

Construction Management Plan

Greenheys Redevelopment

June 2024
Rev 02.



WILLMOTT DIXON

SINCE 1852

CONSTRUCTION MANAGEMENT PLAN

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1. Project Delivery

Our approach to the construction of Greenheys has been tailored around the proposed design, external works, locality and specific site constraints. Our proposed site team has a vast amount of experience in the construction of large, high profile and logistically challenging schemes similar to Greenheys.

This Construction Management Plan, and associated logistics plans, describes in detail how we will manage the project effectively and in a safe manner.

This plan has been produced to ensure compliance with Willmott Dixon's procedures, whilst specifically addressing the requirements of the Greenheys scheme.



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2. Site Management

Our dedicated Project Lead on the project, Chris Baker, will be involved from the outset, working from preconstruction, through to handover, providing consistency and ensuring no loss of knowledge. Chris will work closely with Project Manager, Jack Overson to make sure we deliver safely on time and to the highest levels of quality.

Jack and Chris have a strong established relationship, through them both currently working on the £50m Spindles Redevelopment. They will bring a wealth of experience and lessons learnt from working on the tight site, that is being delivered in a live environment, and requires constant stakeholder coordination to ensure the smooth operation of the surrounding businesses.

They will be further supported by Construction Manager, and by the 3 of them working on the project throughout the first and second stage, and then moving on to project delivery, we will ensure that this Construction Management Plan is embedded into the project.

Under their leadership, all key supply chain partners will be mobilised and collaborated with during the second stage, enabling a seamless transition from preconstruction to site, with all key partners mobilised to deliver scheme in line with the programme and delivery strategy.

The delivery of the project will be completed through a team of Area Build Managers, split into the following areas:

- Syrus Mccloughlin: Substructure, Concrete frame, roof envelope and externals
- Abi Belfield: Façade & Roof
- Gary Dearden: Ground and first floor
- Richard O'Neill: Second to fifth floor

Creating areas, rather than package management, removes communication and coordination issues between managers to ensure that all of the daily planning, quality and safety actions are under the control of an Area Build Manager.

Lessons learnt to add value: This approach has been used successfully on many of our projects delivered by Chris and his teams, notably the first phase of the Manchester College City Campus and the Spindles Redevelopment working with Jack. These projects are a perfect example of the successful project delivery that area management creates. On our Spindles project our sectional completions are being driven via our area managers who are accountable for a whole section and its successful delivery.

Mobilisation period

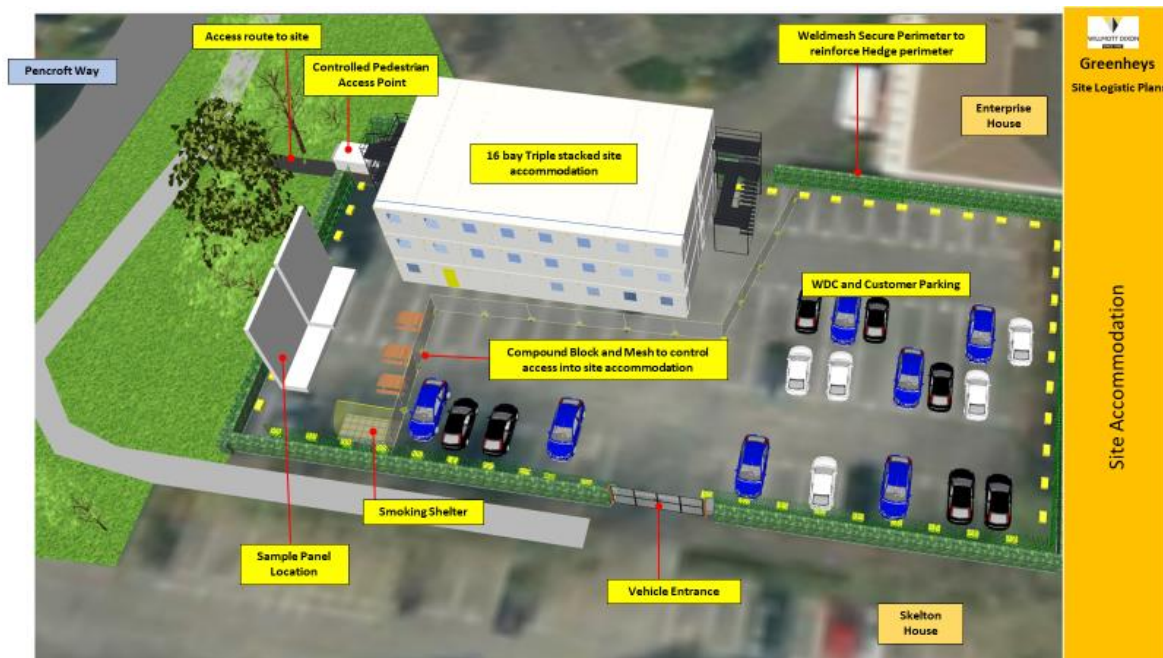
During the mobilisation period our site management team will be responsible for the early planning, health, safety and environment plans and the procurement of the contract works to enable works to commence on site. This team will be supported by our health and safety managers, environmental manager, design managers, building services managers and our supply chain, quality, and social value departments.

During this period, the project will be seamlessly transferred from our pre-construction department to the construction project team. Providing a smooth transition, our Estimator, Paul Core, will support the quantity surveyors for a minimum of 4 months after the start on site.

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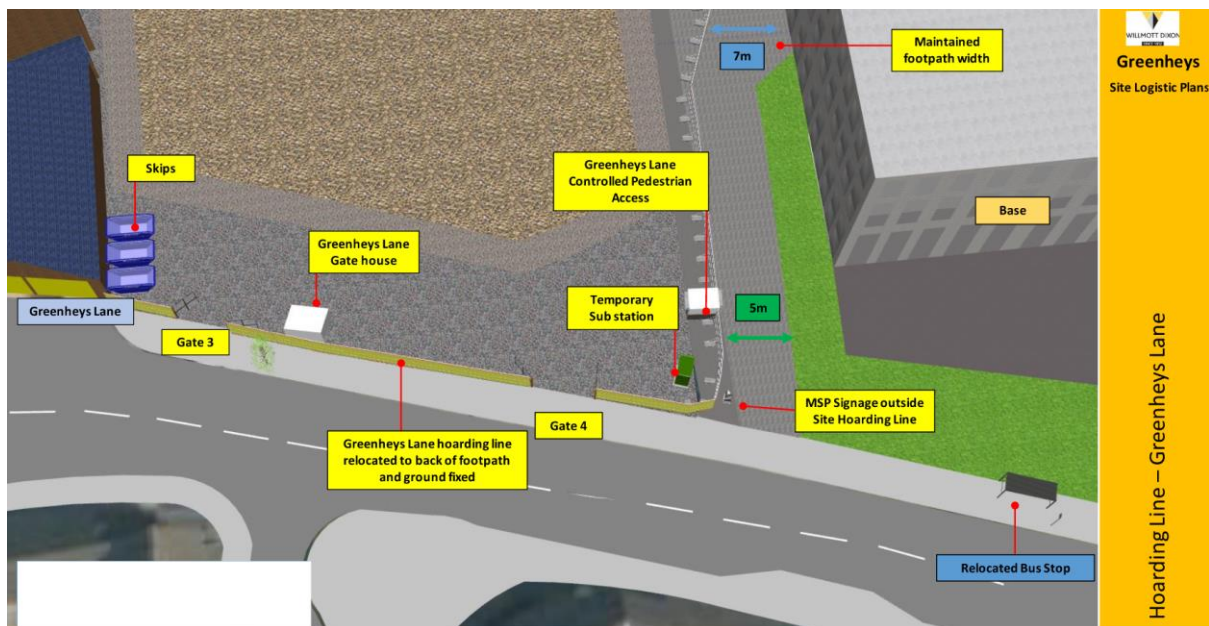
3. Site Establishment & Logistics

From the outset the site team will establish the site set up in line with the phasing/logistics plan shown below.



To maintain pedestrian safety around the Greenheys site we will maintain the footpath on Greenheys Lane and relocate the bus stop. This will be done through agreement with Manchester City Council's highways department and TFGM.

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Two new site entrances and gates will be established via the use of the existing belmouth entrances off Greenheys lane, operating an entrance and exit one-way system. A temporary crossing will be installed to accommodate the footpath closure.

All contractor parking will be off site, with a tool drop facility provided on site for operatives so that their vehicle can be parked outside of the immediate vicinity of the site. The closest paid parking is available on Cecil Street, and our green travel will encourage the workforce to use the various public transport available in the local vicinity to the site. There will be Willmott Dixon staff and Customer parking available at the welfare, with operative parking limited to 40 spaces behind Synergy House, of Guildhall Close.

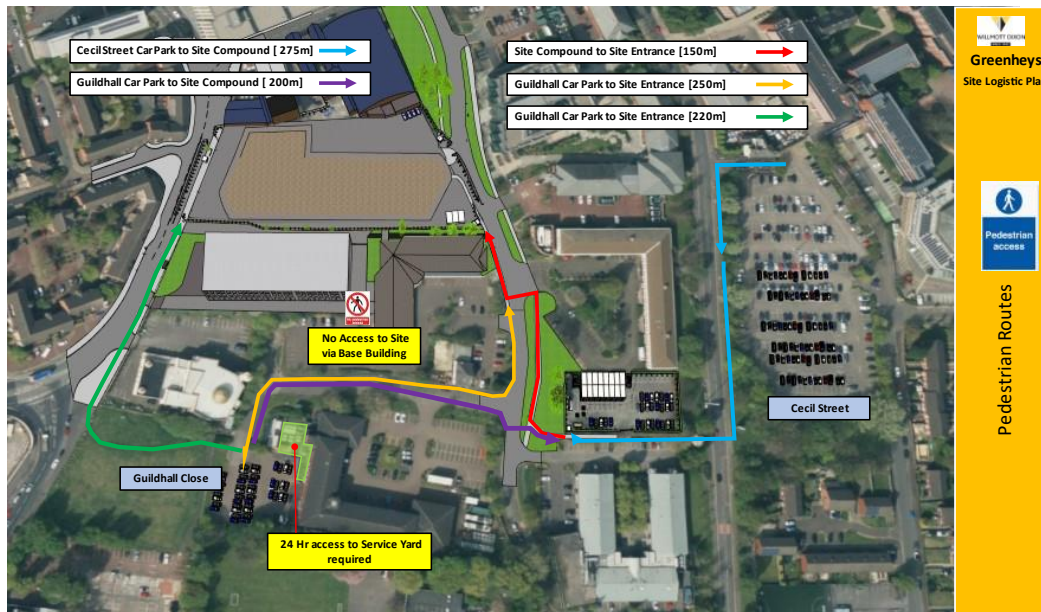
The residential properties along Greenheys Lane will be closely monitored and controlled – no stopping, parking, or waiting for site access will be permitted – our traffic marshal will monitor this area closely.



Routes for ambulances and fire engines will be always kept clear.

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The access gates to the site will be securely locked outside normal working hours. We will have CCTV cameras to monitor the security of the site out of hours – local patrols can attend the site within 10 minutes of an alarm being triggered.



Hoarding to provide safe, engaging segregation

The site boundary will remain consistent always using a permanent solid hoarding line between the public and our site.

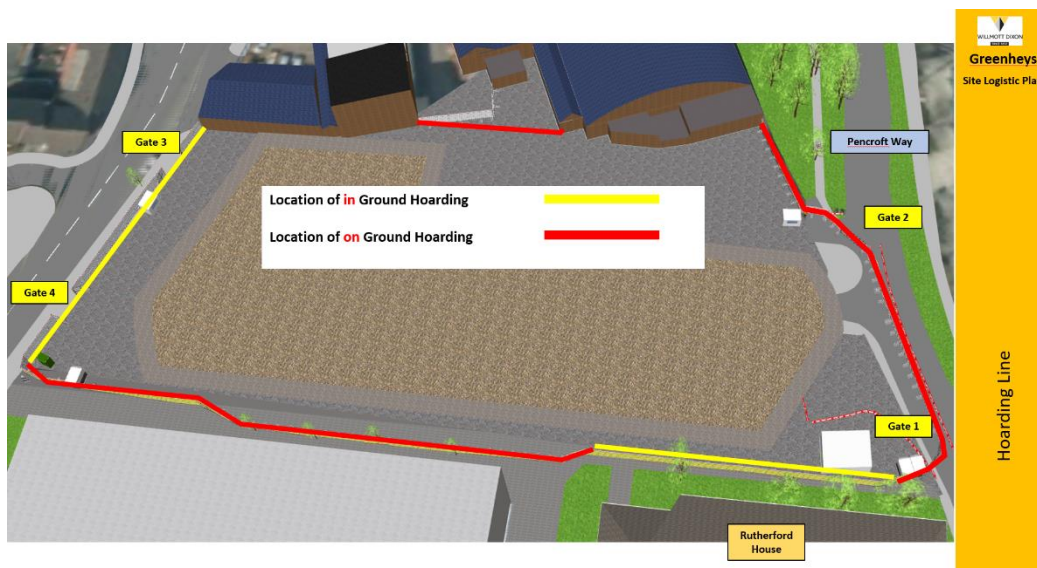
The site hoarding will secure the boundary while incorporating Willmott Dixon Corporate Guidelines, with signage and branded colours on the external perimeter. There will be opportunity for Bruntwood SciTech to advertise the project through signage on the hoarding to foster excitement around the scheme from local people and visitors to Manchester Science Park.

An example of our hoarding on Spindles Redevelopment is shown below:



It is our intention to make use of the existing site access from Pencroft Way for access and egress via Burlington Street. Safeguarding pedestrians and the wider public, a protective hoarding will be installed along the pedestrian route serving the McDougall prayer hall, with a banksman positioned at the egress point for safety.

