the site is indicated as taking place as part of Phases B & C between Q3 2027 and Q1 2028. This means that the new accommodation in the northern half of the site may be occupied while demolition works on the southern half take place. See Chapter 4 of the ES for further details of the indicative construction phasing and programme, which would be updated as part of a future reserved matters stage.

7.2.15 Noise and vibration associated with the demolition works has been predicted at the relevant sensitive receptors (see section 7.4 of this chapter) based on the data and methods described in BS 5228 Parts 1[5] and 2[6] together with information provided in Chapter 4 of the ES and from further correspondence with the demolition consultant. Noise has been predicted for the following demolition activities:

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

7.2.16 The predictions have been based on the shortest distance between the activity and the sensitive receptors to provide a worst-case assessment.

7.2.17 Vibration has been predicted for the vibratory rolling associated with the filling of voids and site levelling activity. Of the plant assumed for the demolition activities, vibratory rolling is the only one for which a prediction methodology is included in BS 5228 Part 2; this has been used together with industry guidance[7] to convert the result to the vibration dose value (VDV) metric, as well as estimate vibration levels on the upper floors of buildings. Compaction has been assumed to take place across an area of approximately 1,000 m^2, with the sensitive receptors adjacent to the centre of one of the sides of this area of work at the stated distance to provide a worst-case assessment.

7.2.18 Further details of the plant assumptions for the prediction of noise and vibration from the demolition activities, including their usage per day, is included in Appendix 7-C.

Target noise levels for fixed plant noise and entertainment noise

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

7.1.1 ———————————————

[1] other locations were affected by technical problems and therefore the data was disregarded.
[2] IMANCH115 (https://www.wunderground.com/dashboard/pws/IMANCH115); IMANCH125 (https://www.wunderground.com/dashboard/pws/IMANCH125); IMANCHES66 (https://www.wunderground.com/dashboard/pws/IMANCHES66)
[3] Department for Transport Road traffic statistics: https://www.gov.uk/government/collections/road-traffic-statistics
[4] MCC planning application reference 110184/FO/2015/S1
[5] BSI Standards Limited (2014), BS 5228-1:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites, Part 1 Noise
[6] BSI Standards Limited (2014), BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites, Part 2 Vibration
[7] The Association of Noise Consultants (2012), ANC Guidelines: Measurement & Assessment of Groundborne Noise & Vibration

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7.2.20 Therefore, target noise levels have been defined at the relevant sensitive receptors based on the relevant policy and guidance (see section 7.3 of this chapter) and the results of the baseline noise survey. These will be referenced during the detailed design of the proposed development to ensure that any significant noise effects from fixed plant or entertainment noise will be avoided. As such, no further assessment is required at this outline planning stage.

7.2.21 Target noise levels have been defined for the relevant periods of interest, i.e., the periods during which the fixed plant and the entertainment premises are anticipated to be in operation. It has been assumed that fixed plant installations could be in operation at any time of the day, and therefore the results of the baseline noise survey have been analysed to identify a typical background sound level (dB $L_{A90,5min}$) for the standard day (07:00-23:00) and night (23:00-07:00) periods, with the target noise levels derived from these values.

7.2.22 For entertainment premises, it is understood that (based on the hours of use of the existing premises on the site) this would be likely to operate on weekdays between 13:00 and 00:00, and on weekends between 12:00 and 00:00. The results of the baseline noise survey have been analysed to identify a typical background sound level for these periods in each 1/1 octave band between 63 Hz and 4000 Hz (dB $L_{90,5mins}$), with the target noise levels derived from these values.

Assessment of effects

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

Construction noise and vibration

7.2.24 The potential significance of construction noise and vibration at the relevant sensitive receptors has been assessed based on the method described in Annex E of BS 5228 Part 1 for noise and the current industry best practice for vibration[8], expressed in terms of LOAEL and SOAEL thresholds, together with the duration of any SOAEL exceedance. These details are presented in Table 7—2 for noise and Table 7—3 for vibration.

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

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

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

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

7.2.25 The criteria defined in Table 7—2 and Table 7—3 relate primarily to residential receptors, which are of high sensitivity. Therefore, they have also been used when assessing the potential effects of construction noise and vibration on any other types of sensitive receptors, which is considered to be a cautious approach. Where predicted construction noise or vibration levels are above the LOAEL but below the SOAEL, then adverse (non-significant) effects are indicated.

7.2.26 To maintain consistency with the standard descriptors of effect significance typically used in EIA, the effect level thresholds and significance criteria have been equated to the "level" of significance in Table 7—4 for noise and Table 7—5 for vibration. Note that for construction noise and vibration, all effects are considered to be adverse.

Table 7—4 EIA descriptors significance level for construction noise

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

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

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

7.3 Legislation and policy which has influenced assessment or mitigation

National policy and guidance

National Planning Policy Framework (2021)[9]

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

7.1.1

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

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

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

  e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.'

- Paragraph 185: 'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

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

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

7.3.3 Paragraph 185a includes a direct reference to the Noise Policy Statement for England for further information regarding the potentially adverse and significant adverse effects of noise.

Noise Policy Statement for England (2010)[10]

7.3.4 The overarching Government policy on noise is set out in the NPSE. It seeks to clarify the underlying principles and aims in past and existing policy documents, legislation and guidance in relation to all forms of noise including environmental noise, neighbour noise and neighbourhood noise (but not noise in the workplace).

7.3.5 It uses the established concepts from toxicology of the No Observed Effect Level (NOEL) and the Lowest Observed Adverse Effect Level (LOAEL). As set out in the explanatory notes, the NPSE extends these by introducing Significant Observed Adverse Effect Level (SOAEL). This is the level above which significant adverse effects on health and quality of life occur.

7.3.6 The explanatory note to the NPSE states that it is not possible to identify a single objective value to define SOAEL for noise that is applicable to all sources of noise in all situations. It is likely to be different for different noise sources, for different receptors and at different times. The NPSE recognises that *'further research is required to increase understanding of what may constitute a significant adverse impact on health and quality of life from noise. However not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.'* Consequently, the practitioner must determine the appropriate threshold values to be adopted for the sources and situations being assessed, based on the available evidence.

7.3.7 The NPSE's vision is to:

'Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

This long-term vision is supported by the following aims:

- *Avoid*[11] *significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life.*

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

7.3.8 Within the NPSE, the phrase '*within the context of Government policy on sustainable developmen*t' is used. This means that noise must not be treated in isolation. Instead, when implementing the aims of the policy, consideration should be given to the economic and social benefit of the activity causing the noise as well as the other environmental effects of the development.

7.3.9 The second aim of the NPSE refers to noise impacts that lie somewhere between LOAEL and SOAEL. The NPSE asserts that, while this means that all reasonable steps should be taken to mitigate and minimise adverse effects, this does not mean that such adverse effects cannot occur.

Planning Practice Guidance for Noise (2019)[12]

7.3.10 Further government guidance on the consideration of noise for planning has been published as the Planning Practice Guidance for Noise (PPG:N), last revised in July 2019. The PPG:N supports the NPPF by providing a range of advice and includes a noise exposure hierarchy table, and again makes reference to the NPSE.

