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**Construction & Environmental
Management Plan
Planning Condition 4 & 45
St Michael's, Jackson's Row, Manchester
for Jackson Row Developments**
Revision 5

3rd February 2021

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1.0 Introduction

This document has been developed on behalf of Jacksons Row Developments to respond to planning condition 4 and 45 for the St Michael's project to enable discharge the pre-commencement condition. The Construction & Environmental Plan provides details of the intended management strategy to undertaking the construction process, which is to have a phased delivery, detailing key activities for the programme duration.

The fundamental approach to the construction is to minimise the impact to the neighbouring properties, businesses and public in addition to the local highways surrounding the project.

The following sections cover the construction approach envisaged at this stage before further coordination with key specialist sub-contractors during the remaining design and early procurement process.

As and when we procure contractors for each phase of the project if there are any changes to this Construction management Plan this will be updated and issued for approval.

2.0 Phasing

The construction delivery of the project is to be in a phased manner and will follow the sequence as detailed on the below plan:



Phase 1

Initial preparations and demolition of the existing kitchen block to the rear of the Sir Ralph Abercromby public house including the making good of the newly exposed façade to match with the existing.

Phase 2

Demolition of the police station building (except the Bootle Street block which is to be retained), and site clearance, the construction of the basement and 10 storey commercial office building complete with retail units at ground and roof level (referred to as Block 2). This includes strip-out of the retained part of the former police station and the removal of existing stair core to construct new lift shafts.

Phase 3

Demolition of the existing Synagogue building, and site clearance, the construction of the basement access ramp, 6 storey plinth (referred to as Block 1) encompassing the Synagogue and Hotel amenity space, and 40 storey tower of the hotel and residential accommodation. This phase will include all S278 works.

Phase 4

Refurbishment and fitout of the retained block of the former police station to South Mill street to form the boutique hotel.

Phase 5

Refurbishment and fitout of the retained Sir Ralph Abercromby pub, any proposed amendments will form a separate planning application.

3.0 Methodology and Programme Sequencing

The following sub-headings summarise the approach and key aspects of the construction programme which will be visible and may interact with surrounding properties, highways and public. These will be undertaken in order for each phase of construction delivery.

Hoarding/Highway Works

Solid Heras temporary panels will be provided to the perimeter of the construction area during the enabling works, permanent solid hoarding will then be installed progressing around the perimeter of the site covering the area of works.

Site Accommodation

Site accommodation will initially be starter units covering the demolitions and construction works up to capping beam, thereafter offices and welfare will be in adjacent rented accommodation. For production purposes a location of 50 metres within the site boundary has been assumed.

Service disconnections

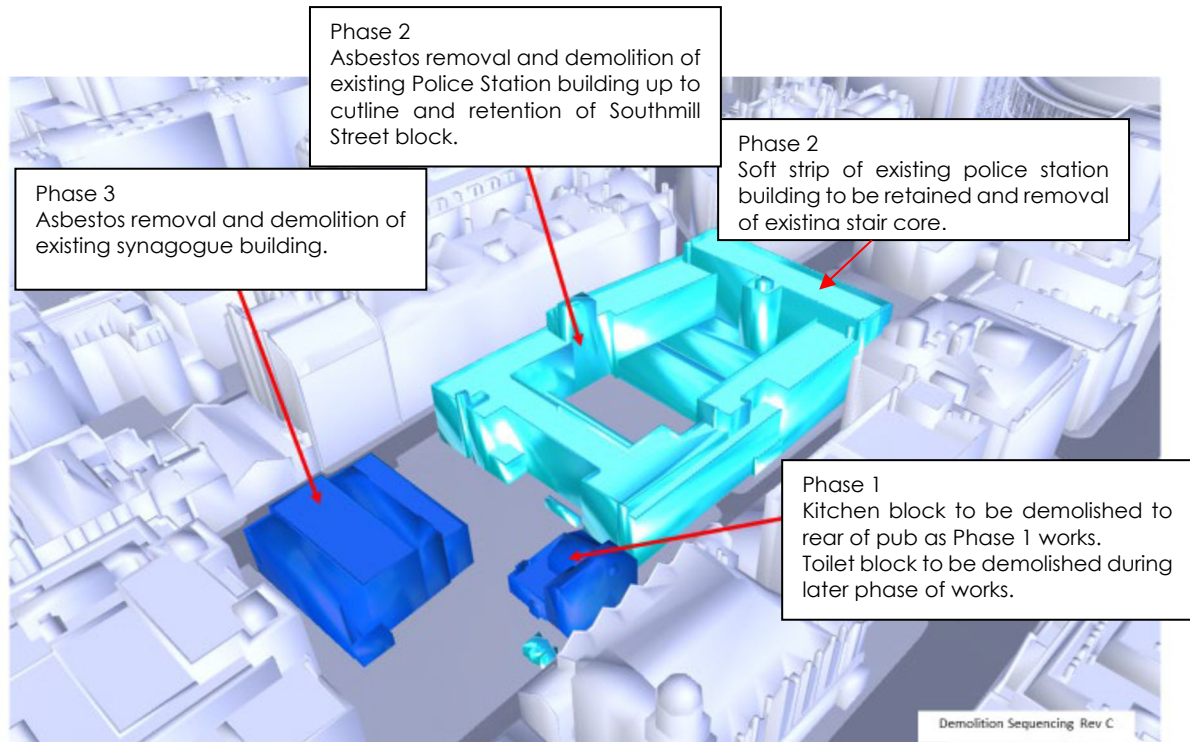
Existing buildings are to be disconnected of all existing services prior to the demolition commencement. All services on disconnection are to be taken back into the highway and outside the sheet piling zone of influence to ensure the piling can be undertaken without compromise.

Road closure for demolition

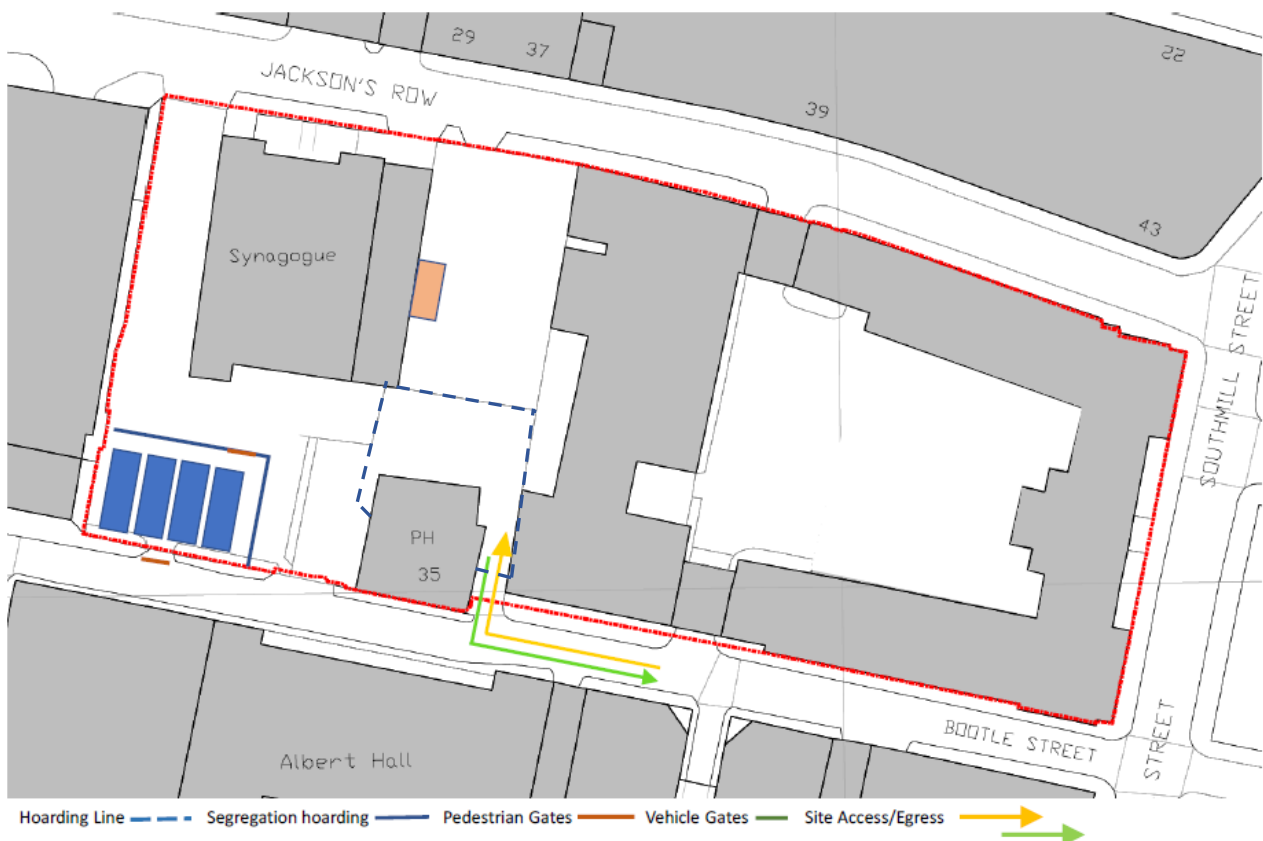
To ensure safe demolition the specialist contractors require full envelope scaffolds to the police station and synagogue alongside road closures.