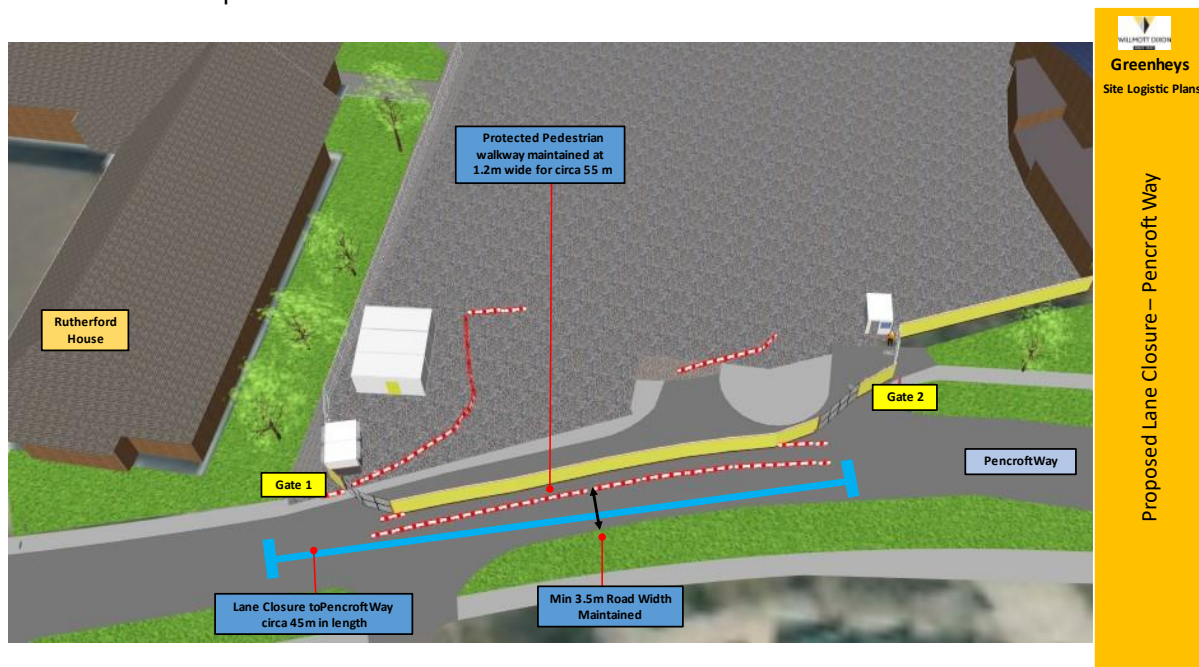
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The site hoarding shall be installed prior to our commencement in line with our hoarding requirements. Our team will work closely with your team to ensure the project is set up for success.

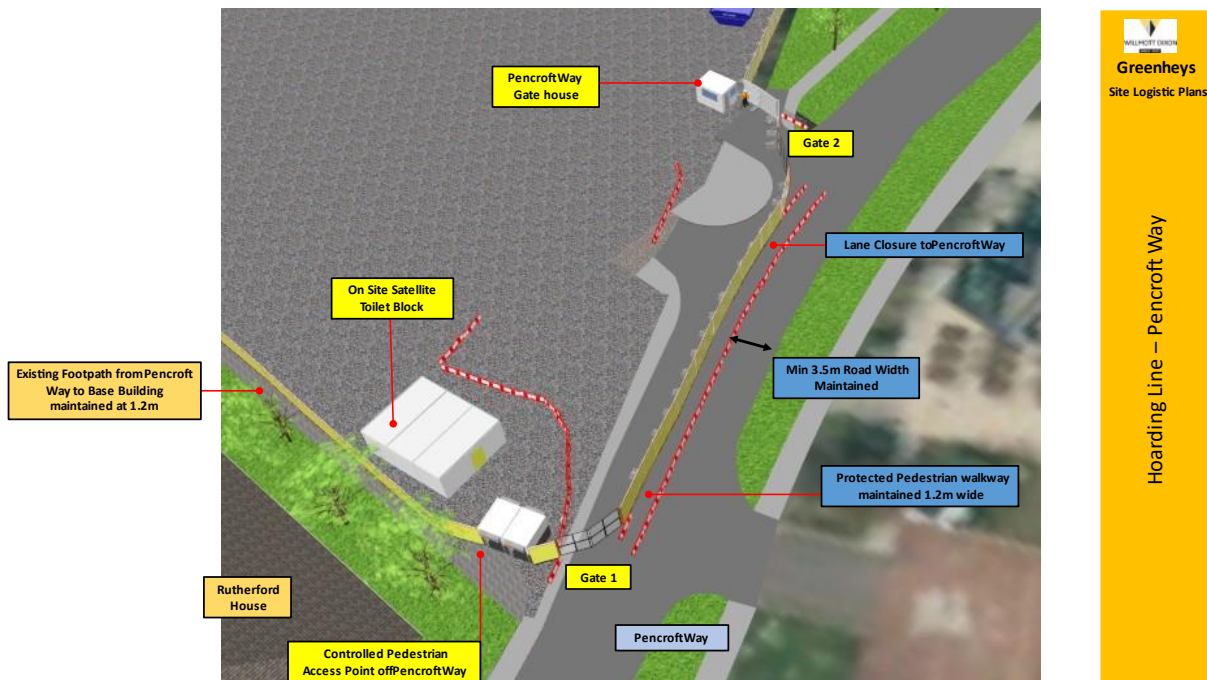
The site entrance area will include all Willmott Dixon HS&E information and site operations to display to members of the public, including a 24-hour access emergency number. Hoarding lines will be established to ensure both the safety of the surrounding stakeholders and deliverability of the proposed building:

- **Northern Secure Line** – The site hoarding lines have been established in between existing buildings and using these buildings to form the most Northern secure line of the site, with no access to pedestrians.

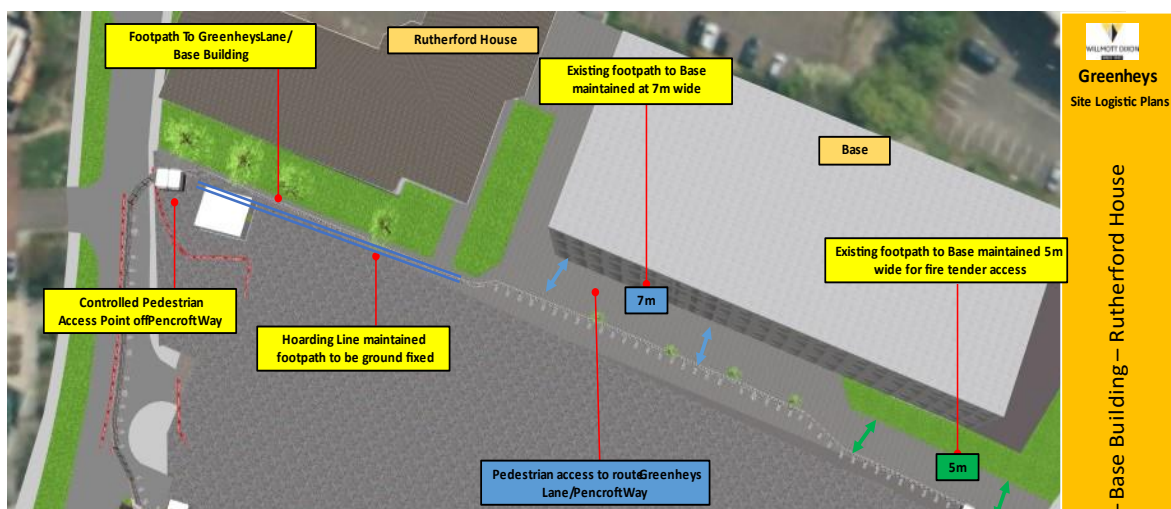


- **Eastern Secure Line** – This secure line will be established along the pedestrian footpath, allowing pedestrian movements outside of the site line to continue as currently used. There will be vehicle access and egress points on this side of the site.

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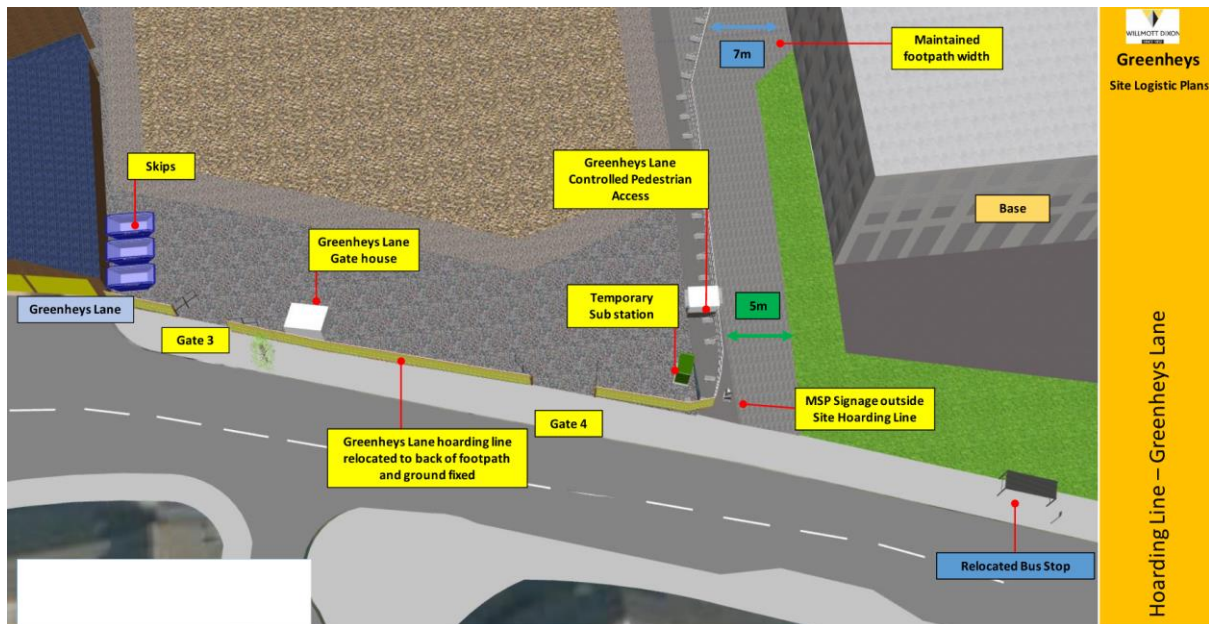


- Southern Secure Line** – The secure line for this side of the site has been established within the current landscaping of the BASE building, so some removal and replacement work of landscaping will be required. This is to ensure that elevational access equipment and tower cranes can be erected to the South of the proposed building to construct the elevations. Site access will be gained via the southern elevation from the welfare provision.



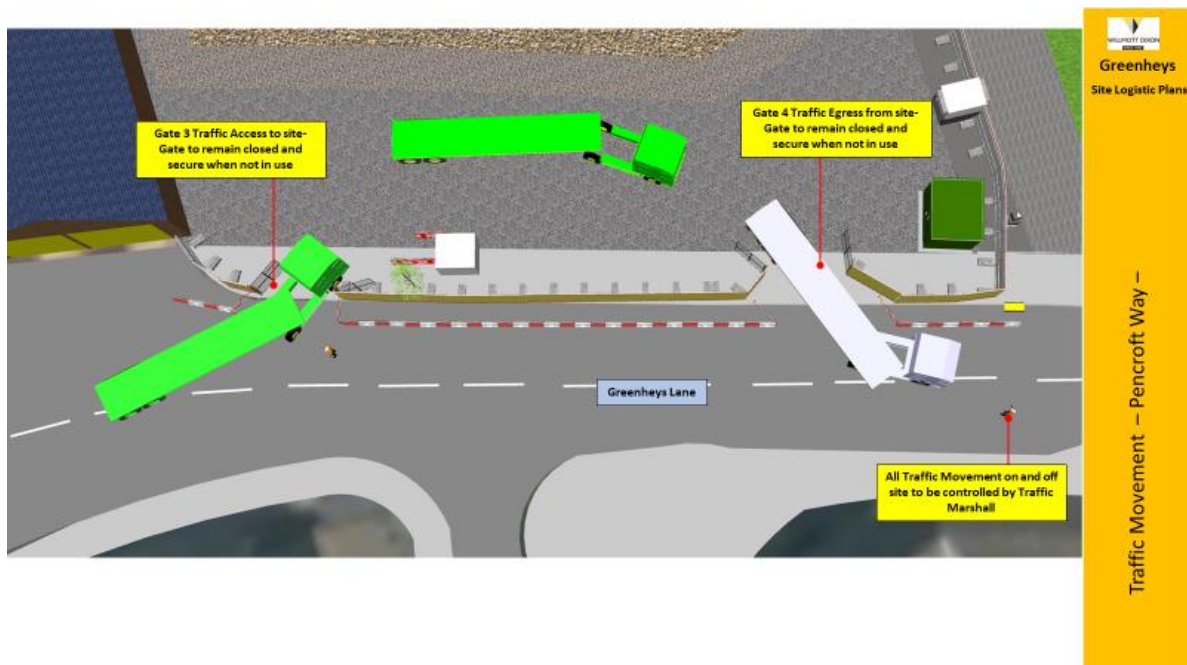
- Western Secure Line** – Hoarding lines will be established within the existing footpath, to provide enough room to guide deliveries into the site; this will require a temporary footpath closure and hoarding licence agreement. This will temporarily divert pedestrians over to the opposite footpath to provide better safety at the entrance of the proposed construction site.