7.3.11 The hierarchy table (reproduced in Appendix 7-D), provides descriptive (i.e., non-numerical) guidance on the potential effects of various degrees of noise exposure with reference to the effect levels referred to in the NPSE, i.e., where noise is above or below the NOEL, LOAEL and SOAEL, as well as featuring the additional effect level of No Observed Adverse Effect Level (NOAEL) and a description of unacceptable adverse effects that should be prevented. The table confirms that adverse effects (between LOAEL and SOAEL, where noise starts to cause small changes in behaviour or attitude) should be mitigated and reduced to a minimum. Increasing noise exposure will cause the SOAEL boundary to be crossed, with there being two levels of adverse effect above it:

- A significant observed adverse effect – noise causes a material change in behaviour, e.g., keeping windows closed or avoiding certain activities at certain times. The planning process should be used to avoid this effect occurring, for example through choice of sites and use of appropriate mitigation. It is undesirable for such exposure to be caused, but as mentioned in footnote 11, there are circumstances when such effects can occur. Decisions must take account of the economic and social benefit of the activity causing or affected by the noise caused; and

- An unacceptable adverse effect – noise exposure would cause extensive and sustained adverse changes in behaviour and / or health without the ability to mitigate the effects of the noise. Under these circumstances, the impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise this situation must be prevented from occurring.

Local policy and guidance

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

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

7.1.1

[10] Department for Environment, Food & Rural Affairs (DEFRA) (2010), Noise Policy Statement for England.

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

[12] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government (2019), Planning Practice Guidance: Noise. https://www.gov.uk/guidance/noise--2

[13] Manchester City Council, 2012, Manchester's Local Development Framework – Core Strategy and Development Plan Document

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Other relevant policy and guidance

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

7.1.1

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

Assessment limitations (technical deficiencies or lack of knowledge)

7.3.20 Demolition noise and vibration has not been predicted and assessed at every potential sensitive receptor (i.e., every individual property). The assessment has been based on the receptors nearest to each of the four sides of the site, therefore representing a worst-case.

7.3.21 The assumptions used for demolition plant and methodology are estimates and are subject to modification, but they are considered to allow assessment of the reasonable worst-case demolition effects.

7.3.22 As previously discussed, sufficient detail with which to undertake predictions of noise from fixed plant installations and entertainment premises is not available. Therefore, conservative target noise levels have been defined that will be referenced in the detailed design of the proposed development to ensure that any significant noise effects from these elements are avoided.

7.4 BASELINE CONDITIONS

Current baseline

7.4.1 The baseline noise environment, as observed during the noise survey, was dominated by road traffic noise, with the A6010 Wimslow Road dominant on the north and west sides of the site, the B5093 Mosely Road at the south of the site, and contributions from both roads at the east of the site. Other noise sources noted included occasional aircraft overhead and fixed plant noise.

7.4.2 The results of the noise measurements at locations L3 and L5 are presented as time history graphs in Appendix 7-E. The data has also been analysed to identify the typical background levels for the relevant periods discussed in section 7.2 of this chapter based on the method detailed in Appendix A of the MCC Planning and Noise Technical Guidance document. The typical background noise levels relating to the assumed operating hours of any fixed plant are presented in Table 7—6.

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

Location	Period	Typical background sound level[1](dB $L_{A90,5min}$ free-field)
L3	Day	37
	Night	33
L5	Day	46
	Night	38
Note: [1] Derived based on method detailed in Appendix A of the MCC Planning and Noise Technical Guidance		

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

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

Location	Typical background sound level at 1/1 octave band centre frequency, Hz (dB $L_{90,5min}$ free-field)							
	63	125	250	500	1000	2000	4000	8000
L3	46	37	35	33	33	30	29	32
L5	61	51	49	47	47	45	43	46

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Future baseline

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

Identified receptors

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

Table 7—8 Identified receptors

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

7.5 CONSTRUCTION EFFECTS

Relevant aspects of the scheme

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

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

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

Potential effects of the development and their significance

Construction noise (demolition works only)

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

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

Receptor	Predicted noise level for demolition activity (dB $L_{Aeq,T}$ façade)			Exceedances of LOAEL?	Exceedances of SOAEL?
	Soft strip	Demolition	Filling & levelling		
North	73	**85**	**84**	Yes	Yes (in bold)
East/South	64	**77**	75	Yes	Yes (in bold)
West	63	**76**	74	Yes	Yes (in bold)
On-site (north/south)	70	**83**	**82**	Yes	Yes (in bold)

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

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

Construction vibration (demolition works only)

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

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

Receptor	Predicted vibration level for vibratory roller (VDV m/s$^{1.75}$)		Exceedances of LOAEL?	Exceedances of SOAEL?
	Ground floor	Upper floors*		
North	0.19	0.47	Yes (upper only)	No
East/South	0.14	0.35	Yes (upper only)	No
West	0.13	0.32	Yes (upper only)	No
On-site (north/south)	0.11	0.28	Yes (upper only)	No

* values include a multiplication factor of 2.5 to account for possible amplification of vibration on upper floors of buildings.

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

Climate change and adaptation

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

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

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

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Summary of effects

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

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

Intermediate year construction effects

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

Supplementary mitigation measures

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

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

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

7.6 OPERATIONAL EFFECTS

Target noise levels for fixed plant and entertainment premises

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

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

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

Receptor	Period	Target noise level for fixed plant installations (dB $L_{A90,5min}$ free-field)
North/East	Day	32
	Night	28
South/West	Day	41
	Night	33

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

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

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

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

7.7 RESIDUAL EFFECTS AND CONCLUSIONS

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

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

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

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

7.8 REFERENCES

- BSI Standards Limited (2014), BS 5228-1:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites, Part 1 Noise;
- BSI Standards Limited (2014), BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites, Part 2 Vibration; and
- Department for Environment, Food & Rural Affairs (DEFRA) (2010), Noise Policy Statement for England.
- Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (2019), Planning Practice Guidance: Noise.
- High Speed Two (HS2) Limited (2017), High Speed Two Phase One Information Paper E23: Control of construction noise and vibration.
- Manchester City Council, 2012, Manchester's Local Development Framework – Core Strategy and Development Plan Document
- Manchester City Council, 2022, Planning and Noise Technical Guidance
- Ministry of Housing, Communities & Local Government (2021), National Planning Policy Framework.
- The Association of Noise Consultants (2012), ANC Guidelines: Measurement & Assessment of Groundborne Noise & Vibration;

7.9 GLOSSARY

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

7.10 LIST OF APPENDICES (ES VOLUME III)

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

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7.11 NON-TECHNICAL SUMMARY

Introduction

7.11.1 The noise and vibration chapter has predicted and assessed the potential effects of the demolition works associated with the proposed development, which are anticipated to represent the worst-case in terms of the potential effects of noise and vibration from the overall construction process. It also sets out target noise levels for fixed plant installations and entertainment premises to be referenced in the design to avoid significant adverse effects.

7.11.2 As well as comments received via the EIA Scoping opinion, direct liaison with the MCC Environmental Protection Section was undertaken to confirm the approach to the baseline noise survey and assessment methodology.