Demolition

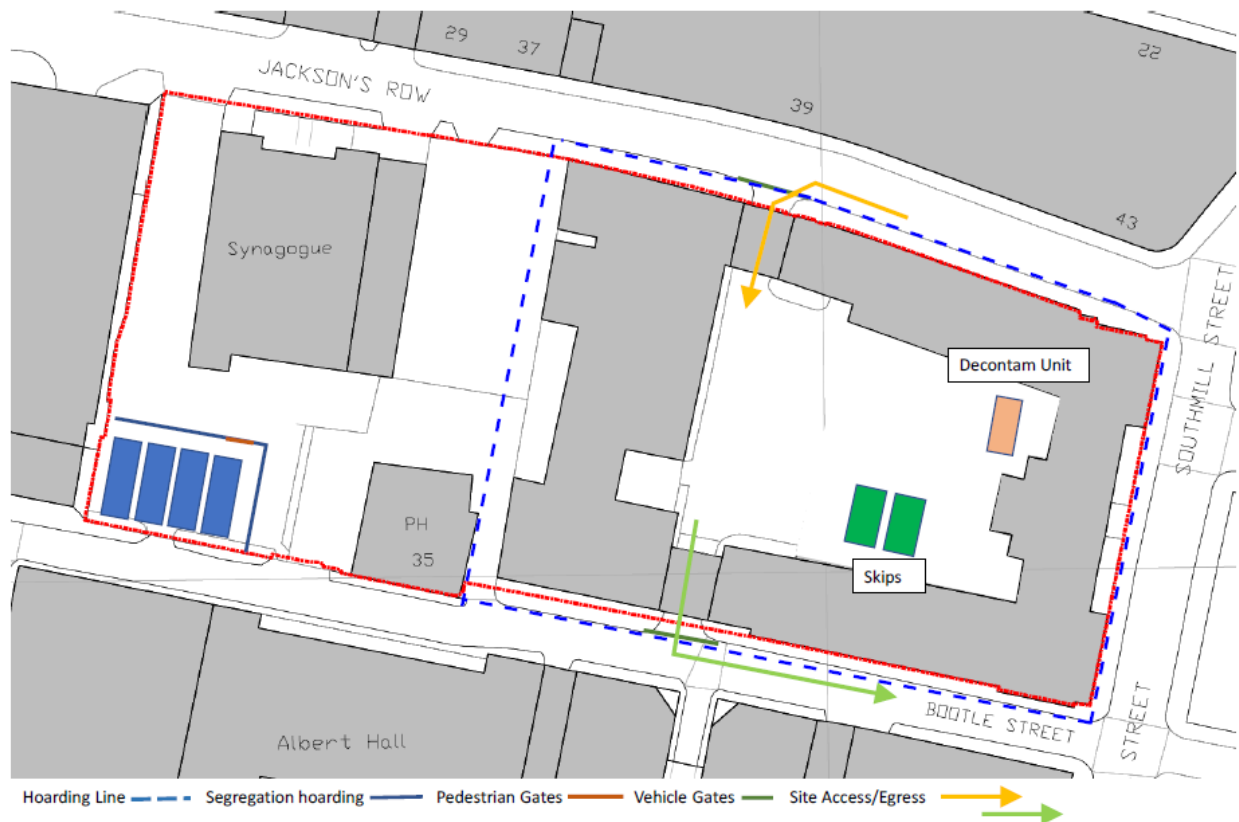
Demolition will commence with vacant possession and permits to dig and demolish issued by the Employer. Following on from the soft strip, asbestos removal carried during the enabling works, hard demolition will be progress. Existing basements and piling platform will be filled using MOT 6f2 material which is either as-dug and or crushed demolition material. Demolition sequence will follow the phased delivery as shown on the below image.



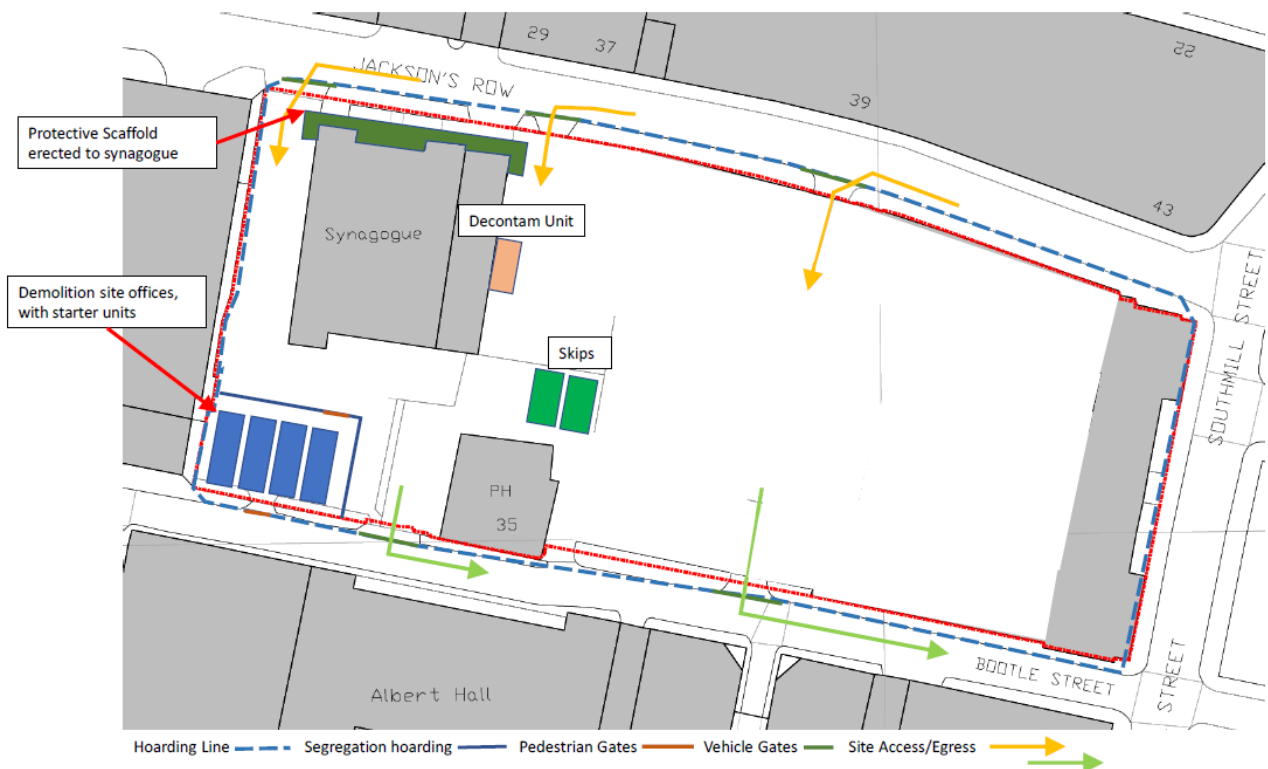
Phase 1 Segregation, access and egress during phase 1 for the demolition of the kitchen block will follow the below plan.