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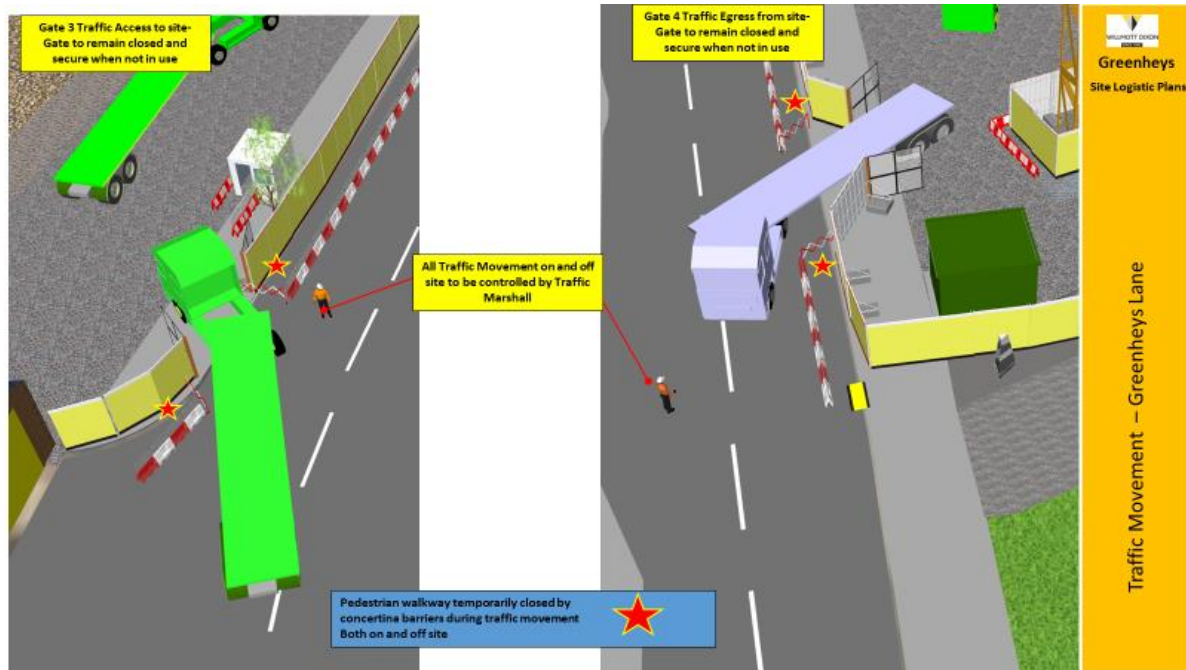


Site Vehicle access restrictions and deliveries

The site delivery access and egress gate off Greenheys Lane has been positioned so that site deliveries can come into site and leave site in a forward-facing position, with no need for reversing movements. This option provides the safest approach to offloading deliveries, with deliveries being called into and out of the site “just-in-time”, to ensure no delivery vehicles remain on Greenheys Lane.

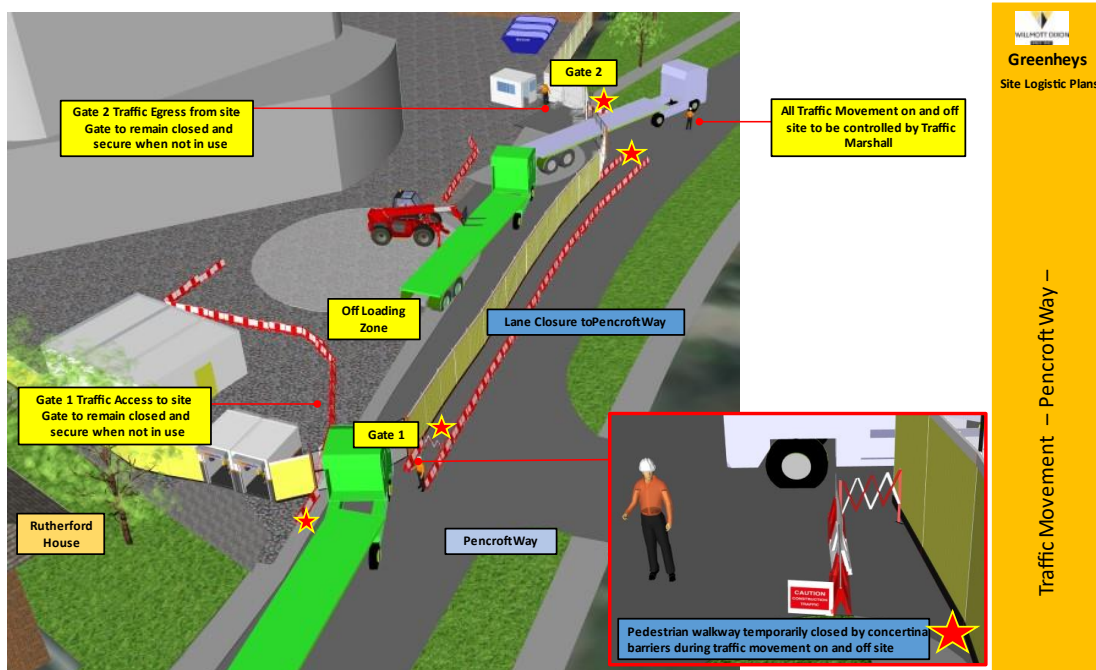


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The secondary access and egress gate is off Pencroft Way, with deliveries able to enter the site and turn within the delivery offloading zone.

Deliveries will arrive via the Pencroft way as the primary access for the East side of the building. Given the site constraints and size of the development there is a requirement to have a secondary access via Greenheys lane this will serve the west of the building, facilitated by the footpath closure.



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We will have a permanent gateman in place at each gate to manage construction vehicles whilst ensuring minimal disruption to the main highway and members of the public. No vehicle holding will be allowed in the adjacent streets.

The site will operate a strict one-way vehicle access regime, with vehicles only being permitted onto site when space is available and have been pre-arranged via our delivery booking system. Vehicles will not be permitted to waiting time on the highway and will be turned away if our booking system has not been utilised.

Materials will be ordered on a 'just in time' basis wherever possible to minimise the number of materials to be stored on site.

Delivered and offloaded materials will be distributed around the site by telescopic forklift and the tower cranes onto loading towers positioned around the building envelope. Secure containers will be available on site to secure small plant and materials. Passenger and Goods hoists will be utilised to assist with the management of materials. Material storage areas will be identified and included in the site management plan.

Added value - From our initial site set up plans we have assigned a material store within our site set up and have worked with our supply chain partners to explore the use of any off-site storage facilities that they are able to provide to ensure 'just in time' deliveries to the Greenheys site. Our SCP's will utilise off site storage as we have done on Spindles and City Campus phase one.

Minimising disruption in terms of construction traffic and to reduce any risks in line with our traffic management strategy, we will make sure all open backed vehicles/lorries have their covers/sheeting in place to ensure material does not fall from the vehicle.

Clear signage will be displayed directing traffic to/from site and traffic movements into/out of site via both entrances will be controlled by trained banksmen/ signallers. A fixed budded wheel wash will be in place so that all vehicles can be cleaned prior to leaving the site lines.

Tower Cranes

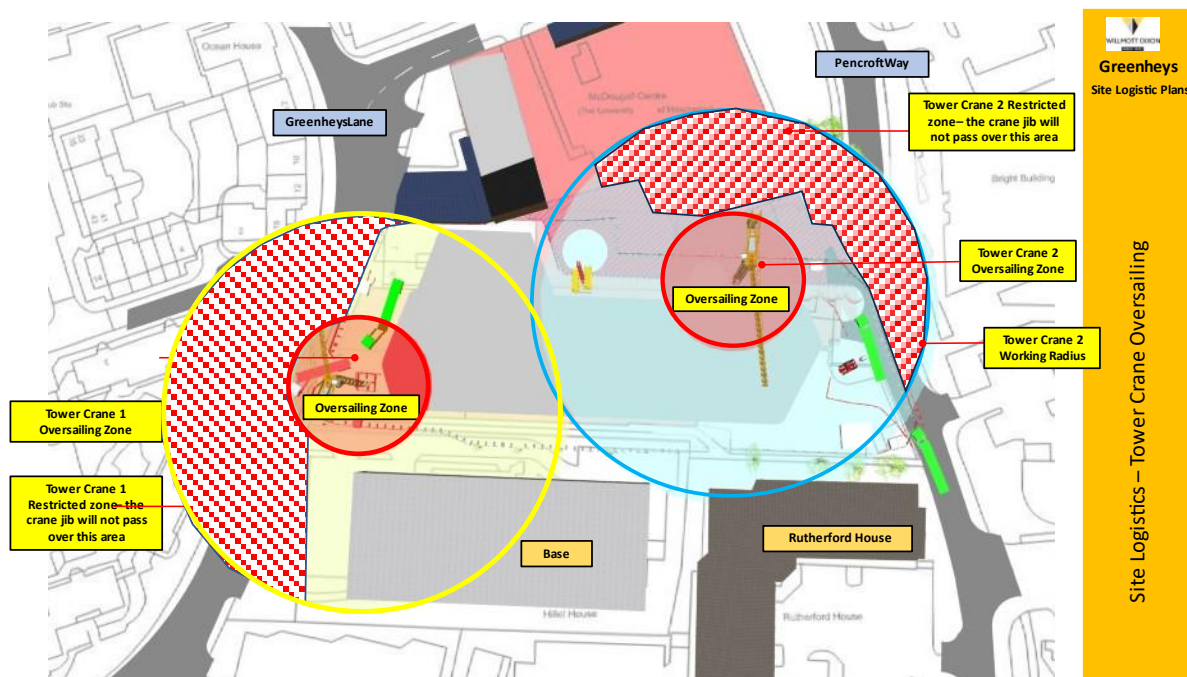
We have developed our lifting strategy around a two-tower crane approach.

Assessing the requirements to deliver the frame from insitu concrete, we have proposed to use two tower cranes during the superstructure works. Both cranes will be luffing jib tower cranes with a maximum radius of between 35m and 50m, although there may be some consideration for a small city crane to explored at the next stage.

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Crane oversailing licences may need to be agreed with neighbouring properties, with the minimum radius of a crane this size at 10m during out of operation mode. The size and location of these cranes have been positioned to ensure they can reach the higher points of the building and pick up from the delivery offloading and material laydown zones successfully.



TC1 and TC2 will be erected to construct the jump-formed cores and concrete frames of the Greenheys Building - this will be the first activity following the piling as a critical path action.

Road closures, which may be required to rig and de-rig the cranes, will be agreed with MCC once exact dates are known, at present the erection and dismantle dates are as follows:

- TC1 - June 2024 – Jan 2025
- TC2 - July 2024 – June 2025

4. Community Liaison

The Construction Manager will act as ‘Liaison Manager’ and will work closely with the site neighbours and local businesses to keep them included in the build process and up to date with all planned activities.

Prior to start on site, we will organise and arrange meetings with stakeholders and residents on a regular basis to discuss the construction schedule and to inform the stakeholders and residents of any known changes to the schedule or works or operations that are reasonably anticipated.

We will implement a letter drop with contact details so that a direct contact link can be made with the site team should surrounding residents and businesses have any concerns they wish to discuss.

Lesson Learnt: On the Spindles Redevelopment we are holding weekly trader and centre management meetings, to communicate our proposed works and discuss any logistical changes. By utilising the output of these meetings, we are able to flex our approach around the needs of the end-users, ensuring no loss or interruption of the shopping centres services. Due to the success and positive feedback from end-users of this approach, we will implement the same approach on Greenheys.

EVIDENCE: Willmott Dixon is a long-established associate member of the Considerate Constructors Scheme. We target all of our sites to exceed the requirements of the Considerate Constructors standards.

On the Spindles Redevelopment, Chris, Jack and the team were recently awarded maximum marks of 45/45 for their considerate delivery:

SCORING		
Respect the Community	Excellent - 15 / 15	• A score of 9 in a Section or 27 for the Total Report Score reflects a conforming score for the Code of Considerate Practice • For more information on the Monitor Checklist, scoring descriptors, the Scheme's definition of innovation and report writing standards, visit www.ccscheme.org.uk.
Care for the Environment	Excellent - 15 / 15	
Value their Workforce	Excellent - 15 / 15	
Total Report Score	Excellent - 45 / 45	

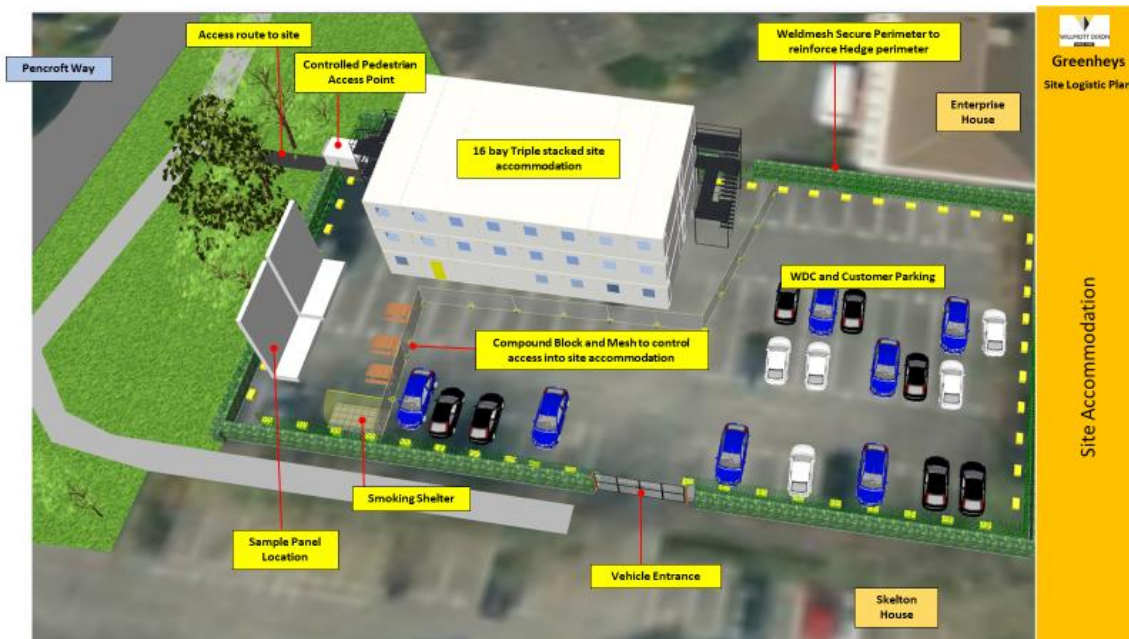
EXECUTIVE SUMMARY	
WDC regional office is located in Oldham and a number of projects have been carried out in the Borough for number of years which has enabled the site team to link up with established contacts where the site can offer and guidance. The particular challenge for the site is to ensure minimal impact on the stakeholders utilising the shopping mall and pedestrians around the town centre. Engagement has been established with the Oldham College and Academy to provide hands-on experience for students. Working in a busy town centre including demolition works is particularly challenging and the team have assessed all the potential impacts, prioritising on dust and noise control utilising fixed monitoring points and employing specialist consultants. The health and well-being of the workforce and the entire site team is clearly a priority, welfare facilities are first class and cater for all needs both male and female. Well-being events are promoted and there has been early contact with the local branch of Andy's Man Club, their representative giving an awareness talk to the workforce on MH, trained MH first aiders are available on site to provide guidance and support should it be required. My thanks to Dan and the entire team for their efforts particularly to Makenzie for completing the self-assessment.	