7.11.3 A baseline noise survey was undertaken at the site in May 2023 in order to obtain noise data to inform the assessment and derive the target levels for fixed plant and entertainment noise.

Demolition and construction effects and mitigation

7.11.4 While based on preliminary data, significant effects from the noise associated with the demolition works have been predicted at the nearest noise sensitive receptors around the site, with a major adverse level of significance being indicated. Mitigation measures will be confirmed via an Outline Demolition Environmental Management Plan (ODEMP) and an overarching Construction Environmental Management Plan (CEMP). Measures will include the selection of quieter plant and methods as far as is practicable, and the use of screening and enclosures to reduce noise levels at the receptors.

7.11.5 Vibration arising from vibratory ground compaction has also been predicted, but no significant effects have been identified with a minor adverse level of significance being indicated.

Operational effects and mitigation

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

Residual effects and conclusions

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

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Appendix D – Swept Path Analysis.



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Vehicle Key

A) 4.6t Light Van

B) 12m Rigid

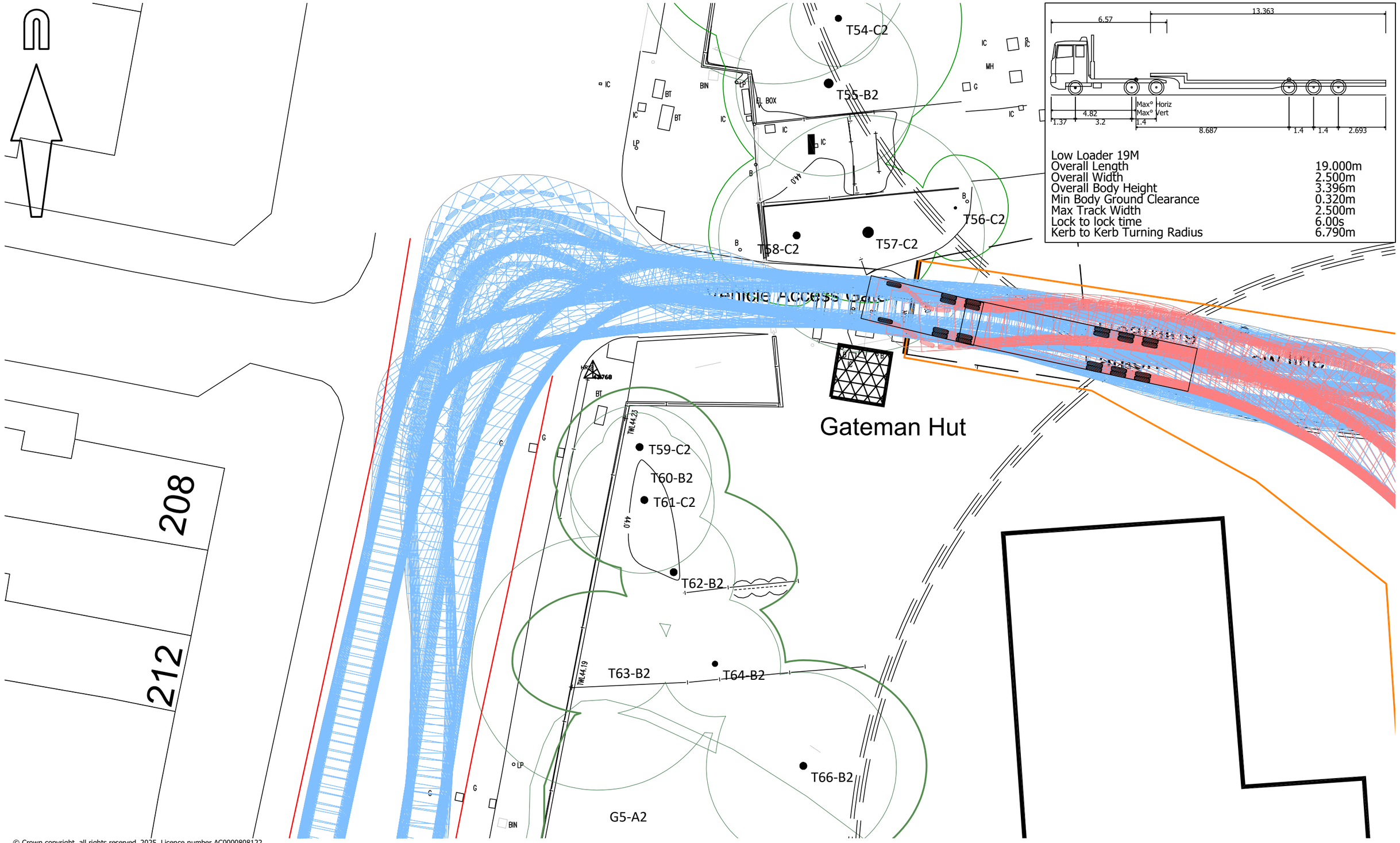
C) 19m Low Loader

D) Large Tipper

E) Max Legal Artic

Drawing title	UOM Fallowfield - SPA Delivery Drawing with Notes P1
Drawn by	H.ROGERS (GRAHAM)
Scale	A0
Date	May 2025

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UoM STUDENT RESIDENCES
FALLOWFIELDS CAMPUS