Phase 2 Segregation, access and egress during the demolitions of for phase 2 during the demolition of the police station will follow the below plan.



Phase 3 Segregation, access and egress during the demolitions of for phase 3 during the demolition of the synagogue building will follow the below plan.



Isolate / Cap Off Drainage Following Demolition

Drainage will be terminated prior to demolition commencement.

Piling and Foundations

Sheet piling is required to the perimeter of the site to allow excavation of the perimeter ring beam without compromise to the highways. Existing services have been identified in the zone that require removal. Slip trenches are to be undertaken to further develop the requirements of service diversions and lowering that will be undertaken during the enabling works phase.

Sheet piling to the perimeter of site will be undertaken as soon as the demolition is complete with priority given to the area of the tower. On completion of the sheet piling and piling mat work will commence on the piling the contiguous wall.

Due to the previous history of the site we will be pre-auguring using a large diameter bored piling technique to remove all obstructions, following a re-rig 750mm diameter CFA piles will be used. These are installed at 10-12 piles/day. Note the tower crane bases are piled during the piling period note 4no piles/base/4no bases.

As soon as an area is cleared the capping beam will be commenced. The sequence will be excavation, break down piles, blinding, shuttering, reinforcement, and concrete.

Bulk Excavation

When the capping beam is completed to the building footprint the bulk excavation is commenced. In total there is just over 36,000m³ of bulk excavation to remove off site. A major factor in determining the duration of the programme is the assessment of number of wagons per day that can physically get off site. The subcontractors involved have confirmed that the maximum per day is 80 nr/day. It has been assumed that during the critical part of the excavation programme that a maximum of 80 nr/day over 5½ days per week or 445 wagons/week though numbers will ramp up and then ramp down again from this peak. Archaeology requirements will have been completed pre-commencement as part of the planning condition discharge, therefore the works can progress unhindered.

In order to achieve the programme the routes around site from Southmill Street to Jacksons Row through the site then out onto Bootle Street/Marron Place then Deansgate are critical to achieve the cart away rate. We will work closely with the MCC Highways Department to ensure these routes are managed and kept clear.

Basement Construction

The form of construction in the basement B2 is very traditional, the predominant trade is the steel fixer. To provide materials distribution into the basement, priority is given to the construction of tower crane bases followed by tower crane erection allowing for curing time. Forming and concreting of core base and pad foundations release the basement B2 slab to be poured.

Vertical elements will follow, with the installation of the twin wall panels to the core by tower crane, followed by the construction of the 1200mm wide rc columns/downstand beam which is constructed traditionally due to size. In parallel with this work sprayed concrete will be applied to the contiguous piles followed by waterproofing and single side shuttered reinforced concrete liner walls. This releases the falsework installation for B1. The sequence to ground floor is repeated.

Superstructure

The completion of the buildings is driven through the completion of the frame. The methodology is to drive the programme to deliver the earliest release date for the superstructure. The cycle time of 7 days per floor (excluding wind allowances) for Block 1 utilising TC 1 & 2. Additional time is required for level 10, this is due to the large in-situ columns around the core, the large sloping shear walls at level 7, the in-situ transfer slab at level 7 then a further 3 floors of insitu shear walls at level 8-10. As part of the floor plate erection in both the hotel and residential floors the bathroom pods are loaded out (final positioning will be later to suit the progress of the glazing). Block 2, the office area, is constructed

using TC3 covering floor plates, and TC4 covering the core, the uniform nature of the office block once above first floor drives a cycle time of 10 days.

Superstructure Boutique Hotel

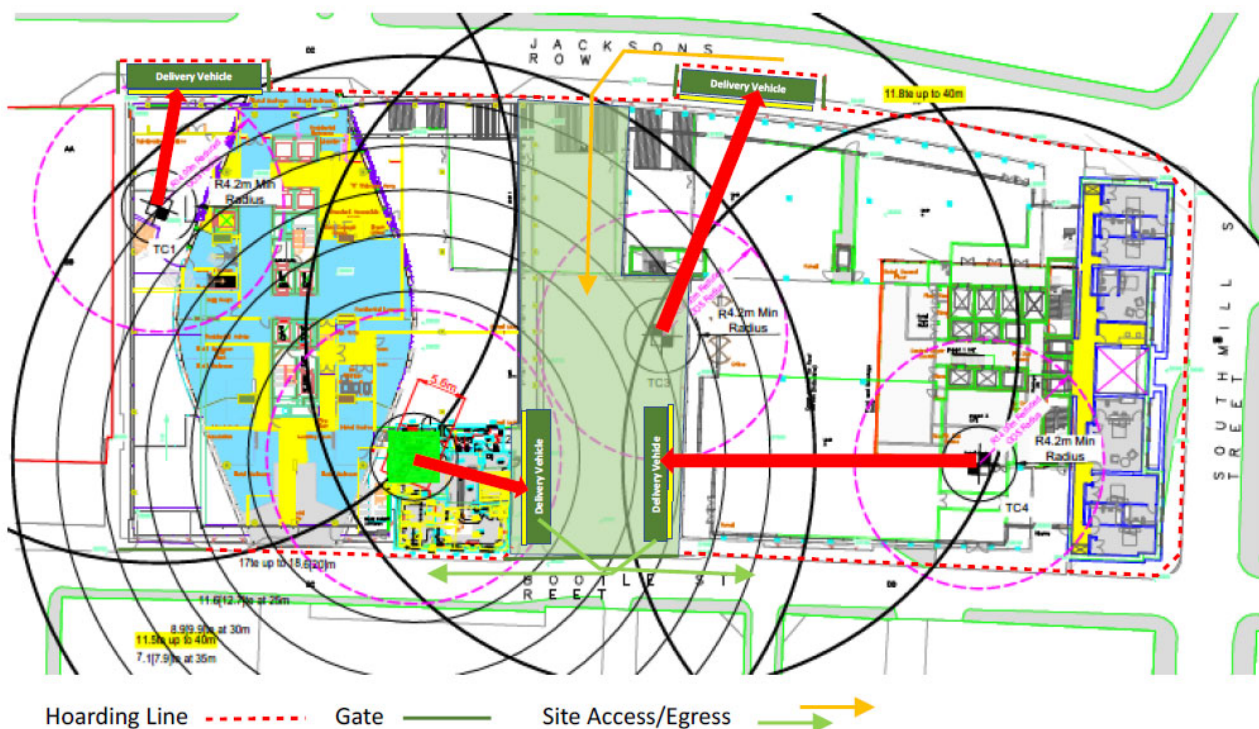
The new structure above the old police station commences on completion of block 2 frame, and with an allowance to erect a scaffold externally and crash deck internally to prepare the roof for steelwork.