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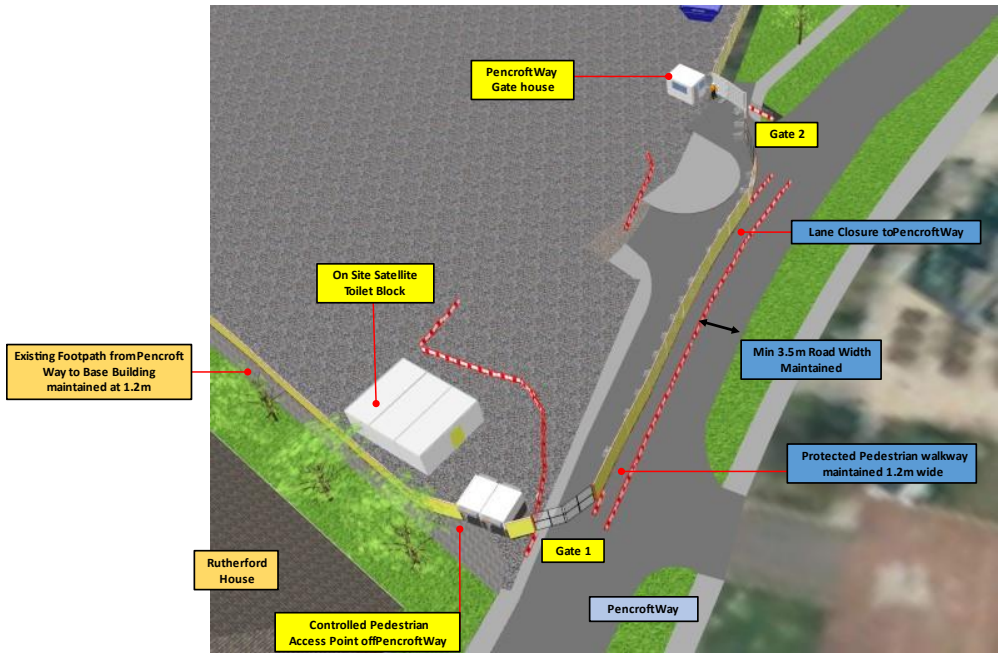
5. Health & Welfare Facilities

High quality health and welfare facilities will be established on site throughout the construction phases. The welfare facilities will be comprised of male, female and disabled toilets, shower, canteen and drying room. All the facilities will be shown on a welfare plan which will be displayed in the site canteen and site offices. A copy of this will also be kept in the Health and Safety file. All welfare facilities will be maintained daily in good order. The First Aid box and accident book will be maintained in the site office.

The location of the site offices is proposed just off Pencroft way on an existing carpark, this is between Enterprise house and Skelton house. Siting the welfare and site offices in this location would provide a cost effective and local solution to the welfare needs of the Greenheys development. The location of our waste recycling area will be placed in the service area off Pencroft way inside the site lines.



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**Greenheys**
Site Logistic Plans

Hoarding Line – Pencroft Way

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6. Health & Safety

The construction of your new Greenheys labs alongside a busy main road and the local mosques and school will present a greater than normal degree of Health and Safety risks to operatives and to others that may be affected by our actions than the pre-commencement environment of the existing facility.

We believe that the following proposals will help us to mitigate the risks as the work progresses:

Fire Planning

The site-specific fire plan will be agreed prior to positioning the site offices and welfare facilities. The plan will consider any members of the public that will be using the adjacent building within the current Burntwood estate. Access/pedestrian pathway that runs around the north and east of the site via the Greenheys Projects boundary. The plan will be updated at regular intervals to reflect the stages of construction of the project. Fire points will be positioned in and around the site offices, welfare facilities and on the construction site. The positions will be clearly identified in the Fire Plan and location maps around the site. Fire Extinguishers will be clearly marked and checked once a week as laid down in Willmott Dixon's procedures. A fire drill will be carried out once a month, with prior notice given to the local UOB Base building.

Underground Services

All necessary steps will be taken to accurately locate and identify existing underground services prior to any excavation taking place. These steps will include:

- Referral to all relevant statutory authority drawings.
- Communication with the relevant authorities in order to accurately locate services on site.
- Cable Avoidance Tool (CAT) and Genny surveys of all areas prior to excavation work.
- Issue of a Permit to Dig by the site manager following strict WD Service Avoidance Procedures.
- A non-intrusive radar survey will be completed.
- Vac Excavation works in areas of high risk with lots of services within the vicinity.

Traffic Movement

Wherever practical the layout of the site will include separate routes for vehicular traffic and pedestrians with priority given to safe access and egress to pedestrians. This principle will include the elimination of reversing vehicles wherever possible. The traffic plan will be made available to all suppliers and contractors working on site.

The site compound will be set up with two-meter-high fencing and anti-climb mesh. We have developed a strategy for traffic movement to ensure minimal disruption to the ongoing activities and adjacent businesses during the construction works as well as focusing our early works on maintaining access to the surrounding business for customers and service vehicles. This includes a turning circle on site which allows smooth flow of construction traffic at all times via the main access gates.

Clear signage will be displayed directing traffic to/from site and traffic movements into/out of site via both entrances will be controlled by trained banksmen/ signalers.

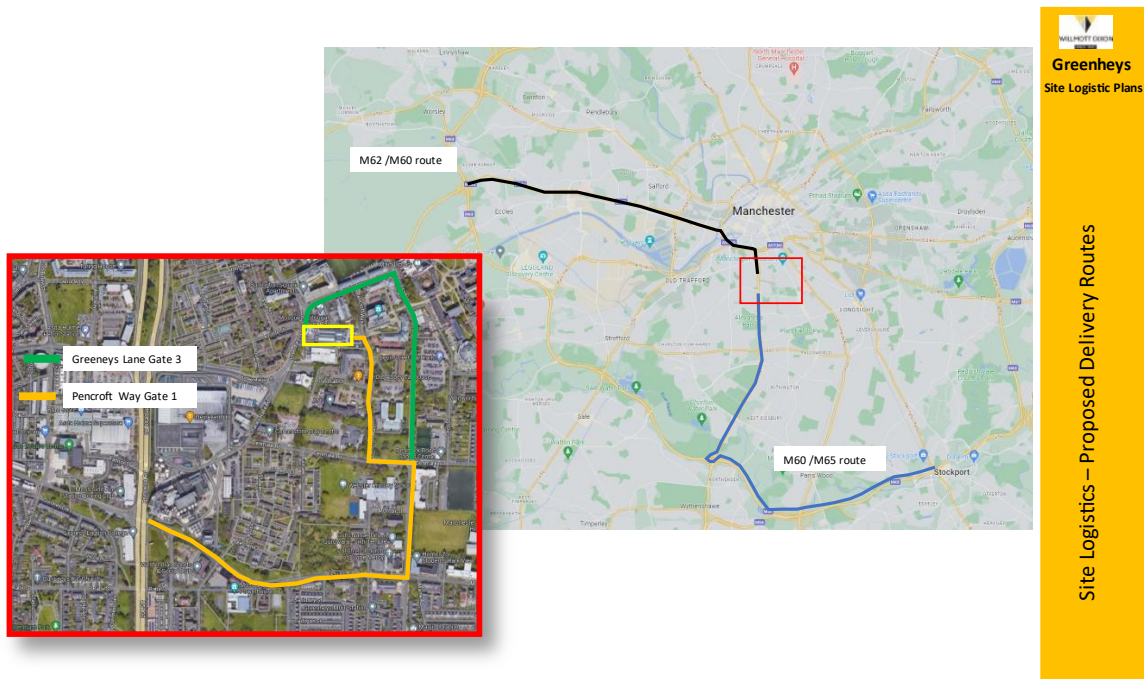
Audible warning devices will be fitted to vehicles that need to reverse, and they will be supervised by a banksman at all times. Construction vehicles, other than vehicles delivering materials and plant, will be fitted with reversing beepers. The routing strategy can be seen on the logistics plans included at the end of this plan.

Access To and From Site

Access/egress to the site will be directly off Pencroft way and Greenhays lane. There will be adequate signage to ensure that minimum disruption is caused to the usual traffic flow of the highways by site

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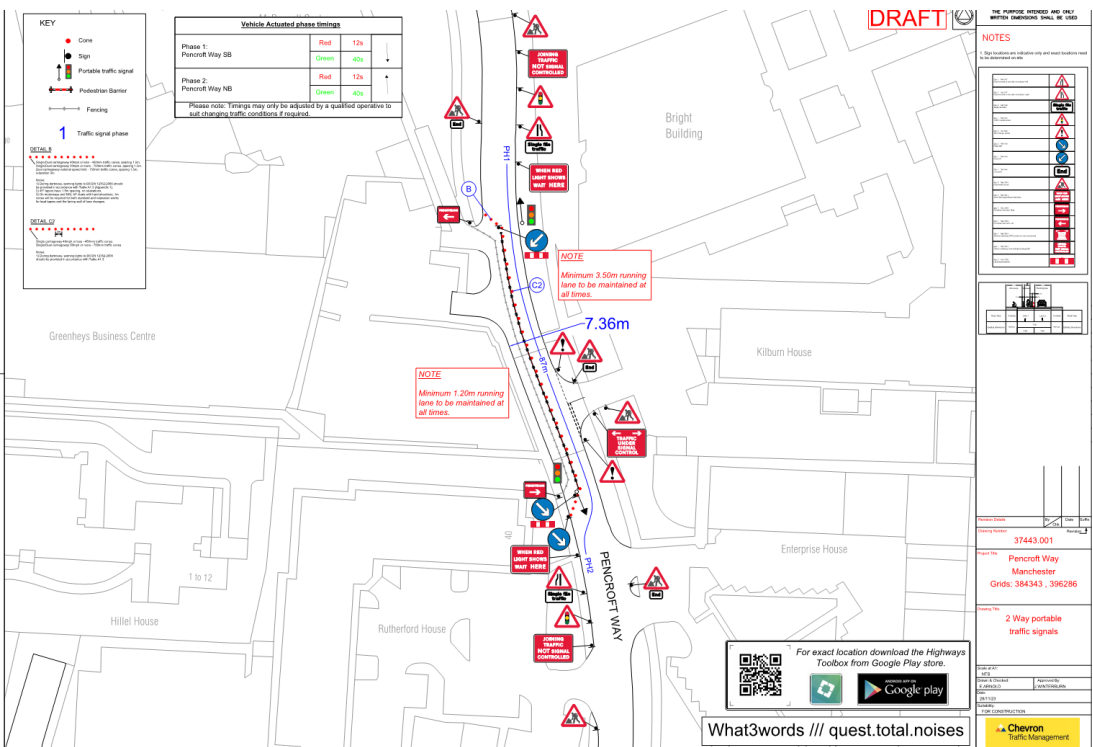
traffic. Site vehicles will not be allowed to park outside the site compound, unless in emergency situations.



Routes for ambulances and fire engines will be kept clear at all times. Additional access points for emergency vehicles will be installed in the site fencing to facilitate access.

The access gates to the site will be securely locked outside normal working hours.

Traffic Management – Pencroft way



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Manual Handling

Designers have a duty under CDM to design high-risk activities wherever possible, which should include the 'weight' implications of materials specified.

Notwithstanding item 5 (a) above, all heavy materials will be mechanically off-loaded and whenever possible transported around site by mechanical means, i.e., Tower cranes, forklift trucks, hoists, pallet trucks, sack trucks, wheelbarrows, etc.

Where risks are identified then contractors will carry out written manual handling assessments, which will be prepared in accordance with Manual Handling Regulations. The assessments must be attached to the method statements.

The manual handling of kerbs and slabs is not permitted, and mechanical means will be used wherever practical. If mechanical means are not practical, then a detailed risk assessment will be carried out.

Permits to Work

Where necessary, the following permits will be issued by Willmott Dixon:

- Permit to Work
- Permit to Enter (Confined Spaces)
- Hot Works
- Permit to Dig
- Permit to Lift
- Permit to Use Electrical Equipment Greater Than 110v.
- Permit to Load

COSHH

Any necessary COSHH Assessments will be made by the relevant contractors and attached to their method statements.

The Construction Manager has overall responsibility to ensure that COSHH assessments are completed and to ensure that all relevant parties on site are aware of any operation that may affect other persons.

Personal Protective Equipment

Any necessary Personal Protective Equipment (PPE) will be supplied by the relevant employer and must be worn as, when and where necessary. As a minimum, helmets, safety footwear, Hi-Viz clothing and appropriate safety gloves must be worn by all persons on site including visitors who must report to the site office on arrival.

Method Statements & Risk Assessments

All necessary Method Statements and Risk Assessments will be prepared and kept in separate method statement files, which will be held on site.

We work on the principle of 'They who create the risk - creates the necessary Method Statement/Risk Assessment'.

The requirement for a Method Statement will be highlighted to the supply chain partner by the Construction/Operations/Projects Manager, at the pre-order meeting and the requirement thereof forms part of the contract documents.