title

SWEPT PATH ANALYSIS
19M LOW LOADER
ENTERING AND EXITING SITE
VIA WILMSLOW ROAD

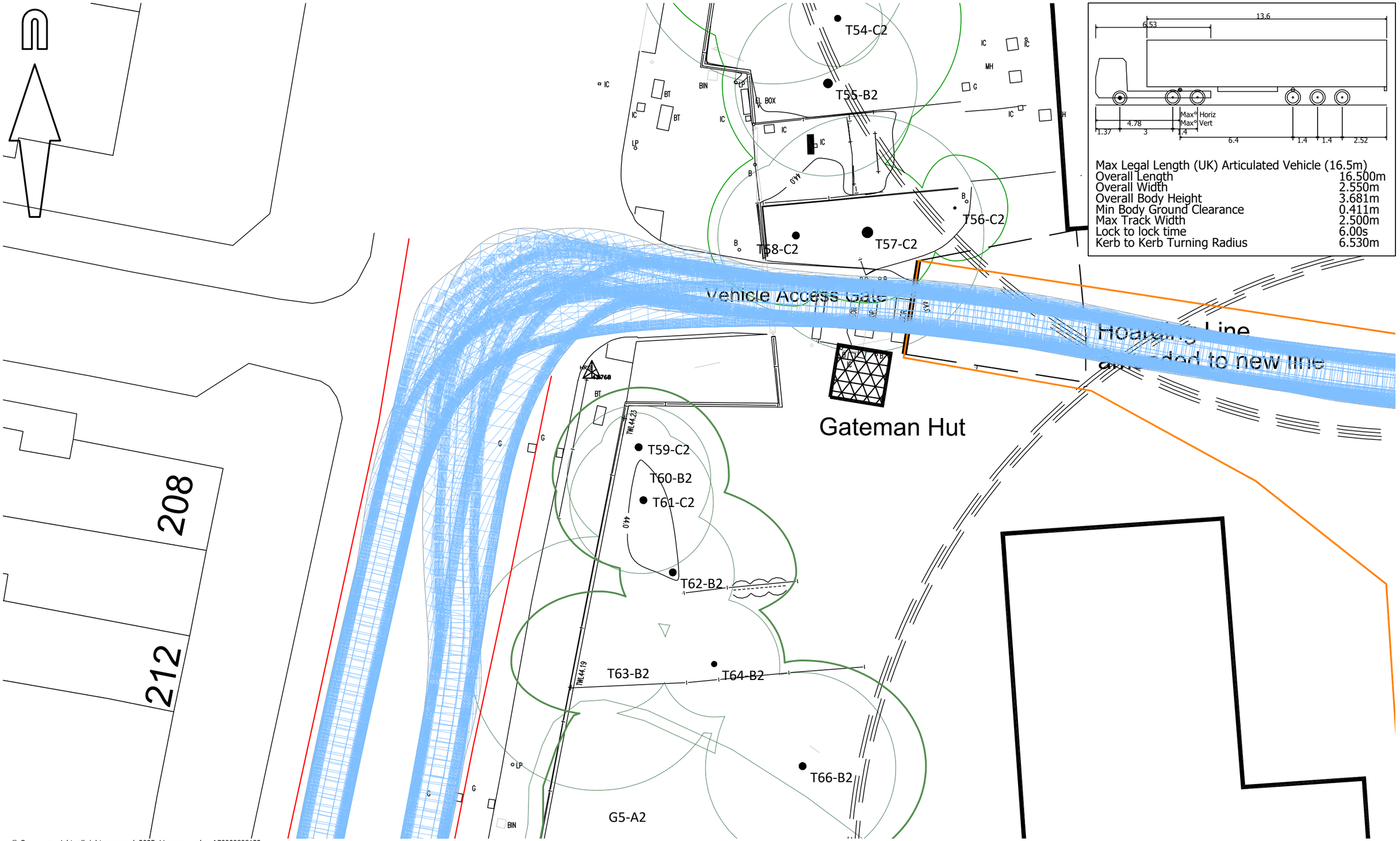
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Overall Length	16.500m
Overall Width	2.550m
Overall Body Height	3.681m
Min Body Ground Clearance	0.411m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.530m

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title

SWEPT PATH ANALYSIS
16.5M ARTIC
ENTERING AND EXITING SITE
VIA WILMSLOW ROAD

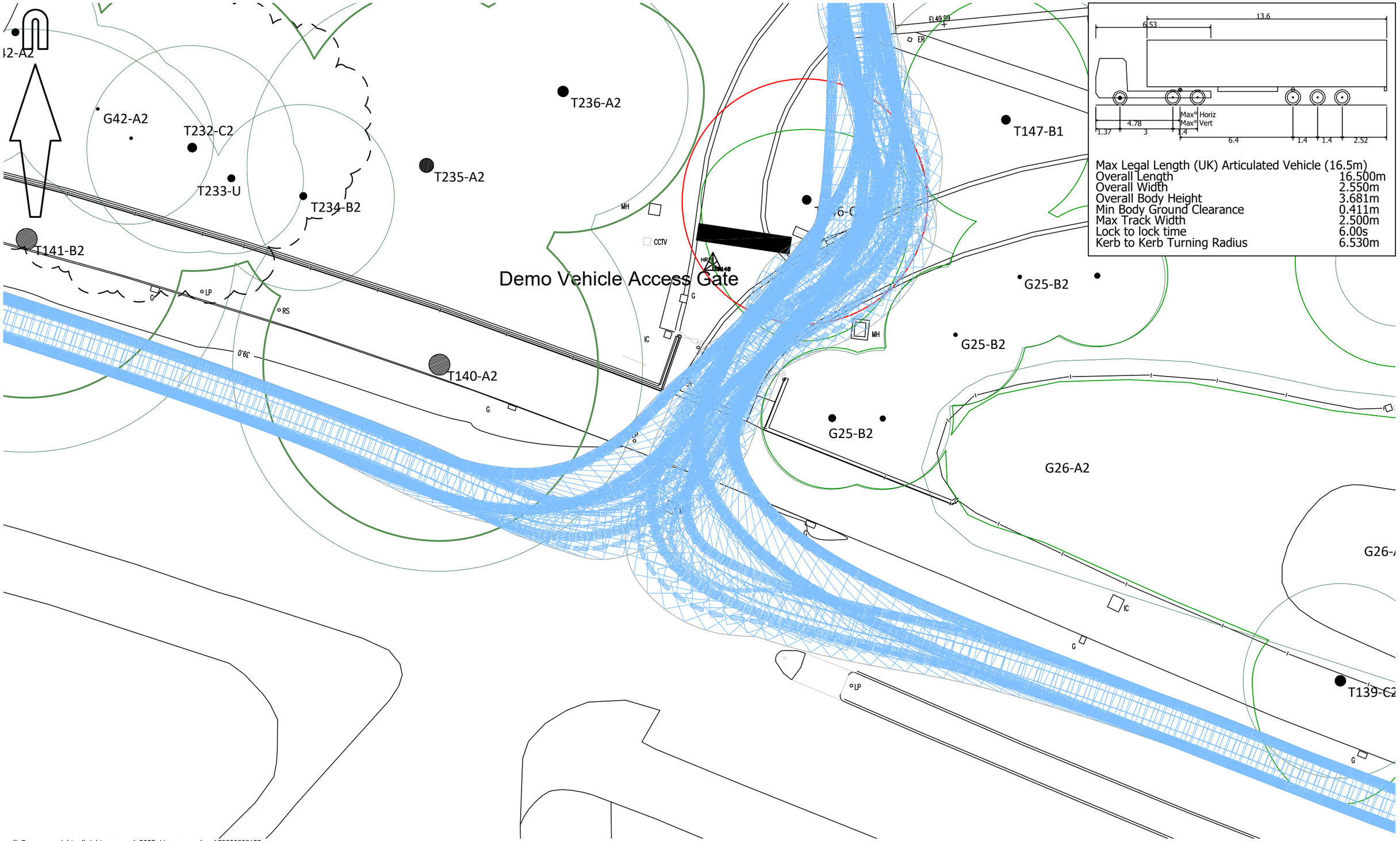
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SWEPT PATH ANALYSIS
16.5M ARTIC
ENTERING AND EXITING SITE
VIA MOSELEY ROAD