Hoists

It is proposed to use one twin goods/passenger hoist installed to serve the fit-out of the tower. The hoist is progressively installed to rise with the tower frame. The hoist removal is dependent on completion of the goods lifts serving the tower. It is the intention that ties for the hoist ties are installed at the slab edge to minimise the disruption to the fitout and allow the unitised glazing to be installed.

Tower Cranes

Tower crane strategy is shown on the below plan with pick up points shown in for both substructures and superstructures. Tower cranes are removed upon completion of the highest level of cladding for each building. The below logistics plan shown the location of the tower cranes and how the positioning and clash prevention has been coordinated to enable construction of all aspects of the project and also permit overlap of phases of construction works. Luffer cranes have been selected for the project to minimise oversailing.



Design for Manufacture and Assembly MEP Installations

It is assumed that the tower cranes will lift and position key plant and equipment items. The cranes loads and radius have been assumed at this stage and will need to be fully sized on receipt of final equipment information and loads. No additional or supplementary crange is considered necessary or any road closures for this installation.

Block 1 – Tower

It is intended that risers and horizontal modules are installed progressively as the floors are constructed so that horizontal modules are loaded out prior to the commencement of envelope via cantilever

platform. Vertical modules are generally 3 stories high and are installed progressively using the tower crane. This section of the programme also covers the plantroom installation at level 18 which is critical for the handover of the residential levels up to level 29.

Block 2 - Office

Block 2 horizontal modules are installed progressively as the floors are constructed via cantilever platform prior to the envelope. Vertical modules are generally 3 stories high and are installed upon completion of the core. Plant rooms are loaded out via cantilever platform prior to cladding installations.

External Cladding Block 1 Podium GF to level 6

The podium cladding commences on completion of the podium frame. Curtain wall systems will be installed using access cradle and floor crane, and unitized glazing will be installed using floor crane/launch table. Rainscreen or curtain wall glazed system will be installed using cradles from the roof. Materials are loaded out via cantilever platform. Any PC cladding panels are installed utilising tower crane 1 & 2. The upper levels are installed utilising tower cranes 1 and 2.

External Cladding Block 1 Tower Level 6 to Roof

Unitized glazing is installed progressively following the frame. The cycle of 7-day time is the same rate as the progression of the frame. The glazing installation is not hook dependant and will follow 5no floors behind the frame progress - ie Current constructed floor slab, one floor below - propping 2 floors below remove props, concrete finishes snagging, loading out stillages (plus DfMA horizontal modules), three floors below glazers floor crane, 4 floors below launch table, 5 floors erection of glass from launch table.

The cladding at penthouse is a mixture of curtain wall and unitized cladding which can be installed via the tower crane once any steelwork supports are erected.

External Cladding Block 2

The block 2 office cladding commences on completion of the level 6 frame. Curtain wall systems will be installed using access cradle and floor crane, and unitized glazing will be installed using floor crane/launch-table. Rainscreen or curtain wall glazed system will be installed using cradles from the roof. Materials are loaded out via cantilever platform. The upper levels are installed utilising tower cranes 3 and 4.

External Cladding Boutique Hotel

Following completion of the new extension on the roof, (scaffold erected previously), the scaffold is progressively stripped allow for the progressive installation of both new glazing and cleaning the existing stonework.

Roofs

All roofs are progressed as soon as the concrete operations have been completed to provide earliest opportunity to provide an element of weatherproofing allowing the fit-out trades to progress. Roof finishes follow the installation of envelope.

BMU

The BMU installation affords the ability to help remove ties as the hoist is progressively stripped at the end of being required on site.

Balcony Roofs to residential areas

Balcony roofs are progressively installed as the glazing is progressed.

Lift Installations

To complete the fitout of the tower the hoist must be removed so this requires that key lifts need to be operational. The rule of thumb for lift installations is a week per floor. The tower lifts are 44 storeys high and it would take 45 weeks to install from completion of the shaft. To ensure that the lift is completed in time the shaft will be temporarily be capped at level 24 allowing the 28 weeks of lift

installation to commence early. The last 17 weeks of installation will commence on completion of the frame. We have allowed 5no lifts to be brought into beneficial use. The office lift installations will commence upon completion of the roof and the shaft is weathertight.

Main Fit-out Block 1

The fit out commences with the core/plant/Back of House areas. As the structure is progressed works will commence MEP/Fit-out within the cores. Tower GF - L05 fitout is critical to meeting programme dates due to the extent of fit out to be undertaken in these levels.

The podium fit-out is partly dictated by TC1 removal in the north-west corner, this affects the entrance into the synagogue and the synagogue plant room. However, there is sufficient time to complete these areas prior to completion. Fit-out of the Synagogue Hotel and Residential units will progress up the tower following structure and watertight façade.

Block 2

Block 2 fit-out is determined by TC3 and 4 dismantle dates which will allow fit-out to progress. As with block 1 the core and back of house will progress early ahead of the floor plates.

Boutique

Works commence with the alterations to create openings to form the lift shaft, this is also dictated by the completion of the core on block 2. The new core will provide stability to the old police station structure before any further works are undertaken. Once the new structure is constructed and clad, fit-out to the rooms can commence.

Pub Sir Ralph Abercromby

Following removal of the hoist the fitout works and any alterations are permitted to be undertaken.

Commissioning & Handover

Systematic commissioning and handover of the building will occur as the different uses progress to completion and aligning for a full building systems commission and test.

4.0 Environmental

4.1 Offices and welfare

The following arrangements for welfare and offices have been considered for the duration of the works;

Demolition Phase

- Welfare – Starter Units (note demolition contractor self-sufficient)
- Staff Serviced office accommodation in close proximity

Construction

- Welfare/Staff – utilising local office rental or the Boutique Hotel/Existing Police Station following asbestos removal and separation from/demolition of the rest of the police station

Fit-out/Completion

- Welfare/Staff – Ground floor retail units

4.2 Working hours

Construction works will be undertaken in accordance with the working hours within the consented planning notice and Manchester City Council's approved working hours for construction works: -

Monday – Friday	7:30–18:00
Saturday	8:30–14:00

It may be necessary to seek agreement from MCC to increase the working day during some stages of the programme. Typically, this may be to enable deliveries, pre-loading out and completion of some activities which cannot be completed in the standard working shift/hours. Also Internal fitout works, where noise can be easily controlled, may continue beyond these hours to meet programme timescales.

Any requirement for out of hours working will be by prior agreement from the Environmental Health Officer only.

Noisy working and noise in general will be kept to a minimum during the first hour of each shift.

Working on Sundays and Bank Holiday will be prohibited.

4.3 Site hoarding

Solid permanent 8ft high painted and contractor branded hoarding will be erected to the full perimeter of the construction zone to provide a secure line and prevent unauthorised access. Temporary barriers / herras fencing will be utilised for segregation of the public during the erection of the permanent hoarding. The solid hoarding will be provided with hoarding lighting to ensure that the perimeter of the site is illuminated during the hours of darkness.

Positioning of the hoarding will take account of access and egress requirements of surrounding properties and businesses to ensure that access is maintained and will be finalised with input from the MCC Highways team before permit requests are submitted.