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All such Method Statements/Risk Assessments must be available on site prior to that operation commencing. These will comply with the requirement of the Health and Safety Policy to ensure that they are sufficient in detail and, if acceptable, will be signed on site by all operatives who will agree to comply with the Method statement/Risk assessment at all times. If at any stage of the work the Statement requires revision, then work will not be permitted to continue until the revision is in writing and again all concerned have signed it.

7. Environment

Environmental Management Plan

Willmott Dixon's Environmental Management Plan details the environmental management system that is to be used on this project to control our environmental impact on the surrounding area; this is to achieve continual environmental improvement and to ensure compliance with relevant environmental legislation, standards and codes of practice. The system is designed to be compliant with all the clauses of the International Environmental Management System Standard ISO 14001:2004. The Environmental Management System (EMS) also aims to provide a framework so that there is linkage and connection between the legal requirements of the business and the Environmental Policy, the scope of our operations and also our environmental aspects. The EMS takes the significant aspects of our operations and applies objectives, controls and targets to achieve continual environmental improvement.

All EMS documentation will be amended as and when deemed necessary by the Company and supervised by the Company's Environmental Director. Alison Brough, the Environmental Manager for the northwest region in conjunction with the site will produce the site-specific Environmental Management Plan, (EMP) and a dedicated, based on site will be responsible for the day-to-day management of the plan which will be audited by the Environmental Manager.

Tree felling and scrub clearance if required on Greenheys shall be undertaken outside of the bird breeding season (March-August) unless a checking survey by a suitably qualified ecologist has deemed active nests to be vacant and appropriate notice of such provided to the Local Planning Authority prior to any such works commencing. It is not anticipated that any are required on this project.

Any trenches left uncovered/open overnight shall provide a means of escape for mammals including badgers through the provision of a ramp at least 30cm wide and at an angle of no greater than 45 degrees.

Site Waste Management Plan

Construction projects generate many environmental matters that require control measures. To ensure that these matters are controlled the Environmental Toolbox talks as listed below will be considered as 'Activities with Risk to Health and Safety' and will be part of the H&S Managers and Safety Inspectors inspections regime. Toolbox Talks are the responsibility of the Willmott Dixon Environmental Manager. The site will have a site-specific Site Waste Management Plan (SWMP) on site

- Spill Controls
- Water Pollution Prevention (Fuel and Oils)
- Dust and Air Quality
- Noise and Vibration
- Water Pollution –SILT
- Water Pollution- Cement and Concrete
- Tree Protection
- Storage of Waste
- Storage and use of Petroleum, Diesel and Oils
- Pumping and Over Pumping
- Washing down Plant and Machinery

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- Be a Good Neighbour

A separate Project Environmental Plan will be developed by our proposed site management team alongside our Environmental Manager prior to starting on site that will identify the procedures in place for environmental considerations throughout the project duration.

Dust And Waste Management

A number of the enabling and building operations are inherently 'dusty'. We will keep dust to a minimum through the use of damping down sprays where applicable.

We will have a segregated cutting zone which will enable us to exercise greater control over dust pollution created during cutting exercises. This will be positioned at the furthest point away from sensitive receptors in the area.

Dust suppression equipment will be used wherever necessary, and this will be monitored on a task basis and is to be included in each Method Statement in line with the Risk Assessments produced to minimise dust while ensuring no contaminants enter the surface water sewer network.

We have allowed for wheel washing throughout the groundwork's phase to ensure all vehicles leaving the site do not spoil the surrounding roads. This will be achieved via a wheel wash station inbound off the main site gates, this station will have a temporary drainage system (silt trap) that will contain the spoil on site so it can be disposed of in line with our Environmental Management Plan.

The wheel washing strategy will also make use of the Banksman who is stationed at the main site gates, this banksman will check in and out all construction vehicles, during this check the banksman will wash off any debris collected on site via a jet wash station (where all liquid run off will be contained within surrounding silt traps to avoid debris entering the surface water drainage network. Further to this road sweepers will be utilized throughout the day as a capture all clean down of the roads leading to and from site.

Surplus materials will be placed in segregated skips for removal from site to a registered waste processing centre and will be recycled where possible. Willmott Dixon's site-specific Environmental Management Plan will identify these items as risks and will identify the necessary control measures.

We will not allow any fires on site for the burning of materials.

The highways will be protected using a robust environmental management approach, preventing spillage by bunding all plant on site and installing silt traps at all drainage points across site. Dust mitigation such as dampening down will be utilised on site and debris netting preventing materials leaving the site lines will be in place.

Greenheys Dust Mitigation Measures

Willmott Dixon will implement the below in line with the Air Quality Report

Communications

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary.
- Develop and implement a stakeholder communications plan that includes community engagement.
- Display the head or regional office contact information.

Site Management

- Record all dust and air quality complaints.
- Make the complaints log available to the LA when asked.
- Record any exceptional incidents that cause dust/or air emissions, and the action taken to resolve the situation.
- Hold regular liaison meeting with other high-risk construction sites within

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500m of the site boundary (if applicable). Ensure plans are coordinated and dust and particulate matter emissions are minimized.

Preparing and Maintaining the Site

- Plan Site layout so that machinery and dust causing activities are located away from receptors.
- In the event of high potential for dust production, adequate measures are to be put in place such as dust suppression equipment to be utilized when operations last an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible. In the event this is the case dust suppression methods are to be utilized at all times to minimize the risk.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Use water as dust suppressant where applicable.

Operating Vehicle/ Machinery and Sustainable Travel

- All vehicles switch off engines - no idling vehicles. All vehicles comply in line with the FORS procedure and being responsible within the community in line with Considerate Contractors scheme.
- Avoid the use of diesel or petrol-powered generators where practical.
- Impose and signpost a maximum-speed-limit of 15mph on surfaced. and 10mph in unsurfaced haul roads
- Produce a Construction Logistics Plan to manage sustainable deliveries. This is to be discussed at each pre-start meeting with the supply chain.
- Implement a Travel Plan that supports and encourages sustainable travel.

Operations

- Cutting equipment to use water as dust suppressant or suitable local. extract ventilation
- Ensure adequate water supply on the site for effective dust/particulate. matter suppression/mitigation
- Use enclosed chutes and covered skips where possible.
- Minimise drop heights.
- Ensure equipment is readily available on site to clean any spills. Spill kits to be adopted in line with WD Environmental Procedures and fuel storage equipment to be double bunded and padlocked to avoid issues.
- Installation of a mitigation bund to mitigate any surface run off entering the lake.

Waste Management

- No bonfires
- Covered skips.
- Covered wagons.

Earthworks and Construction

- Re-vegetate earthworks and exposed areas.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate.
- Only remove the over in small areas during work and not all at once
- Avoid scabbling where possible and if so, adequate dust suppression equipment is to be used.
- Ensure sand and other aggregates are stored and not able to dry out, unless it is required for a specific process
- Ensure bulk cement and other fine powder materials are delivered and stored to prevent escape.

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- For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust

Track out.

- Use water-assisted dust sweeper on the access and local roads.
- No dry sweeping is to be utilized and dust collection / suppression is to be adopted on site.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials. Refer to the sheeting section above as listed.
- Inspect on-site haul routes for integrity, instigate necessary repairs and record in site logbook
- Install hard surface haul routes which are regularly damped down.
- Implement a wheel washing system at a suitable location near site exit
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits
- Access gates to be located at least 10m from receptors, where possible

7.1 Environmental Management Plan

We will produce an Environmental Management Plan for the project that will detail the environmental management system that is to be used on this project to control our environmental impact on the surrounding area; this is to achieve continual environmental improvement and to ensure compliance with relevant environmental legislation, standards and codes of practice. The system is designed to be compliant with all the clauses of the International Environmental Management System Standard ISO 14001:2004.

For an overview of our Environment proposals for Greenheys, please refer to (Environmental Social & Governance)

8. Quality Control

Our reputation is built on the quality of the products we produce, and we never get complacent in our approach to perfection.

Our conscientious people and supply chain partners are the key drivers in delivering first class quality products. To support them, we have robust quality procedures which we will implement during both the preconstruction and construction stages:

Pre-construction

Design review: During Stage 4, our design managers Dave Wood, Martin Keane and Gareth Blunden will meet with the design team and our supply chain partners every 2 weeks supported by Chris Baker to ensure that the design is progressing in line with the specification, and we are incorporating the best buildability details and advice from our trusted partners.

Quality plan and Risk Assessment: A project quality plan will be developed with Chris Baker detailing how we will manage each key critical element of quality on your project. We will pay particular attention to piling, concrete frame, roofing, envelope, MEP and fire compliance – we understand the key detail of CL2 lab spaces and the criticality of providing water and airtight spaces to compliment pressure regimes. The plans will focus heavily around achieving the required quality for the day 1,2 and 3 fit out.

Commissioning Plan: We know from engagement with end-users that getting into the building in a seamless transition is so important to them. We will therefore develop a robust commissioning plan in

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preconstruction in conjunction with the operational team, which we will tie into our soft-landing procedure to include training your people on how to use the building services.

Construction

The construction phase is where we will put our plans into place and deliver exceptional products. To help our team achieve this, we will implement the following processes that support us in our defect-free delivery commitments.

Daily Quality Inspections: Led by Jack Overson, your project manager, we will complete daily inspections of works complete, in line with our pre-populated quality inspection sheets, giving confidence that all works are being completed in line with the quality plan, specification and drawings.

Field view: Each of our supply chain partners will have their own access to Field view, our quality record system. They photograph their works, complete our pre-populated checks for each package and submit the forms to our management team for review. Only when our team are happy the works have been completed to the right quality, will we sign it off and make payment to the supply chain partner. This ensures that we have robust checks in place to ensure the best quality. We encourage our customers Clerk of Works to utilise our system and work as part of our team during the works to ensure a seamless handover process.

USE OF TECHNOLOGY:

To enhance quality management on site we use a tablet-based system called Fieldview that helps our teams quickly and effectively manage snagging, variations, incomplete works, damage and other site tasks.



Quality Delivery toolbox talks: Our area managers and supply chain partner supervisors will hold quality delivery talks prior to the commencement of key packages such as piling, groundworks, frame, roofing, envelope and internal finishes – this will reinforce what we expect of our partners, operatives and ourselves.

Added value: In addition to the above checks in both preconstruction and construction, we also have support from our regional principal quality manager, James Wilson, who is focussed on continuous improvement of business process and capture of key records in relation to our golden thread for fire compliance. Our group quality inspector, Simon Pearce will visit site every 6 weeks to carry out in depth quality audits, reviewing our quality files, onsite installation and offer support on upcoming packages. This added level of review helps us deliver outstanding products for our customers.

9. Construction methodology for Greenheys Redevelopment

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he assurance that we have the knowledge and expertise to deliver the complex requirements of your project, we have provided below a detailed construction methodology of how we propose to deliver each element:



9.1 Enabling works

Site services survey

Prior to commencement of the works a comprehensive site services survey will be carried out by our specialist contractor. This will entail identification of services by ground penetrating radar detection and hand digging. All services across proposed access points and key junctions will be exposed and plotted accurately for future reference, we will work closely with Bruntwood SciTech regarding any critical diversions.

We are in possession of the survey ops preconstruction GPR however at each stage of the scheme these scans will be re done ensuring accuracy of the identified services and live updating of the information through the enabling phase once services have been diverted. All services identified by scans will be located by trial digs and vacuum excavation. All live services to the scheme will be safely disconnected prior to demolition works commencing on site. Minimising disruption to the adjacent businesses, we will agree a time when all utility supplies can be physically cut, and tail ended at the site boundary.

Piling

Two piling rigs and concrete agitator will be delivered and operated within the site boundary, working on the designed piling mat. Following completion of the piling, substructure works will commence consisting of reinforced concrete pile caps, ground beams, retaining walls and ground floor slab.

Two rigs are being used so that a core and TC base can be worked on concurrently releasing the critical path of the build.

Using a telescopic leader rig, piles will be driven to within 50mm of agreed levels or refusal, whichever occurs first. Refusal being defined as being one of the following:

We will deliver the CFA piling element of works for the main building using the following process:

- **Set up and drill** – We will set up the auger over the pile position and commence drilling to design founding level
- **Pile arisings** - As the auger is advanced, pile arisings will be cleared using the attendant excavator
- **Concreting** - On reaching the design founding level, concrete will be pumped from a static pump through the centre of the auger while simultaneously extracting the auger

- **Pile reinforcement cage installation** - The attendant excavator will clear the residual pile arisings and excess concrete. The pile reinforcing cage will then be lowered to design level using the piling rig or attendant crane

9.2 Groundworks

Our specialist supply chain partners will commence with the pile cropping and installation of the capping beam, using a hydraulic pile cropper attached to an excavator, the piles will be reduced to the de-bonding sleeve/depth of the capping beam. Formwork will be installed to the profile and depth of the capping beam. Prefabricated steel rebar cages will be placed over the exposed pile reinforcement and tied. The concrete pour will follow, utilising a concrete pump.

These works will be completed from the temporary piling platform, used for the piling works. Once the capping beam has cured, we will strike the formwork and remove the temporary platform, exposing the front face of the CFA piles ready to be sealed, reinforced and anchored to the slab.

Due to the level of groundwater encountered during site investigation works, we propose using a de-watering solution. Using this solution would effectively lower the ground water locally to the work area.

Drainage and external works 278 – culvert connection

The attenuation tank will require temporary propping based on its position adjacent to the highway, with a cofferdam type sheet piled arrangement used to construct the tank. The surface and foul water drains will be installed early in the programme, as the runs are shown in constrained locations adjacent to the new build and the existing structures – sequencing wise these elements being installed early will ensure that the substructure programme is not constrained.

A new connection is being shown across Greenheys lane for a 300mm SW connection into the existing culvert – a road closure will be required while this work is undertaken. The road closure will need a section 50 application with highways and a s106 application will be required with the culvert asset owner – in this case UU – the work will be undertaken with temporary works sheet of and trenching.