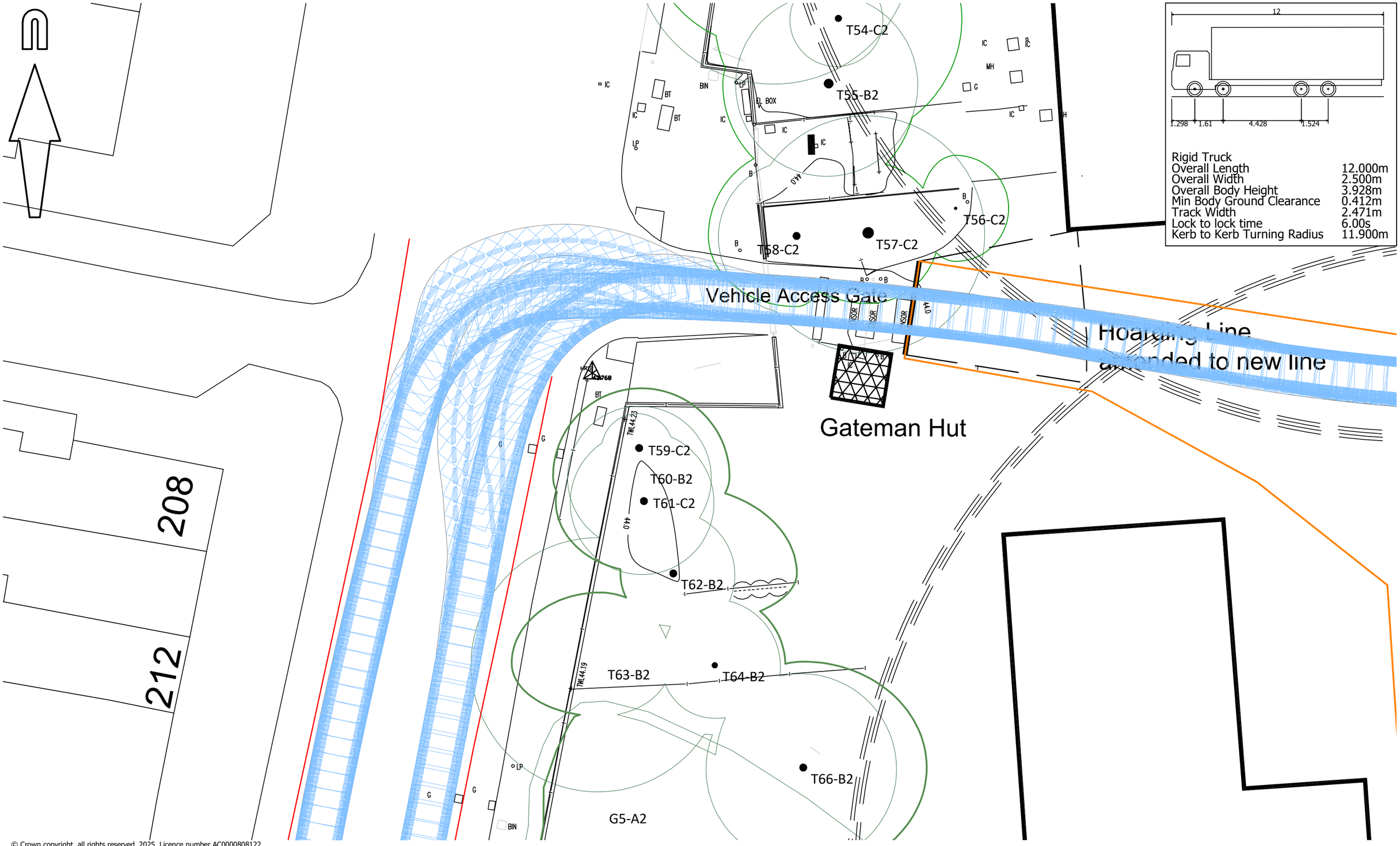
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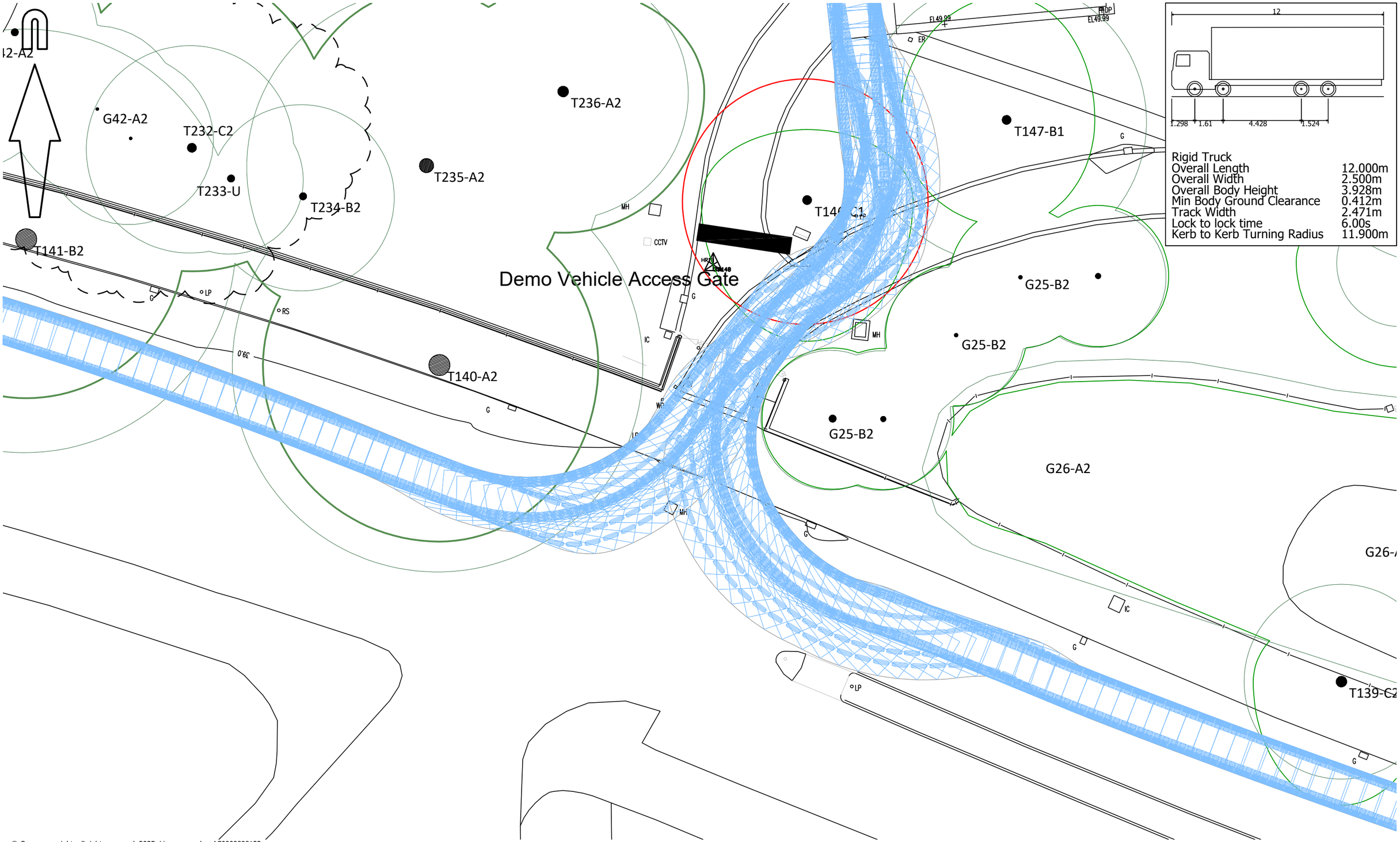
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12M RIGID
ENTERING AND EXITING SITE
VIA WILMSLOW ROAD