Site personnel access along with a security turnstile will be included to control access to the construction area and prevent unauthorised access. Vehicle access and egress gates will be positioned in accordance with the traffic management plan to permit access to the construction area for deliveries and egress back out onto the highway, these gates will be secured and controlled to ensure only permitted vehicles gain access.

The proximity of residents to the construction site is noted and consideration will be given at all times to control and minimise disruption and endeavour to manage the programme and adhere to the above times throughout the project.

4.4 Site security

Out of hours site security will be provided to the perimeter of the construction zone by way of static and pivoting CCTV cameras ensuring full coverage, these will be remote monitored outside of construction hours with mobile patrol units which will attend in the event of an issue. During operational hours there will be a guard provided to the turnstile gate house and also operatives will control the vehicle gates and also provide operational security during working hours.

4.5 Noise & Vibration

Noise and vibration caused during the construction, by plant and on-site activities, will be monitored and recorded throughout the works to ensure that levels do not exceed acceptable levels and cause a nuisance to surrounding properties and the public. These recordings will be baselined against background noise levels prior to construction activities commencing.

During the procurement of the trade contractors for the relevant phase each element of construction work will be considered to identify those which have potential to generate noise and vibration. For each activity the method will be considered and the most appropriate method selected which fulfils the requirements whilst minimising the noise and vibration, following this method statements will be written accordingly with noise and vibration control in mind.

Impact of the construction to the surrounding environment has been thoroughly considered during the design stage and appropriate products and techniques have been designed in, for example piling to form the contiguous wall to the perimeter of the basement the considerations are: -

1. The type of pile – CFA piles have been selected as the least intrusive method which achieves the depth and diameter piles required.
2. Choice of plant & equipment – CFA piling rig reduces the impact, low noise levels and no vibration.
3. Measure to mitigate the impacts – proof digging the made ground to remove any obstructions.

For the structural frame for the building the considerations were: -

1. The type of frame – precast modular frame selected which minimises the construction activities on site and the timescale to erect the frame. Lower levels of the tower podium are insitu concrete as modular was not feasible for these levels.
2. Choice of plant & equipment – tower cranes for lifting of sections for fixing in place, reduced number of delivery vehicles with a pre-cast solution.
3. Measures to mitigate the impacts – timing of deliveries for unloading and preloading.

This approach will be taken with all site activities which have the potential to generate noise and nuisance and mitigating measures will be taken to reduce the impact of each activity including the use of acoustic screens for cutting activities etc.

Sensitive Receptors

The following are the sensitive receptors which have been assessed.

The nearest existing residential premises to the construction site is the Radisson Blu Edwardian Hotel approximately 55 m to the south of the Site on the opposite side of the A34.

There are a number of commercial premises / offices, the closest of which are the Sir Ralph Abercromby pub within the development boundary itself and offices immediately adjacent to the western Site boundary at 201 Deansgate.

Other premises are located approximately 10m from the boundary of the Site on the opposite side of Jacksons Row, Southmill Street and Bootle Street.

Baseline Noise Levels

Two separate noise surveys have been undertaken so far around the perimeter of the project site to confirm background noise levels around the construction site to provide baseline noise levels. These surveys have established that the ambient noise levels measured at the monitoring stations were fairly consistent during the day, evening and night-time and ranged between L_{Aeq} 59-60 dB.

Disturbance to sensitive receptors from noise generated by on-site (non-traffic) construction activities

For construction activities, following the ABC Method for determining significance provided within BS 5228-1 and given the prevailing ambient noise levels at the sensitive receptors, it is considered appropriate that the construction noise assessment be undertaken against the façade noise limits identified in **the following table**.

Table 6.5: Criteria Used to Determine Magnitude of Impact Scale for Construction Site Noise at Dwellings

Magnitude of Impact 1	Daytime Construction Noise Level (Façade), LAeq,T (dB)2	Weekday Evening Construction Noise Level (Façade), LAeq,T (dB)3	Night-time Construction Noise Level (Façade), LAeq,T (dB)3
Large	>75	>75	>65
Medium	70 to 75	70 to 75	60 to 65
Small	65 to 70	65 to 70	55 to 60
Negligible	<65	<65	<55

1 A lower magnitude may apply where works are very short in duration.
2 Category A of the ABC Method in BS5228-1 has been adopted in determining the significance for these receptors based on a prevailing daytime noise levels established during the baseline noise survey.
3 Category C of the ABC Method in BS5228-1 has been adopted in determining the significance for these receptors based on a prevailing weekend and night-time noise levels established during the baseline noise survey.

BS 5228-1, Table E.1, Note 3 states that these limits apply to residential receptors only. As commercial receptors are considered to be less sensitive than residential receptors, the magnitude of impact is considered to be reduced for a given construction noise level compared to those stated in the table above.

A relaxation of 5-10 dB on the levels given above would be considered reasonable based on internal noise design ranges being 5-10 dB higher in office scenarios in BS 8223 in comparison with residential dwelling.

A series of construction noise level predictions have been undertaken in accordance with BS 5228-1, with the results compared against criteria also derived from this standard. These have been reported for the nearest noise sensitive dwellings as described in the standard.

Disturbance to sensitive receptors from vibration generated by on-site (non-traffic) construction activities

The magnitude of impact from vibration due to construction activities has been determined according to the resulting levels in absolute terms, as presented in **the following table**, which is based on the guidance contained within BS 5228-2 for human perception.

Table 6.6: Criteria Used to Determine the Magnitude of Impact Scale for Construction Site Vibration

Magnitude of Impact	Construction Vibration Component Peak Particle Velocity (mms-1)
Large	>10.0
Medium	+1.0 to +10.0
Small	+0.3 to +0.9
Negligible	<+0.3

The above criteria are more stringent than those given in BS5228-2 for determining the likely magnitude of vibration damage to buildings. Therefore, by extension, an assessment using these parameters will ensure that the significance of effects in relation to building damage is also assessed (with lower significance than the identified effects on human perception).

Overview of construction noise and vibration generating activities

The main sources of noise and vibration generation during the construction phase are anticipated to include the following activities and that these actions will be undertaken in broadly the following order (although there is likely to be some overlap between each stage/individual process):

- Securing of the Site and the implementation of temporary fencing;
- Site clearance, including vegetation and tree removal and removal of existing below ground services and structures;
- Demolition of existing synagogue and rear portion of Police Station buildings;
- Creation of internal access, haulage routes; parking and traffic measures;
- Creation of construction compounds;
- Contiguous piling to the perimeter of the site;
- Earthworks and surface re-profiling/sub-base works to form the basement;
- Foundation construction;
- Construction of the building superstructure;
- Installation of cladding and building envelope;
- Installation of plant; and
- Implementation of public realm, landscape, lighting; strategies and external and internal finishing.

The potential noise and vibration effects of the key stages of the construction phase of the Project have been assessed at sensitive receptors that constitute dwellings. A number of assumptions have been made in the calculations of noise and vibration levels resulting from activities and plant during construction. Such assumptions relate to the type, location and number of plant as well as their duration of operation and have been applied based on the information available at the current time and experience gained from similar projects.

The works have been split down into the following key stages for prediction purposes.

- Stage 1: Demolition, pre-enabling and enabling works;
- Stage 2: Main construction phase – Foundation construction (i.e. sub-structure works); and
- Stage 3: Main construction phase – Tower construction (i.e. super-structure works).

An estimate of the likely noise from the construction activities has been made for a sample of local receptors in the vicinity of the Site. The predictions are based on the methodology contained within BS 5228-1 and are in terms of the LAeq,T noise levels over the core working day.