9.3 Concrete frame

Following the completion of the piles, caps and beams the frame will begin following the same sequence. Which will start on the West at Grid Line q working East

Jump Formed Core

Each tower crane will be erected in time to commence construction of the two slipform rigs. During the preconstruction period we will design and procure the equipment, ensuring that the structural stability of the cores is maintained in its temporary condition. The rig will be fully encapsulated to ensure that no materials fall out or blow off the structure. Jump form has been selected as slip form is not viable from a commercial perspective for this height of building. Forming the cores and jump rigs will be one of the first activities.

Floor Construction

Following the completion of the ground floor slab, columns will be cast insitu and the temporary works installed, this allows the upper floor construction to commence, we have proposed to split the floors into 4 pours of circa 600m² or 215m³ per pour. All slabs will be power floated that will require working outside planning hours. Props will be transferred and re-erected on each floor via cantilever decks. Once level 3 has been cast we shall commence the preloading of the ground floor and fit out sequence. This will then follow a fortnightly sequence as we move up the building. The frame shall be planned around a 6-day working week averaging around 100 operatives.

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Upon the completion of the frame the slipform rig will be de-constructed and craned off the top of the core, and the capping slab installed.

Stairs

Our intention is to pre-cast the stairs and these will be installed progressively as we progress up the building.

Hoists

Two passenger and goods hoists will be installed:

- The hoist will be a twin mast sited on the North elevation so it can be serviced by delivery vehicles and the tower cranes.

Cantidecks

- Cantilever decks shall be utilised during the concrete frame construction for distributing the props and pre-loading the floors.

Lift Installation

When we have completed the core structure and capped at roof levels and have sufficiently advanced the floor slabs, we will commence with the installation of the passenger lifts. Owing to access restrictions and handling of materials, we will fit out each lift shaft before commencing the next and so on. By completing the lifts early, we will get beneficial use of the lifts progressively.

9.4 Facade & Roof

Mast climbers will be installed to the perimeter of the site within the site hoarding and the cladding and curtain walling will be progressively installed from these.

Prior to starting works on the cladding and façade installation, we will focus on getting large sections of the building weathertight through installation of the roofing system. The first operation shall be a peel test to ensure the concrete has fully cured and is ready to receive the monolithic coating; following the peel test the materials and boiler will be distributed to the roof via a mobile crane.

The monolithic coating is the first operation, the product will be heated to 180°C and then distributed using buckets and squeegees across the cured concrete areas. To deliver a fully bonded system, we will prepare the surface of the substrate to accept the full system.

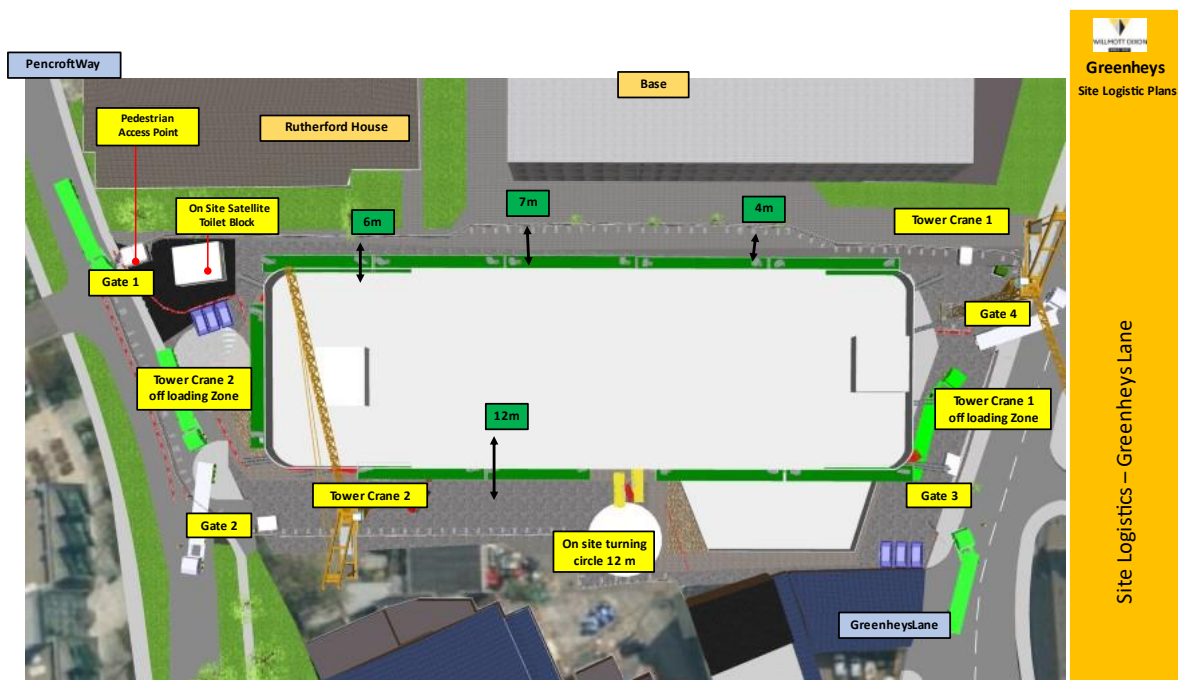
Once the areas are complete, the 220mm extruded insulation, paving slabs and ballast will be craned to the roof area. The insulation will be manually handled to the work area and laid in a staggered system. The paving slabs will be taken to the relevant area using mechanical means i.e., pallet truck or sack truck. The slabs will be laid on solid plastic supports, which will sit on a separation layer laid directly on top of the insulation. The round washed ballast will be craned to the roof area and distributed to the relevant area using the crane or wheelbarrows.

9.5 Installation of the curtain walling

SFS (Structural Framing System) and window installation

The SFS and window installation will be carried out once the frame is at level 4 and is completed from the mast climbers, this enables a safe installation method which is completely enclosed from the site to the public highways.

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We will install all first fix prior to the main envelope and cladding works starting. We will start by fixing the curtain wall stick work transoms at head and track to the slab and then move on to the mullions. Operatives will work from a range of 9250 scissor lifts around the perimeter of the workplace, 3219 small electric scissor lift (1.3T) off the podium levels. The majority of the façade will be serviced by mast climbers.

Using a C6 spider crane and manipulator from Ground floor level or a glass smart lifter from the floors, we will lift and install the glass and spandrel panels. We will seal up and weather where required and lastly complete the external finishing elements such as pressure plate and caps enabling us to install the cladding feature panels in front of these areas.

Working from 9250 scissor lifts located at the ground level around the perimeter of the building, we will fix the brackets to the primary structure at head and track and curtain wall framework will be built and installed. Once the lower levels are completed from mewps the mast climbers will be installed for the remainder of the facade.

We will fix the large spans of the structural glazing frames back to the structural frame, the glass and spandrel panels will then be lifted and installed using a C6 spider crane and manipulator from the Ground/Mezz level. Any glazed balustrade to the terrace will be installed manually with the base track fixed to the curtain wall support transom below, the glass units will then be installed followed by the metal handrail. Our operatives will work from the roof and from a 9250 MEWP around the perimeter and mast climbers.

The elevations will be constructed in a linear sequence so that the watertight strategy can be achieved per floor releasing the critical path of the fit-out trades.

For the plant deck screen, we will fix steel to the slab at the head and track followed by the external cladding and commence the installation of the cladding substructure build-up.

Plant screen

Panels will be distributed to roof level, either via goods hoist or site tower crane. Primary support steelwork posts will be installed to allow us to fix the panel support channels to. Will then install the perforated panel by lifting and installing in place via spider crane and manipulator sat on the roof. For the Rainscreen cladding areas, sections of SFS & Board will be required to the underside of the plant level slab.

Operatives will then install the support brackets and build up from off the masts. Once completed we will install the rainscreen panel again using the spider crane and manipulator sat on the roof. we will also install these from off the masts. After the rainscreen is fixed we will install the aluminium roof capping's which will be done from off the roof / mast.

Shading Fins

We propose to install feature fins once the building is substantially watertight and off the critical path. The materials will be brought up in the mast climber to the workface. Operatives will install the horizontal and vertical feature fins fixed back to the curtain wall. All these works will be carried out by working from top down to also enable the mast ties to be progressively removed and areas infilled as we drop down the building. Then we can remove the mast climbers to allow the low-level capping to be carried and any remaining ground floor infills and flashings. The hoist infill glazing and rainscreen will be carried out last from single masts to complete the works.

Green wall and Cladding

Considering the sensitive nature of the green wall cladding, the intent is to install all the structure and windows during the main facade programme and treat the green wall as a final fix item that will benefit from the right season for installation and maintenance.

9.6 Internal Fit-out and Services including the lab Construction.

Fit Out

When we have a fully watertight floor, we will complete the high-level spine services, including any temporary electrics, power, and lighting. As the roof covering and glazing installation progress to create a weather seal, the internal fitout will commence. Internal partitions to corridor walls and service risers will be constructed head of the high-level MEP installation. Materials required internally are to be loaded by forklift onto loading bays and goods hoist and distributed by pump truck internally. There will also be a passenger and goods hoist to provide a central location to service material to all floors.

As the Mechanical & Electrical services and joinery approach second fix, mist coating, sanitary ware, painting & decoration, toilet cubicles, ceramic wall tiling, floor finishes and hand railing works can commence. These will be coordinated around screeding to floors. We will pay particular attention here to air tightness.

The completed first side boarded walls will be handed over to the Mechanical and Electrical contractor for their first fix works to all services as well as ventilation and ductwork, electrical, comms and control wiring, gas suppression pipework and all pipework including all testing prior to handing back for second side boarding and ceiling works. The areas will be plastered, and mist coated when dry. The walls will be snagged and repaired where necessary ahead of 2nd fix joinery, and final decorations. Final fix electrical and lighting will be followed by floor finishes, builders clean and commissioning of services. The team will instigate an inspection and snagging process with the customer team to clear all defects before final sparkle clean and lock up of the completed area.

The points set out below have been considered between all fit out trades and included in our programme, to create the most efficient sequence of install across all fixes, and trade to trade interfaces. We have a robust logistics plan in place which includes hoists that will enable each floor to be safely serviced with material, plant, and the workforce.

The fit-out approach includes for the Day 1,2,3 tenant access requirements, and allows the project to be commissioned in stages focusing on levels L00, L01, L06 and external plant areas. These will be prioritised to enable the tenant's plant and equipment delivery, installation, commissioning, and early habitation of the building.

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We aim to deliver a high quality and compliant product, to do this we will employ our tried and tested QA/QC ITP process which includes, but is not limited to, hold points after each “fix” or interface between trades i.e wall handover between erectors and MEP trades, wall inspections prior to second side sheeting, MEP QA inspections and pressure tests prior to lagging. This process secures programme certainty by negating any reworks and demonstrates compliance at all stages of the installation.

We have broken the stages of install down to the following points:

- **Early work:** These works will start once the back propping for the upper floors have been removed. The works will include drainage pipework as this will allow us to manage any water ingress on the higher floors that will still be under construction. We will be identifying high priority walls i.e risers, smoke clearance shaft which enable us to install the building wide life safety systems that are required for the tenants’ early access on day 3.
- **First fix:** These works will commence after the Early works as the external envelope will be installed, and we will have an environment where it will be safe to install drylining and services. Due to the absence of ceilings in many areas of the project these works will include 1st fix walls, MEP install up to final wiring and high-level final fix.
- **Second fix:** These works start as soon as the MEP trades hand over the first fix walls back to the dryliners, the MEP 1st fix will continue, at this time they will be wiring high level. This will take the rooms, areas to the point that they are ready for decoration and any ceiling if required.
- **Final fix:** The final fix element will consist of ceilings where required, final decorations and final MEP connections low level and installation of light fittings.
- **Final fix Low level:** This only applies to level 2 where there is a raised access floor where the sequence and works will be RA flooring pedestals installed and tiles, then we will be installing the low-level MEP services including data and power.

9.7 MEP Installation

The MEP installation on the project has been based on three key factors:

- 1 = Compliance and quality
- 2 = Programme adherence and betterment through the MMC approach
- 3 = The tenant’s timely access requirements, which have driven a split commissioning strategy

We have detailed out every step of the process from design and drawing production, procurement for long lead items, into construction and most important of all commissioning. This approach is tried and tested on similar lab buildings that have been completed recently.

Our MMC approach of riser modules, major plant work modules and small floor plate service modules not only reduces the time spent on the project but increases the QA performance by removing the work from site and carrying it out in a factory environment. This is also in line with our carbon reduction strategy.

Our commissioning strategy is focused on enabling the tenants access dates by designing, procuring, installing and commissioning these areas early. The areas of focus will be L00, 01 and 06 which supply the power, water and air to the space. We will also be focusing on the life safety systems which span the whole building i.e smoke clearance, fire alarm etc which will be required for a habitation certificate. Our early works process is key to this as described in the section above.

M&E MMC Potential

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The MMC feasibility review of the Greenheys is based upon the current Sillcock Leedham stage 3 design and will need to be considered further and integrated throughout the stage 4 and 5 design process.

Due to the constraints of the welded nature of processed extract ductwork and the current stage of design, the MMC feasibility intent is currently limited to the Electrical and wet Mechanical services.

The MEP brief notes the requirement for future flexibility with the ability to adapt the space influencing the open ceiling approach where all services are on show.

We believe that the modulization of the space will allow and cater for future adaption of the space while keeping the same look and feel to future expansion.

Ground floor

The ground floor is currently detailed by BDP as an exposed ceiling except for the office (MF (Metal Frame)), toilet (MF) areas and Labs which have CLG-891 Exposed with suspended Class A perforated metal acoustic rafts / baffle. Primary multi-tier modules would suit this type of installation as the module not only provide uniformity of install, full traceability / structural analysis of design and fixing methodology, but it can also be designed to allow for the “hanging” of light fittings etc. These works could also be undertaken early in the advanced works sections of the build sequence.