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FALLOWFIELDS CAMPUS

title

SWEPT PATH ANALYSIS
12M RIGID
ENTERING AND EXITING SITE
VIA MOSELEY ROAD

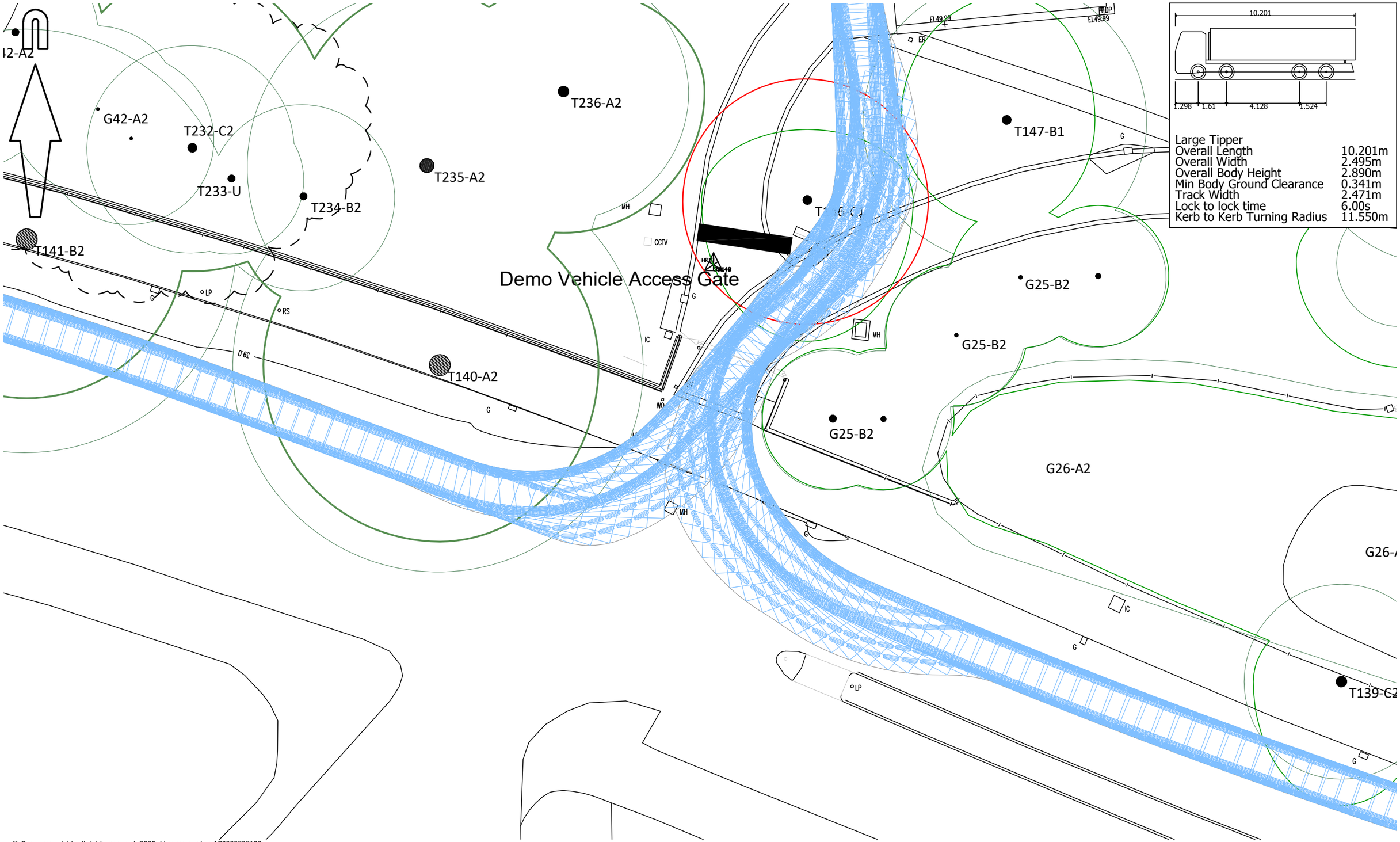
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FALLOWFIELDS CAMPUS

title

SWEPT PATH ANALYSIS
LARGE TIPPER
ENTERING AND EXITING SITE
VIA MOSELEY ROAD

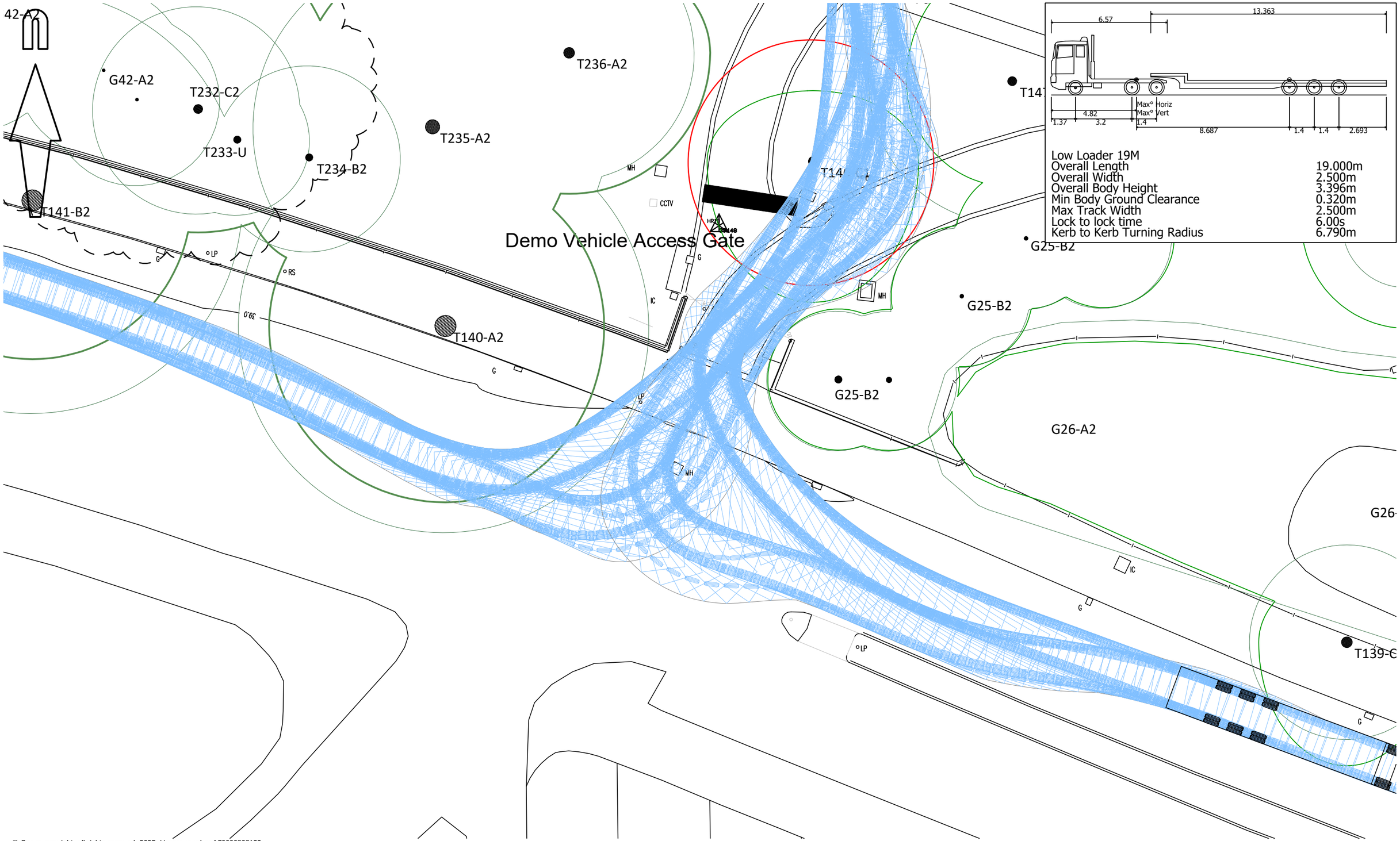
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SWEPT PATH ANALYSIS
19M LOW LOADER
ENTERING AND EXITING SITE
VIA MOSSLEY ROAD