Standard working hours will be 07:30 to 18:00 hours, Monday to Friday and 08:30 to 14:00 hours on Saturdays with no work on Sundays and Bank holidays. It is possible that exception to this may arise on occasion outside of these hours with prior agreement, with some periods of construction required during the night-time. The phases of construction when this may be required could include for example the frame construction to apply finishes to concrete slabs.

On this basis the assessment of significant effects from construction noise have been assumed for a worst case daytime scenario as the threshold value derived for weekday daytime (07:00 to 19:00), Weekends and weekday evenings (19:00 to 23:00) have adopted the same threshold value range on the basis of the results of the baseline survey. Additionally a night-time construction scenario has been considered on the basis of the main construction phase i.e. Stage 3.

Predictions have been undertaken for each of the stages presented above. The **table below** sets out the typical plant types, numbers and utilisation (the percentage of time plant is actually operating during the working day - the 'on-time') that have been used in the noise level predictions. This includes a large rotary bored piling rig, which may not be used during the construction phase, but is used to provide a worst case scenario.

Table 6.11: Plant and Equipment (and Associated Noise Levels) Associated with the Construction Phase

Plant/ Equipment	Number of Plant	Sound Power Level, LWA (dB) and Data Source Reference	Assumed Percentage Time On Site
Stage 1: Demolition, pre-enabling and enabling works			
Tracked excavator	1	110 (BS 5228-1 (Ref 3.1) Table C1:12)	60
Tracked crusher	1	110 (BS 5228-1 Table C1:14)	80
Tower Crane (35m Jib)	2	105 (BS 5228-1 Table C4:49)	40
Tower Crane (40m Jib)	1	105 (BS 5228-1 Table C4:49)	40
Tower Crane (48m Jib)	1	105 (BS 5228-1 Table C4:49)	40
Articulated dump truck	1	106 (BS 5228-1 Table C4:2)	60
Pulverisator mounted on excavator	1	104 (BS 5228-1 Table C1:4)	30
Breaker mounted on excavator	1	114 (BS 5228-1 Table C1:13)	30
Scaffold access platform	1	95 (BS 5228-1 Table C4:57)	20
Road sweeper	1	104 (BS 5228-1 Table C4:90)	25
Skip wagon	1	106 (BS 5228-1 Table C8:21)	10
Diesel generator	1	94 (BS 5228-1 Table C4:78)	100

Stage 2: Main construction phase - Foundation construction			
Tower Crane (35m Jib)	2	105 (BS 5228-1 Table C4:49)	40
Tower Crane (40m Jib)	1	105 (BS 5228-1 Table C4:49)	40
Tower Crane (48m Jib)	1	105 (BS 5228-1 Table C4:49)	40
Tracked excavator	1	110 (BS 5228-1 Table C1:12)	60
Articulated dump truck	1	106 (BS 5228-1 Table C4:2)	60
Concrete mixer truck	2	108 (BS 5228-1 Table C4:20)	40
Concrete pump + concrete mixer truck idling	1	103 (BS 5228-1 Table C4:26)	60
Large rotary bored piling rig	1	111 (BS 5228 – Table C3.14)	50
Delivery wagon	25	107 (BS 5228-1 Table 11.14)	-
Poker vibrator	2	97 (BS 5228-1 Table C4:34)	50
Vibratory roller	1	105 (BS 5228-1 Table C5:26)	20
Road sweeper	1	104 (BS 5228-1 Table C4:90)	25
Diesel generator	2	94 (BS 5228-1 Table C4:78)	100
Stage 3: Main construction phase - Tower construction			
Tower Crane (35m Jib)	2	105 (BS 5228-1 Table C4:49)	40
Tower Crane (40m Jib)	1	105 (BS 5228-1 Table C4:49)	40
Tower Crane (48m Jib)	1	105 (BS 5228-1 Table C4:49)	40
Telescopic handler	1	99 (BS 5228 Table C2:35)	80
Mobile telescopic crane	1	105 (BS 5228 Table C4:39)	40
Concrete mixer truck	2	108 (BS 5228-1 Table C4:20)	40
Concrete pump + concrete mixer truck idling	1	103 (BS 5228-1 Table C4:26)	60
Delivery wagon	25	107 (BS 5228 Table C6:21)	-
Poker vibrator	2	97 (BS 5228-1 Table C4:34)	50
Angle grinder	1	108 (BS 5228-1 Table C4:93)	50
Road sweeper	1	104 (BS 5228-1 Table C4:90)	25
Diesel generator	2	94 (BS 5228 Table C4:78)	100

In practice, the plant items identified for each stage will move around the Site, operating at different times, for different durations and at different locations on any one day for the duration of the works.

As a consequence, noise levels at any receptor may vary quite considerably day-to-day. Hence, it is necessary to rationalise the geographic and temporal spread of activities to obtain a meaningful prediction (and subsequent assessment) and to this end, various assumptions have necessarily been made as described in the following paragraphs.

The most important assumptions relate to the location of construction plant and their operational 'on-time' during the period of interest.

With respect to the geographical location of the plant, the full complement of plant for each stage, as identified above, is assumed to operate together at a single point as follows:

- For Stage 1 works, at the approximate centre of the existing structure earmarked for demolition that is the closest to the noise sensitive receptor; and
- For Stage 2 and 3 works, at the approximate centre of the Block A tower building.

Other assumptions which have been made with respect to the construction noise predictions are:

- No barriers have been included;
- Acoustically hard ground cover has been assumed between the noise source and receptor;
- No atmospheric absorption has been included;
- 3 dB has been added to all predictions to account for façade reflections;
- Source and receptors have both been taken to be 1.5 metres high. In reality the noise sources associated with the tower cranes will be at a higher elevation than this. The distances to the receptor from the crane sources will be greater in reality due to the slant distance. The calculation based at 1.5m above ground therefore assumes a shorter source to receptor distance and is worst case;
- A notional screening correction has been implemented to account for the screening effect likely to be provided by the existing buildings between the proposed site and the Radisson Blu Hotel for all plant items with the exception of the tower cranes, which will operate at height; and
- Meteorological conditions have been taken to be 'neutral'.

On the basis described above, construction noise levels have been determined at key residential receptors. The results are presented in the **table below**. This assessment and assumptions will be revisited if necessary should any assumption change significantly during the demolition and construction process.

Receptor. ref.	Predicted pre-enabling, Enabling and Construction Noise Levels, $L_{Aeq,T}$ dB			Predicted magnitude of impact at noise sensitive receptor
	Stage 1	Stage 2	Stage 3	
Old Nag's Head	76	78	76	Stage 1, Stage 2, Stage 3 daytime: Large Stage 3 night: Large
Radisson Blue Hotel	66	65	64	Stage 1, Stage 2, Stage 3 daytime: Negligible to small Stage 3 night:

Receptor. ref.	Predicted pre-enabling, Enabling and Construction Noise Levels, $L_{Aeq,T}$ dB			Predicted magnitude of impact at noise sensitive receptor
	Stage 1	Stage 2	Stage 3	
				Medium
Commercial premises across Jackson Row ^[1]	Up to 77	Up to 79	Up to 77	Small
Commercial premises across Bootle Street ^[1]	Up to 82	Up to 79	Up to 77	Small to Medium
201 Deansgate ^[1]	79	84	81	Small to Medium

[1] – Commercial premises are not considered noise sensitive by BS5228-1 'ABC Method'. Predicted magnitude of impact state is therefore based on a 10 dB relaxation for this type of receiver.