Other potential MMC and prefabrication to explore:

- Secondary modules to allow distribution into side areas and labs (hanging lights), these also reduce the volume of “conduits” and allow for future expansion via the trunking system.
- Secondary modules to cross each Lab service boom due to density of circuitry for the boom.
- Preformed bracketry/tracks for suspension and support of the 10 x 5m Long fabric duct
- External area needs more detail to establish MMC potential.
- The area for the main storage -80 sample storage systems needs more detail to determine MMC potential.

First floor

The first floor is also detailed by BDP as an exposed ceiling except for the office (MF), toilet areas (MF) and circulation / sitech lab hub which have CLG-891 Exposed with suspended Class A perforated metal acoustic rafts / baffle.

This floor would mainly consist of primary multi-tier modules and Skinny single tiers.

The main area of focus would be the switch rooms, external plant space and the DC (hatched areas). All of these are very heavily serviced. Currently the level of information will not allow an informed decision at this point, however there will be potential for plant skids, containment modules for the submains and kits of parts spooling of pipework.

Other potential MMC and prefabrication to explore:

- Skinny single tier modules installed above -80 area to allow servicing and pre-install of lights at 6250affl.
- External packaged Plant skids for pumps and valve assemblies with chiller steelwork and frames
- Low level modules for the generator submains
- Modular pipework for the Crack units in the DC

Second floor

As the other floors the second level details CLG-891 Exposed with suspended Class A perforated metal acoustic rafts / baffle except for the bookable space (MF), toilets (MF), hyper focus and small meeting rooms (MF). This floor has RA flooring which allows for the majority of the power and data to be wired under the floor. Skinny floor modules could be used here but a traditional install usually suits better in floors where the “gap” is less than 500mm.

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Secondary multi-tier modules would suit this type of installation, the electrical infrastructure in the ceiling space is minimal as the power runs under the floor, the power, lighting and wet systems for the FCUs could combined and ran in such a way that again allows the modules to carry the weight of the light fittings, as these areas will be exposed this would present a much tidier and less busy ceiling space.

Other design considerations to explore:

- Under floor services would reduce the size of module in the ceiling to secondary.
- Under floor would need to be traditional due to the gap under the floor.
- There are FCU located on either side of side of the desks on the north and south elevation so a central module would service the FCUs and allow support for the linier light fittings.
- FCU would be provided with preassembled valve arrangements.

Third floor

The third floor varies from the floors below where the most ceilings are MF above the lab benches, and then CLG-351 Acoustic Linear Metal Plank Ceiling System above the write up spaces. The toilets areas and circulation are MF, and the main corridor is in CLG-800 Acoustic Fabric Ceilings. All of the above bring challenges where access and maintenance need to be well considered.

This floor is heavily serviced with ducting and small power / data to the service booms, secondary multi-tier modules would suit this type of installation.

Other considerations to explore:

- Density of circuitry for the lab benches and trunking sizes
- Coordination with ductwork
- Access and maintenance due to MF ceilings

Fourth and fifth floor

The fourth and fifth floors are landlord fit out only, a basic central corridor module is all that is required. BDP have indicated CLG-891 Exposed with suspended Class A perforated metal acoustic rafts / baffles. The fire alarm is the only service that is outside of the central corridor area and can be clipped directly to the slab.

Sixth floor and roof

The sixth-floor external area has a Blue / Green roof that allows for water attenuation and the growth of fauna and fauna. This will require detailed supporting steelwork for the strobic fans and the associated ductwork.

The heat pumps and chillers will also require supporting steelwork, the associated pumps for both of units would be packaged on plant skids. The central plant, AHU's and Chillers, to have package valve arrangements and potential for interconnecting kit of parts pipework.

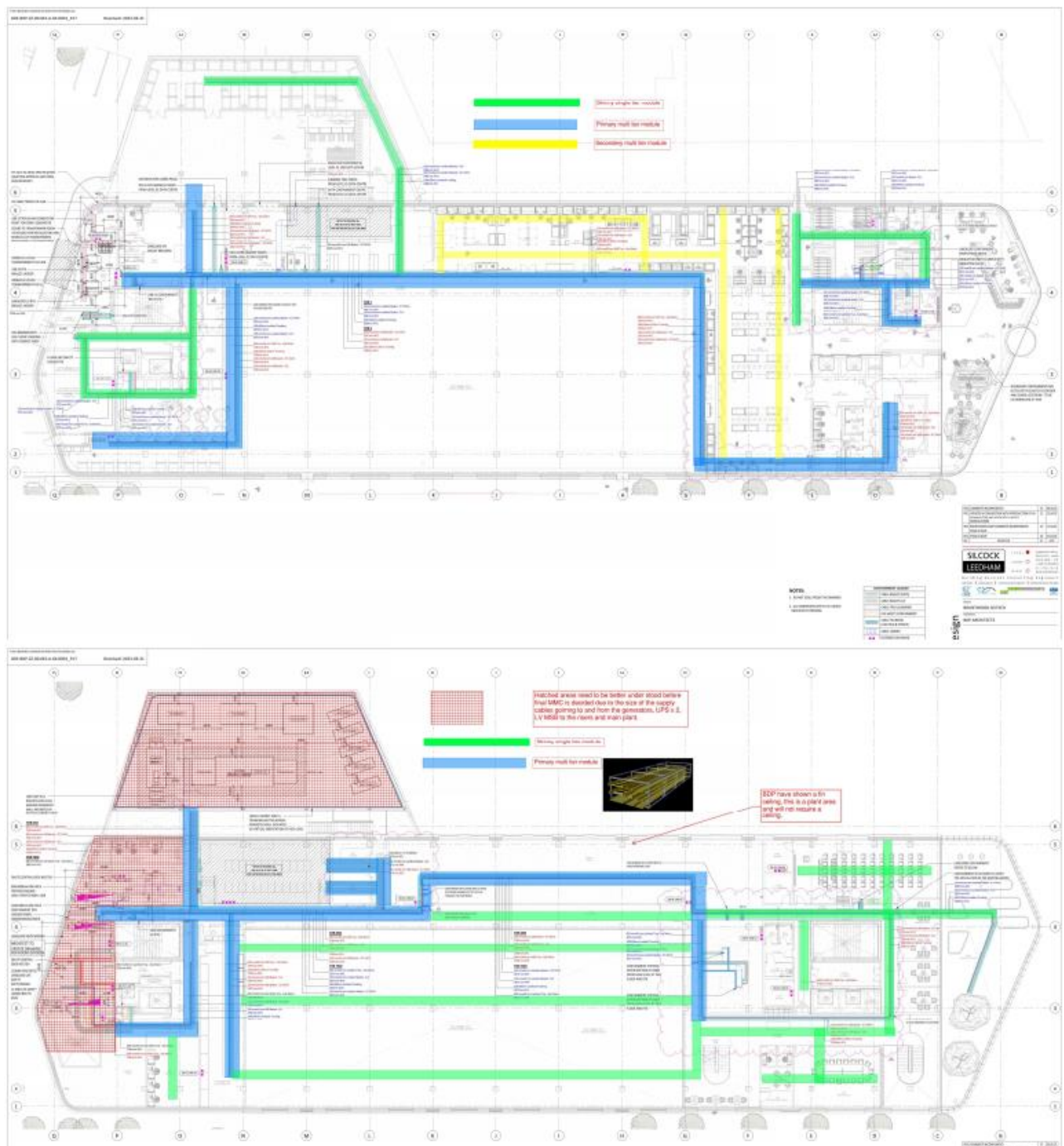
Risers

The four main multi service risers forming the arterial route from the roof to the lower floors are of a significant size (8 m x 3 m) and contain vent, pipework and electrical services. These services have high potential for offsite fabrication as vertical service modules complete with structural framing and flooring to each level.

If implemented the risers could be installed early in the build sequence lowered down the shafts and fixed in position providing early access and removing from the critical path.

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Ground floor cassettes mark up (Blue – primary multi tier module) (Green Single tier module) (Yellow secondary multi tier module)



First floor cassettes mark up (Blue – primary multi tier module) (Green Single tier module)

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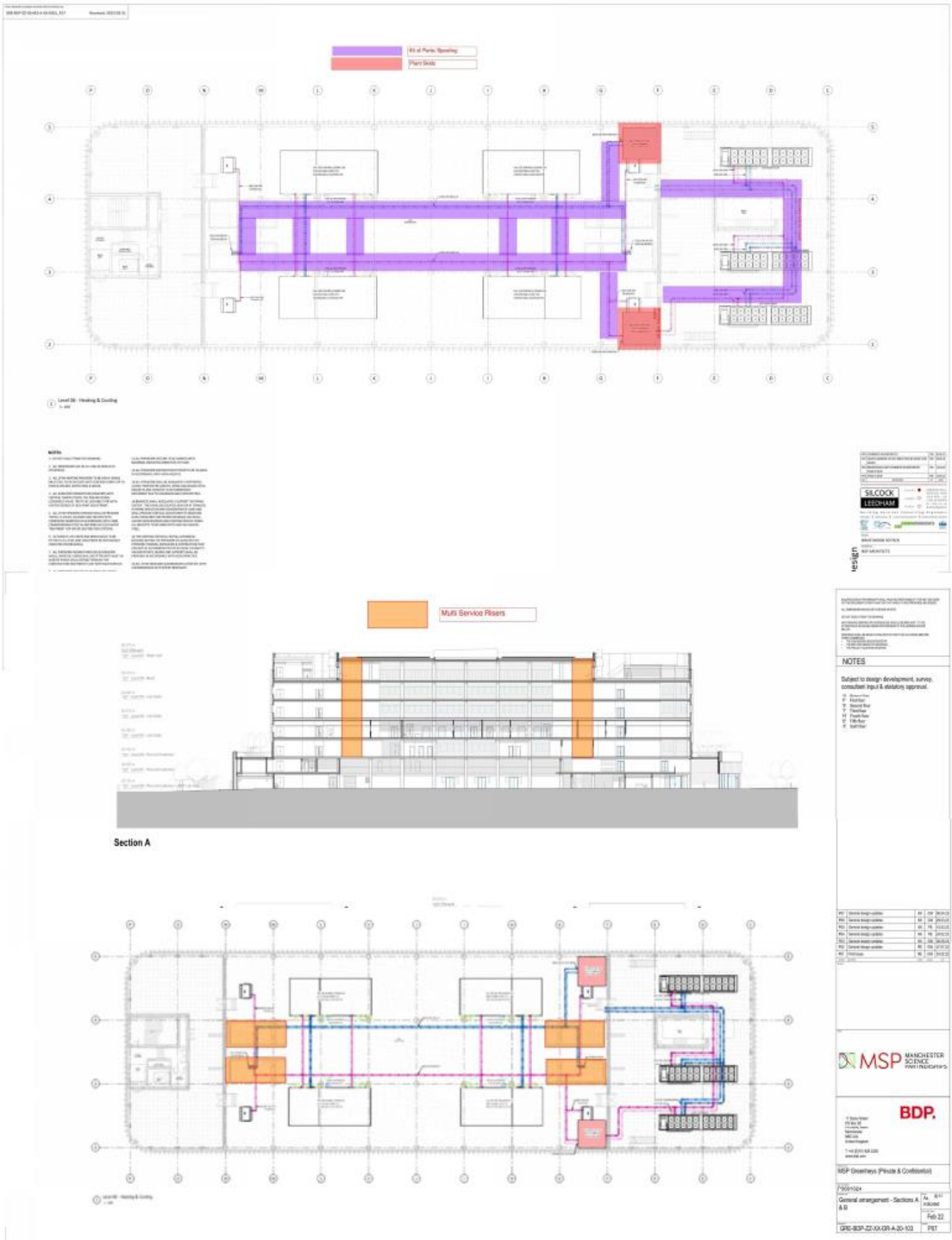
Third floor cassettes mark up (Yellow secondary multi tier module)



Fourth floor cassettes mark up (Yellow secondary multi tier module)

CONSTRUCTION MANAGEMENT PLAN

Plant deck mark up (Purple kit of parts) (Red Plant skids)

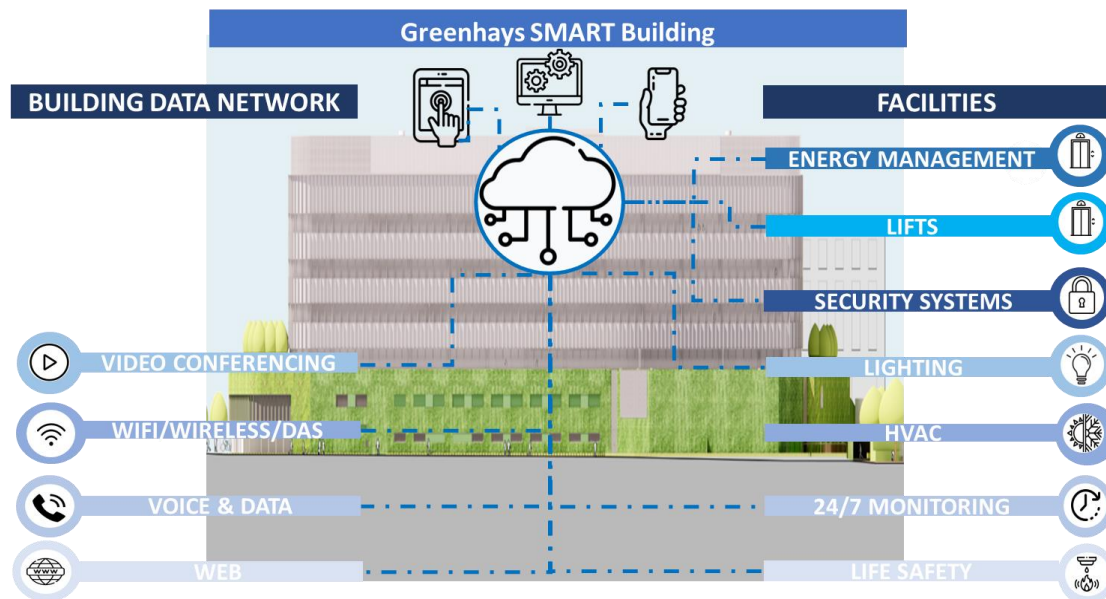


Section of build showing multi service riser cassettes (Orange)

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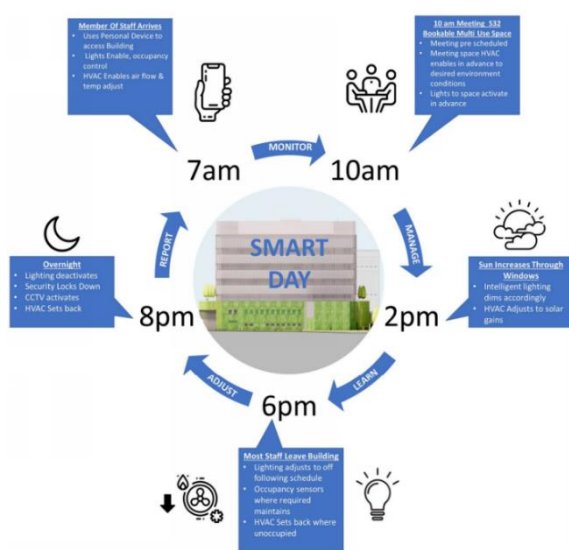
Smart Buildings

For Greenheys it will be important to understand the aspirations and requirements as to what elements of the building's intelligent systems will be interconnected as a master system to monitor activities, optimize operations and user experience.