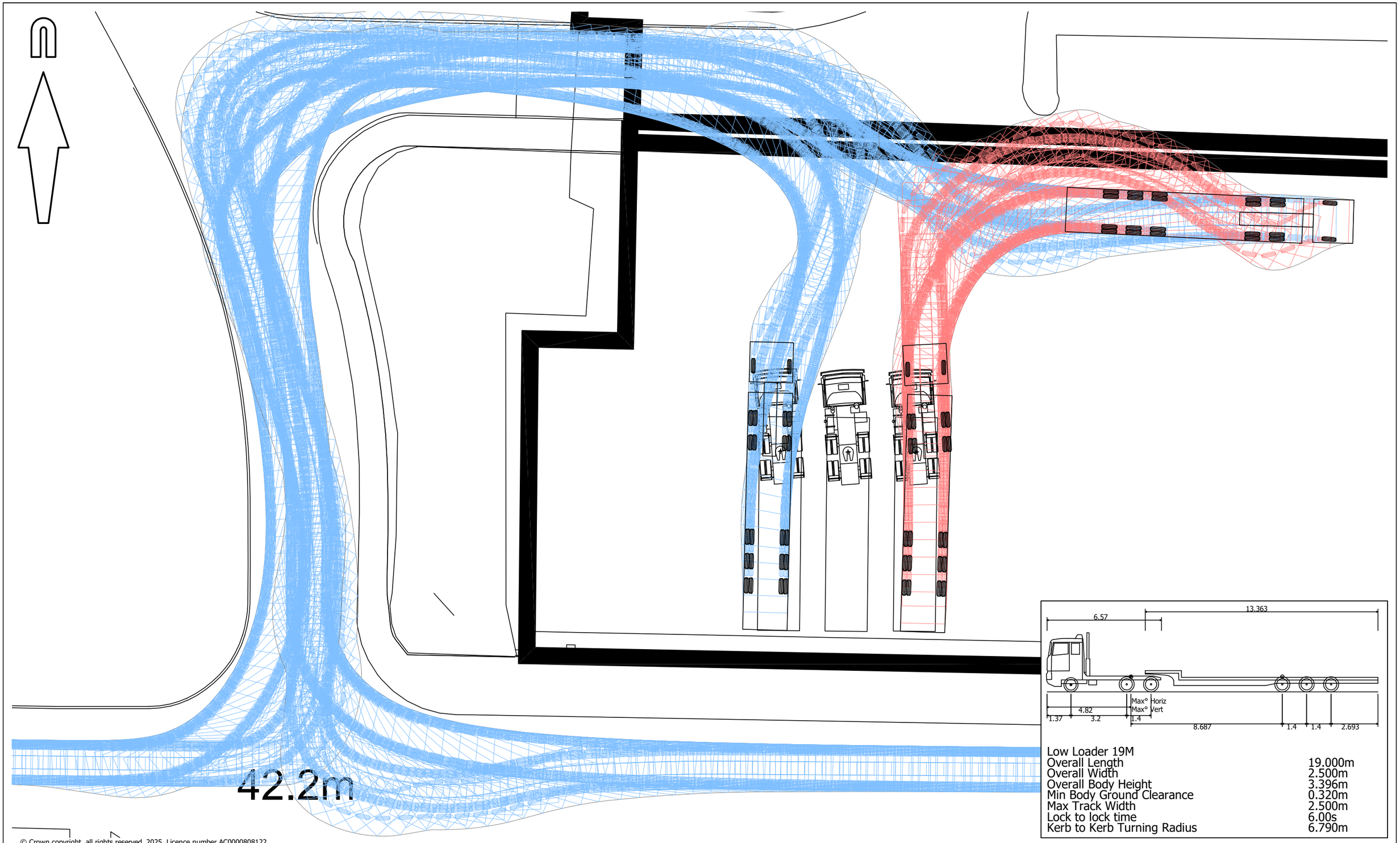
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Overall Width	2.500m
Overall Body Height	3.396m
Min Body Ground Clearance	0.320m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.790m

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SWEPT PATH ANALYSIS
16.5M ARTIC
ENTERING AND EXITING HOLDING AREA
VIA MOSELEY ROAD