Demolition works are expected to generate the most significant negative effects. Additionally night-time works during Stage 3 have been considered due to the more sensitive criteria for the magnitude of impact for night-time construction activities.

The sensitivity of residential use above The Old Nags Head is considered to be high, and the magnitude of impact prior to mitigation, is considered to be large according to the table above during the daytime / evening. Therefore, there is likely to be a direct, temporary, short to medium term effect on the residential premises above The Old Nags Head of **major negative** significance prior to the implementation of mitigation measures. Such measures are discussed further below.

The sensitivity of Radisson Blu Hotel is considered to be high, and the magnitude of impact prior to mitigation, is considered to be **small** during the daytime / evening during construction stages 1 and 2. Therefore, there is likely to be a direct, temporary, short to medium term effect on the nearest occupants of the hotel of **minor negative** significance prior to the implementation of mitigation measures. During stage 3 construction the magnitude of impact prior to mitigation, is considered to be **negligible** during the daytime / evening. Therefore, there is likely to be a direct, temporary, short to medium term effect on the nearest occupants of the hotel of **negligible negative** significance prior to the implementation of mitigation measures.

During night-time construction activities the sensitivity of residential use above The Old Nags Head is considered to be high, and the magnitude of impact prior to mitigation, is considered to be large. Therefore, there is likely to be a direct, temporary, short to medium term effect on the residential premises above The Old Nags Head of **major negative** significance prior to the implementation of mitigation measures.

During night-time construction activities the sensitivity of Radisson Blu Hotel is considered to be high, and the magnitude of impact prior to mitigation, is considered to be medium. Therefore, there is likely to be a direct, temporary, short to medium term effect on the nearest occupants of the hotel of **moderate negative** significance prior to the implementation of mitigation measures.

Night-time works are likely to be of very short duration and as stated above, a lower magnitude of impact may therefore occur. It should also be noted that an assumption applied to the night-time assessment has considered that all the plant shown in the table for Stage 3 works, will operate concurrently. In reality this is unlikely to be the case when specific activities are being undertaken.

Mitigation / enhancement

In the assessments, no consideration has been given to the use of temporary screens or hoardings. A 2.4m high solid hoarding positioned at the construction Site boundary will provide up to 10 dB

acoustic benefit for all ground floor activities where the line of sight to the nearest receptors is completely obscured and up to 5 dB where there is partial line of sight. The benefit reduces at first floor level and most probably be insignificant at levels above this. However, some attenuation will be realised at ground floor locations where hoarding is erected.

Ultimately, to ensure construction noise levels are reduced wherever possible, 'best practice' measures are to be employed:

- The contractor and their sub-contractors will at all times apply the principle of Best Practicable Means as defined in Section 72 of the Control of Pollution Act and carry out all work in such a manner as to avoid or reduce any disturbance from noise (and vibration) as far as is practicable;
- Guidance given in BS 5228-1 (Section 8 - Control of noise and Annex B - Noise sources, remedies and their effectiveness) will be followed as far as is practicable and advice and training on noise minimisation given to staff during Site induction procedures;
- All plant brought on to Site to comply with the relevant EC/ UK noise limits applicable to that equipment should be no noisier than would be expected based on the noise levels quoted in BS 5228-1. Each plant item to be well maintained and operated in accordance with manufacturers' recommendations and in such a manner as to minimise noise emissions;
- Electrically powered plant will be preferred, and used where practicable, to mechanically powered alternatives. All mechanically powered plant to also be fitted with suitable silencers, as appropriate;
- Items of plant on Site operating intermittently will be shut down in the intervening periods between use;
- Where feasible, all stationary plant should be located so that the noise effect at receptors is minimised and, if practicable, every item of static plant when in operation should be sound attenuated using methods based on the guidance and advice given in BS 5228-1;
- Careful selection of construction methods and plant to be investigated and utilised, for example, breaking-out of concrete structures using, where possible, low noise methods such as munching or similar, rather than percussion breaking;
- Temporary acoustic barriers and other noise containment measures such as screens, sheeting and additional acoustic hoarding at the Site boundary should be erected where appropriate to minimise noise breakout and reduce noise levels at potentially affected receptors; and
- If a temporary significant noise (or vibration) effect cannot reasonably be prevented and the works being undertaken are crucial to progressing a particular phase of the project, then separate liaison with MCC will be carried out to ensure an acceptable compromise is reached.
- Neighbourhood liaison will be undertaken with occupiers of residential and business properties that are likely to be affected by the works, informing them in advance of the nature and expected duration of the works and the proposed hours of work.

The above environmental management control measures provide a guide to the management team and environmental controls and monitoring will be employed during the works.

Vibration Levels

A vibration survey has not been undertaken at this stage due to, following consideration, there being no existing significant sources of vibration in the vicinity of the site and therefore it not been considered necessary.

Ground borne vibration calculations have been performed for typical on-site construction activities / machinery during construction based on the empirical prediction procedures presented within BS 5228-2, TRL RR 246: 1990 Traffic Induced Vibration in Buildings (applicable to Heavy Goods Vehicle induced vibration), and TRL Report 429: 2000 Ground borne Vibration Caused by Mechanical Construction Works (Applicable to Vibratory Rollers).

Such predictions have been performed in order to determine the possible distances at which the adopted magnitude of impact criteria may be registered based on a specified confidence limit (where applicable). In this regard, ground borne vibration levels and associated distances have been identified for a sample of typical vibration sources which may be associated with the construction phase. A contiguous or secant bored pile wall is required to support the basement excavation and piled foundations for the proposed tower buildings are required.

It should be noted that contiguous or secant bored piling involves the use of rotary or continuous flight auger (CFA) methods and guidance provided in BS 5228-2 suggests that rotary bored piling tends to set up low level vibrations when compared to other types of piling such as impact piling. Technical datasheets on CFA techniques produced by Skanska and guidance within BS 5228-2 suggest that this process is virtually vibration free.

However, when it is necessary to install rebar casings to support the bored hole or where there is unexpected hard ground / obstruction in the way this installation process can set up short term intermittent vibrations as would be the case with any impact bored piling method. The calculations have therefore assumed that intermittent vibrations will occur during the contiguous or secant bored piling phase.

Piling will be required during the construction of the foundations for the tower. The predictions have assumed that the piling equipment will operate for some time at a point closest to the nearest vibration sensitive receptors, this being approximately 10m from the commercial offices, Old Nags Head (29m), the Sir Ralph Abercromby pub (19m) and the Friends' Meeting House (35m).

Table 6.13: Predicted Ground borne Vibration Levels Applicable to Typical Vibration Generating Enabling Works and Construction Activities

Operation	Confidence Limit	Distance (m)	PPV (mms-1)
Contiguous or Secant Bored Piling	95	48	0.3
	95	19	1.0
	95	3.3	10.0
Rotary bored piling - augering	N/A	20	0.3
	N/A	6	1.0
	N/A	0.6	10.0
Rotary bored piling – driving casing	N/A	75	0.3
	N/A	23	1.0
	N/A	2.3	10.0
Piling - driven cast in place	95	215	0.3
	95	85	1.0
	95	15	10.0
Vibratory Rollers – start & end ¹	95	60	0.3
	95	23	1.0
Vibratory Rollers – steady state	95	3.3	10.0
HGVs ²	N/A	50	0.3
	N/A	17	1.0
	N/A	2.5	10.0
¹ Assumes 2 rollers, 0.4mm amplitude, drum width of 1.3m, e.g. heavy duty ride on roller ² Assumes max height / depth of surface defect of 50mm, max speed of 30km/h, and that surface defect occurs at both wheels.			