By understanding the projects requirements, buildings operational intent we will be able to provide a facility which receives help from lower operational costs by holistically automatically managing the building in line with scheduling, occupancy counting and monitoring to control security, lighting and environmental conditions to name a few.

Not only will the buildings operations and management be optimized but the user/occupant experience can also be positively maximised by providing a seamless experience utilizing the building with intelligent systems providing automated access, specific conditions and requirements. During the next stage we will engage and collaborate with the Smart Buildings Consultant NDS to understand and finalise the SMART brief and specifications with a master systems integrator.



From our recent experiences we have included our lessons learned for delivering labs:

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Lessons Learned	
<u>Design</u>	
1	Firm and robust deliverables schedules to avoid expectations and cross-over of responsibilities of the designer and the installer.
2	A detailed set of interface matrix to be created to avoid scope gaps between contractors.
3	End users' actual equipment to be used for sizing of MEP services and connections. Full list of equipment to be serviced to be available.
4	CDM access and maintenance to be incorporated early, due to specialist ceilings and the layout of end user equipment
5	Care to be taken when sizing fume extract ductwork, there are no fire dampers on the market that have approved details for anything over the 450mm. specific fire testing in a test house to be considered.
6	MEP Distribution (power/Air/water) to reflect construction drawings zones.
7	All BMS supplies and out stations to be fed from essential services of UPS backed so that if there is a power fluctuation you do not lose the BMS and essential plant feeding the DC forge.
8	Cable sizes to be considered when DBs are under 160amp
9	Inclusion of end-user's request during feedback (RDD) sessions, Labs have very specific connection requests for equipment. It is key that this is included not only in the BDP C-Sheet but stage3-4-5 MEP design.
10	Fire/Protected lobbies to have only equipment servicing life safety equipment.
11	CFD to be carried out on smoke extract system to prove functionality, west door is very close to the AOV and could be pulled open.
12	Early identification of cavity barriers as this will change the ducting/damper philosophy.
<u>BIM</u>	
13	Full Cobie deliverables to be identified in BEP and undertaken by each party at the appropriate time.
14	Architectural spaces to be made available ASAP to allow MEP spaces to be linked.
15	Firestopping products to be selected early as these details dictate the distances between the services, substrates and other services, modelling can't begin until products have been chosen. Dalux/Revit so deployed on all tablets so all on site Managers/supervision have access to the 3Dmodel at the workface. Regular model reviews with the customer to demonstrate access as part of the soft-landing process.
<u>Procurement</u>	
16	Off-site storage for purchased plant would be beneficial, this allows for QA to be undertaken on delivered plant, sequenced management of hook time and the ability to VEST materials to aid with potential benefits to reduce Inflationary impacts.
17	The release of information from design, needs to be focused on the long lead items especially the Items coming from America i.e. the strobic fans on 25–30-week lead times.
18	Early final heavy plant selection is essential to aid in the design, selection and erecting of secondary steel work to support the plant.
19	Signoff/Acceptance of drawings and technical submittals to be early focus by customer/consultant to Allow for purchase of specification compliant kit.
<u>Setup and Programme</u>	
20	One combined detailed programme to avoid conflicts in reporting and for accurate forecasting.
21	Advanced MEP works can be undertaken to aid in water management and fire prevention, drainage, gas suppression Dry risers can start with no walls or façade.
22	Sequencing of firestopping and advanced walls to be understood by all as access required from both sides for fire.

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23	Early cable pulling schedule to allow for energization of mechanical supplies early.
24	Fully labour loaded programme to be in place including engineering take off hours to track productivity.
25	BWIC to be controlled and evidenced(photo) when marked, built on site to avoid issues with finite Tolerances of fire dampers and fire stopping. Regulation 38 compliance.
26	Collaborative planning sessions/progress to be undertaken weekly.
<u>Buildability</u>	
27	Drawings to be crated to reflect fire zones and fixing strategy to avoid non-compliant installation i.e. Life safety independently supported through escape walkways.
28	A fixing and bracketry strategy to be agreed early so that all on site are working too the approved strategy.
29	Steelwork for main plant to be designed early as the installation of the plant will be dependent on this.
30	Robust QA procedure to be in place to demonstrate to the customer and statutory authorities that the building is compliant and functional (field view) will be used by WD and our supply chain – the customer team will also be given access to raise direct snags and observations.
31	Benchmarks of all systems to be completed for QA and acceptance of customer and consultant.
32	Bench testing/ one of kind testing on security and access doors to validate operational functionality (to be carried out early).
<u>Commissioning</u>	
33	This period must be, protected as the commissioning of a lab building is more complex than most life science buildings and more in line with a health care project.
34	Separate DBs for mechanical services i.e., separate lighting, general power from FM power so that we can energise the FM DBs early to start commissioning of the systems early. This a fundamental critical activity.
35	240v Power supply for BMS panels to be installed outside of the panel to allow energization and low voltage access to the BMS engineer.

M+E programme

The review below is considering our recent experience of similar Lab buildings and the lessons learned from them regarding programme, sequence, buildability, and efficiencies.

Due to the heavily MEP serviced nature of a lab building, it is key to the successful delivery of the project to have one collaborative detailed logic linked programme, for all build elements i.e. superstructure, façade, fit out and most importantly commissioning. All elements need to align to assist in accurate forecasting, reporting, and for the programme to be utilised to its best potential as a project management tool.

With the project having 2 distinctive areas i.e. Landlords areas, and “Anchor” Tennent areas, it is understood that the building had been designed to be operated as separate spaces in regard to water, heating & cooling, power, and vent servicing the spaces separately. This allows for the building to be commissioned in two sections enabling the “Anchor” tenant’s day 1/2/3 early access requirements. This will not include the building wide services i.e. fire alarm, BMS and smart building controls etc.

Programme headlines:

- Stage 4B release from Silcock Leedham
- GMP submission
- WD contract award
- Stage 4 12 weeks
- Stage 5 23 weeks
- Procurement 42 weeks (this includes manufacturing and delivery of long lead items)
- Installation and commissioning of the MEP systems 62 weeks

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WBS and programme methodology

Work Breakdown Structure (WBS) would be based on three factors.

- The release of the building from the superstructure (frame) being a left to right (west to east) direction and in 4 gridlines.
- The early access request from the customer / tenant meaning that floors L00/L0/L02 and associated plant would need to be installed and commissioned ready for early occupation prior to the remainder of the building being completed.
- To start works on site as early as possible and condense the programme to enable a faster build sequence and offer the customer a more cost-effective product.

All factors above have been considered when creating this programme. The WBS for the building has been split into two simple zones, On the ground and first floor this is split into Three zones to consider the external Annex. This is in line with the pouring and curing of the superstructure concrete.

Design stage 4 and stage 5

Stage 4 duration of 12 weeks comprises of verification of the previous design, energy modelling, and preparation of detailed design to release the procurement of the main plant which is key to delivering this project on time.

Stage 5 duration of 23 weeks allows for the detailed modelling and drawing production including a customer sign off period. During this period, we will be focusing on the heavily serviced areas and concentrating on our MMC enabling drawings i.e. modules, risers, secondary steelwork for main plant on the roof as these are the longest lead times. The sequence will follow L0/1/6 to release detailed manufacturing and then the remainder of the floors, this will also support the tenants early access dates.

Procurement period

The procurement period is split into two sections, Mechanical and Electrical. Each string has a breakdown of the detailed processes involved for each package, including tender reviews and technical sub submissions. This enables WD to fully understand our processes and prepare for the volume of documentation for approval. Each string is logic linked to design release and the proceeding task.

Floor plates and access strategy

Each of the floors are slightly different in their makeup i.e. Plant rooms with external SFS wall make up, areas with open ceilings, raised access floors, solid ceilings, so one approach was not suited to all.

Our strategy will be to have an early works period as soon as a floor plate is available, this will include the Above Ground Drainage, Fire dampers that need to be hung within the wall structure to allow for a compliant installation, at this point we would expect associated head track, partition build and cavity barriers would be installed.

The first fix activity will include hanging of modules, secondary run outs and conduits recessed in partitions.

Second fix comprise of wiring activities for all trades, testing and fitting out HL awaiting ceiling install.

Commissioning

The programme splits the commissioning into two sections.

- 10 Weeks clear for the tenant's equipment, this has been logic linked and checked against plant deliveries etc.
- 16 weeks clear for the whole building systems and landlords' areas, including smart enabled installations.

Key dates:

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These dates have been checked against the installation periods within each area:

- Day 1 is physical completion of the works in the tenant's space
- Day 2 is similar to above however plant is required to be ready for specialist commissioning
- Day 3 Tennent occupies



The above needs to be fully understood by all stakeholders, i.e. all sub main cables for the project need to be pulled by Day 1 as access to the riser is at the soffit of level 1 in the Freezer storeroom which will be off limits after the day 1 entry date.

Lesson learnt - Using the learning gained at our Spindles project, we know how much work is involved in preparing the areas for fit-out and a safe access route for the end-user fit out and this has already been planned into our Greenheys delivery plan. The main construction and external works have been planned to be complete so that day 1, 2 & 3 are achieved – we will continually re-visit our delivery plans through construction to ensure the milestones are achieved.

Ceilings

The project has many different ceilings, some with no interface to the MEP and some where a full and detailed sequences need to be undertaken like on level three where all ceilings apart from the central corridor are MF.

Risers

As suggested by the MMC feasibility the Risers spaces are suitable for MMC, we have detailed this within the programme with the install constraint being the pour and release of the level 6 slab.

Subsequently to the risers the submains cabling install follows, which is a dependency for Day 1 early access date as noted above.

Fire stopping

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Early engagement of the third party fire officer and products are key in understanding the sequence of install, and the implementation of early works to allow adequate access to dampers will support this focus.

Roof Structure

From the documents we have noted the roof appears to be a blue/green roof. These needs considering in line with plant supports concrete/steelwork footings and the sequence of the requirement to be in place prior to the roof covering installation. This is also true of Level 7 for the PV except Level 7 is just a traditional roof.

Builders work

Significant BWIC if cast into the structure will require early attention during the design development period at both Stages 4 and 5. We would note that there are a large number of vent systems on ground and first floors which will require consideration for structural openings for air intake and extract.

9.8 Commissioning

We shall further develop and enhance our tender stage commissioning programme for construction delivery to manage the overall commissioning activities with dates continuously reviewed to ensure successful completion and handover of the building services. The projected dates for commissioning are shown on the construction programme and will be updated and target to provide contingency for any unforeseen issues.

Ensuring the building commissioning is thorough and the results interpreted accurately is a vital part of achieving zero defects at handover. Therefore, to ensure the technical commissioning of the Greenheys project is of the highest quality, our in-house Technical & Commissioning Manager, Phil Hull, will oversee this phase of the project and the delivery of the M&E systems.

ICT integration and commissioning is a key element of this process. This will be thoroughly planned and reflect the end-user requirements. Willmott Dixon's experience in ICT integration together with our specialists will provide a seamless installation of all needs as well as full coordination of works. Our quality management systems ensure that ICT and Customer Commissioning is featured on every Customer and Design Team Agenda.

Once the ICT installation is complete, the respective equipment will be demonstrated to appropriate individuals from the council an operator team to sign off and agree the installation is complete and works to the required standard.

9.9 External Works

On completion of the erection of the superstructure and facade when it is safe to do so the external works will commence.

Incoming services installations will be carried out by specialist subcontractors and their methods of construction and risks will be evaluated once the utility companies have stipulated what is required.

External drainage and attenuation will be installed as soon as it can be in the preliminary stages of the scheme to enable the site to drain. All final connections will be completed with the finishes and landscaping, all drainage is to be checked by building control prior to backfilling. CCTV survey of drains will be carried out on completion.

The external formation will be prepared and levelled in preparation for external finishes. External works will commence along the shared spaces. Once the facade has been installed along this area, we will back-fill to create the required formation level, along with installing the required service ducts. The features will be founded and positioned in place progressively work down the facade followed by the surface finish and planting.

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The soft landscaping (top soiling and planting) is to be programmed with the seasons in mind. The soft landscaping is to commence as soon as the external works are sufficiently progressed.

Once the building is ready for handover, we will work alongside Bruntwood and decant site, the site fencing is to be removed and all areas to be made good required. At all times the site is to be secure and safe.

Following the completing of the final areas externally our soft-landing process will commence while the SMART building commissioning is taking place.