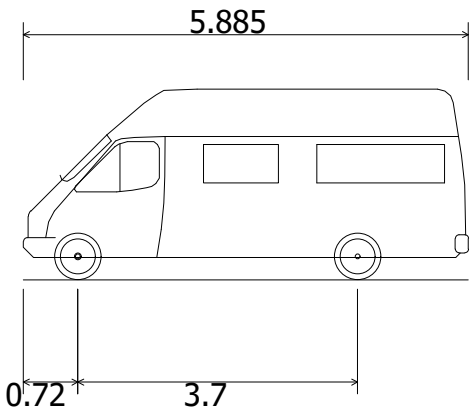
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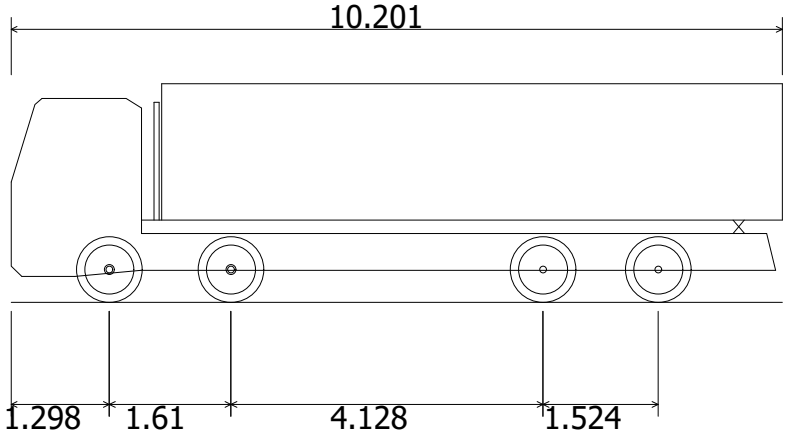
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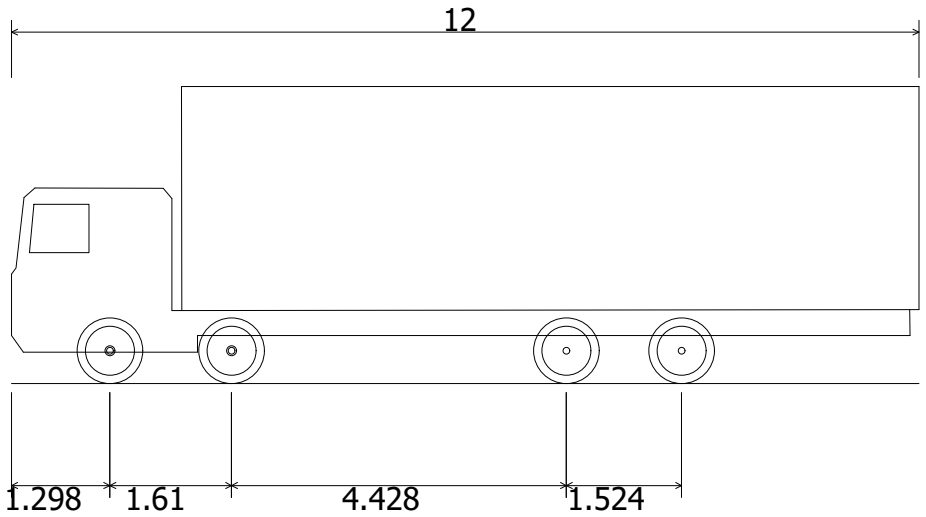
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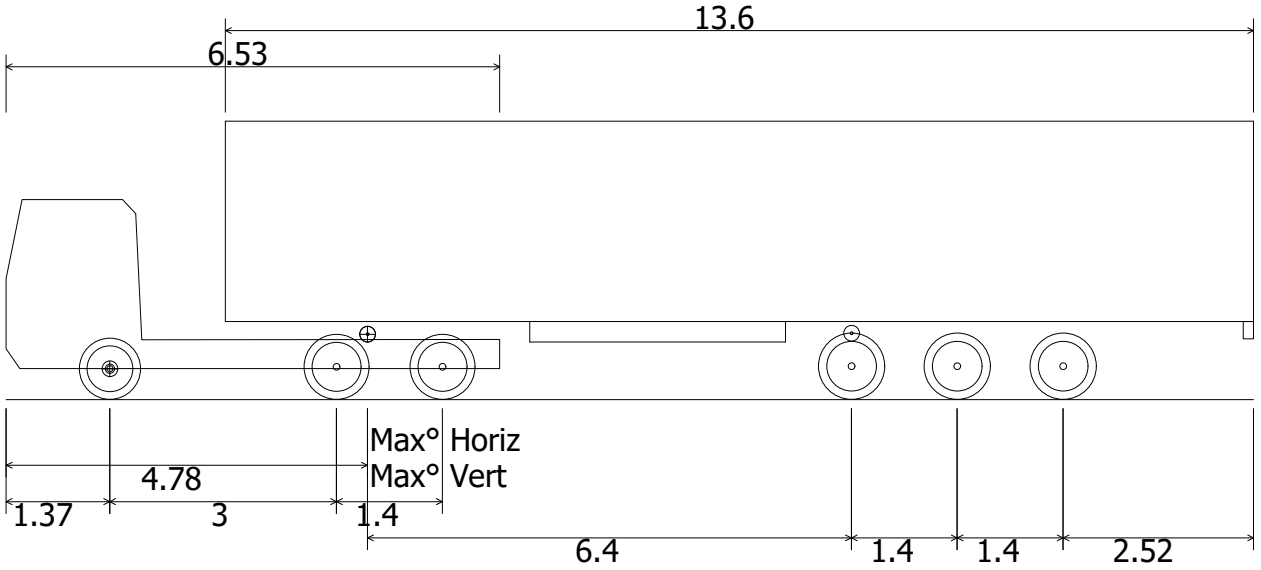
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Kerb to Kerb Turning Radius	6.000m



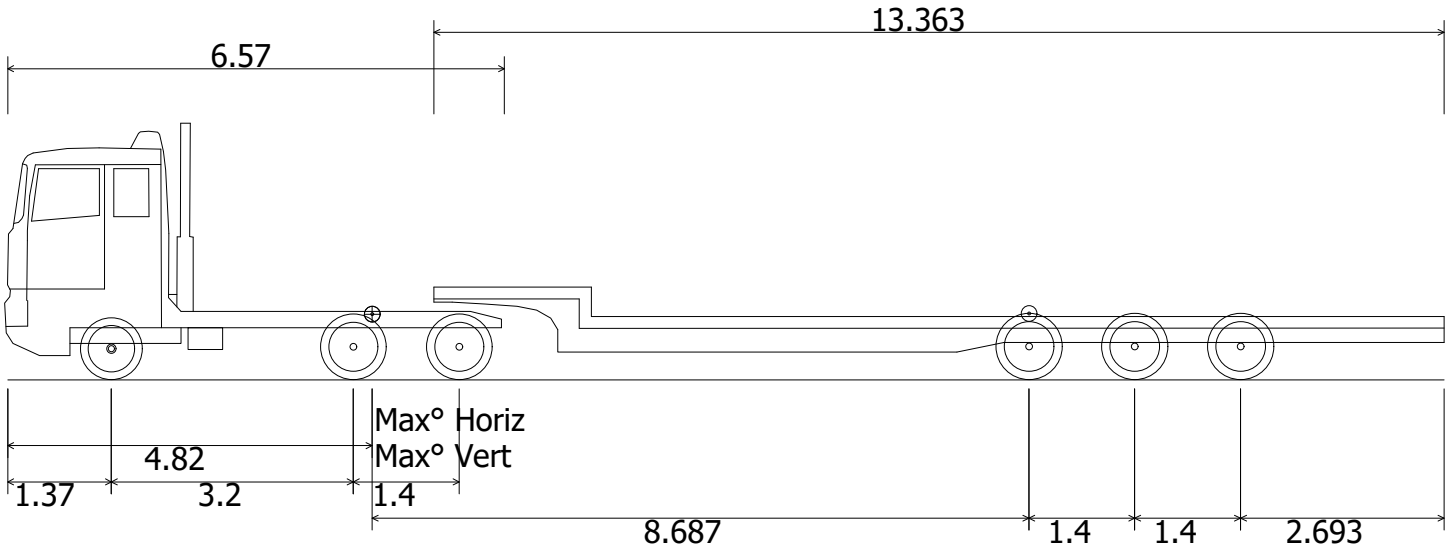
Large Tipper	
Overall Length	10.201m
Overall Width	2.495m
Overall Body Height	2.890m
Min Body Ground Clearance	0.341m
Track Width	2.471m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	11.550m



Rigid Truck	
Overall Length	12.000m
Overall Width	2.500m
Overall Body Height	3.928m
Min Body Ground Clearance	0.412m
Track Width	2.471m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	11.900m



Max Legal Length (UK) Articulated Vehicle (16.5m)	
Overall Length	16.500m
Overall Width	2.550m
Overall Body Height	3.681m
Min Body Ground Clearance	0.411m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.530m



Low Loader 19M	
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Overall Body Height	3.396m
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Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.790m