It is noted that the data presented within the above table is general in nature and is not specific to any one site. Furthermore, there may be potential for different vibration generating activities employed other than those listed. However, the vibration levels and associated distances can be used to determine the typical distances at which specific impacts could be registered (within an associated confidence limit).

The development at its closest point is proposed at distances ranging between approximately 2m and 10m from the closest existing commercial and residential premises respectively, i.e. less than the 2.3m setback distance at which the vibration magnitude of impact in the above table is considered to be large.

The predicted effects at the nearest existing sensitive receptors are as follows:

- The sensitivity of the nearest existing residential receptor (residents above Old Nags Head) is considered to be high, and the magnitude of effect prior to mitigation, is considered to be medium at worst. Therefore, there is likely to be a direct, temporary, short to medium term effect on the residential premises above the Old Nags Head Public House of **moderate negative** significance prior to the implementation of mitigation measures.
- The sensitivity of the nearest existing receptor within the commercial premises / offices (201 Deansgate, the Sir Ralph Abercromby and the Friends' Meeting House) is considered to be medium, and the magnitude of effect prior to mitigation is considered to be large at worst. Therefore, there is likely to be a direct, temporary, short to medium term effect on the occupants of the commercial premises / offices of **minor to moderate negative** significance prior to the implementation of mitigation measures.

Mitigation

Wherever possible each activity that has potential to impart significant levels of vibration into the ground will be substituted with alternatives which generate less vibration where practicable. If alternative approaches or plant cannot be sourced then vibration generating plant is to be used sparingly. Furthermore, given the propensity for more noticeable vibration during the start-up and shut down of plant which inherently generates significant levels of vibration, it is good practice that wherever possible this equipment should be started or stopped at least 30 metres away from any vibration sensitive receptors wherever practicable, and in any case as far away as possible.

Where possible during the construction of the foundations, rotary piling techniques are to be adopted as the least intrusive option to form the basement.

It is noted the levels of vibration which can cause significant damage to buildings are at least one order of magnitude higher than those for human disturbance. Consequently, it may also be concluded that potential significant negative effects are anticipated in terms of building damage from construction vibration where works are being carried out in close proximity of commercial premises of 201 Deansgate and the Sir Ralph Abercromby. Therefore, close attention to be employed throughout the works in these locations to ensure that vibration levels remain below those that are likely to cause damage to the building, and to minimise disturbance to occupants.

Notwithstanding the above advice, a photographic survey to be undertaken to the facades of the surrounding buildings to record the condition prior to works commencing along with tell-tale survey monitoring to any pre-existing cracks to ensure that further deterioration does not occur.

To minimise the impact of deliveries to site and construction activities the following measures will be implemented: -

- Deliveries will be programmed to arrive on a "just in time" basis at pre-defined time slots.
- Coordination and timing of all deliveries to be planned ahead at weekly meetings.
- Deliveries without a allocated slot will not be accepted and will not wait to be unloaded.
- Care will be taken to ensure materials are unloaded from vehicles with a view to minimisation of noise.
- Any storage areas onsite will fluctuate to suit the construction programme.
- Deliveries will be routed so as to minimise disturbance to local residents in coordination with MCC Highways.
- Delivery vehicles to be prohibited from waiting within or near the Site with their engines running.
- There will be no parking on Site for construction vehicles with all staff parking in local car parks.
- Neighbourhood liaison will be undertaken with occupiers of residential and business properties that are likely to be affected by the works, informing them in advance of the nature and expected duration of the works and the proposed hours of work.
- A noticeboard will be displayed in a prominent position near the Site entrance detailing named contacts who are able to provide further information and deal with any complaints as appropriate during working hours.

Monitoring

To ensure that noise and vibration levels are adhered to and are reasonable, fixed monitoring stations will be established at the site boundary, in locations closest to the occupied premises, to record all noise and vibration levels generated during the works. A detailed Noise and Vibration Monitoring Plan shall be prepared by the Contractor or their appointed Acoustician denoting the exact numbers and locations for the fixed monitoring stations, the monitoring strategy and reporting methodology to be followed.

Preliminary monitoring alert threshold levels are provided further in this section however; propagation tests are recommended at the outset whereby both noise and vibration levels generated from day one or early works can be accurately monitored at the boundary locations and at the nearest noise sensitive receptors. The difference in level determined between locations can be used to the work back to setting limits at the fixed long-term monitoring locations.

The preliminary limits/action levels in **the following table** are therefore proposed to protect against exceedances occurring at the Radisson Blu receptor as the most sensitive existing noise receptor and the surrounding commercial buildings and the Old Nags Head as the most sensitive vibration receptors.

Compliance with the noise limits set at the site boundary below is inherently expected to reasonably protect the amenity of the less sensitive commercial buildings, inclusive of 201 Deansgate.

Suitable actions are proposed should exceedances occur. These limits are applicable to loggers located within site boundaries, which should therefore usually be closer than, or a comparable distance from, nearby sensitive receivers with respect to the sources of noise and vibration on site. These shall be determined by the Contractor or their appointed Acoustician.

The limits/action levels represent relatively short duration metrics. This is necessary to allow action before adverse impacts occur. The values shown are levels at which, if the noise persists, there is a risk of the thresholds for adverse impacts being exceeded. Nevertheless, these levels must be sufficiently high that they are above the existing ambient levels with enough margin to not be exceeded by other sources of noise not attributed to the construction works.

Alert Level	Preliminary trigger levels	Corresponding actions
Amber	Noise L _{Aeq, 1hr} 77 dB Vibration PPV 1 mm/s	An alert should be sent to the site manager so that they are informed of the exceedance. In the event that Amber Alert levels are triggered, this should be considered an actionable event to prevent a Red Alert level. The Contractor should ascertain the source of noise that triggered the alert by reference to the timing of the alert, site diaries and a knowledge of current site activity. If it is believed that an Amber is triggered as a result of works on the site, a review of the works being carried out should be carried out to determine the best practicable means used to manage levels and details of corrective actions going forward – if necessary.
Red	Noise L _{Aeq, 1hr} 80 dB	An alert should be sent to the site manager so that they are informed of the exceedance.

Alert Level	Preliminary trigger levels	Corresponding actions
	Vibration PPV 5 mm/s	The Contractor should temporarily cease works while reviewing and investigating whether best practicable means are in place and implement additional mitigation measures where practicable. If there is a risk of repeat red trigger level noise from the site activity identified, then the Contractor may convene a meeting with representatives to carefully review the working method, practices and machinery to determine if there is a reasonable alternative solution or mitigating protection measures that could be undertaken to reduce the risk of a re-occurrence.

In the event of a false alert, the Contractor is to identify the cause and inform their appointed Acoustician that a false alert has been raised and the likely reason for this.

Should multiple false alerts be raised in close succession and the cause of them cannot be prevented, at the end of the working day the Contractor should email the Acoustician to inform them that these false alerts have been raised and the likely reason for this.

4.6 Site Inductions

All operatives and personnel entering and working on the project will be required to sit the project specific site induction which enables them security access to the construction area. Within the induction the following items will be highlighted with importance to minimise the impact to the local area: -

1. Route to access the construction area;
2. Travel options and local parking areas;
3. To be courteous to all whilst inside and outside of the construction area;
4. The hours of work permitted including earliest and latest times for arrival and departure;
5. Control of noisy operations and importance of complying with the method selected;
6. Use of bins provided and littering;

The inductions will also cover the necessary project specific information and Health and safety information and practices that are to be followed. Also as part of the induction operatives will be required to provide RAMS and confirm compliance with the same.

4.7 Traffic Management

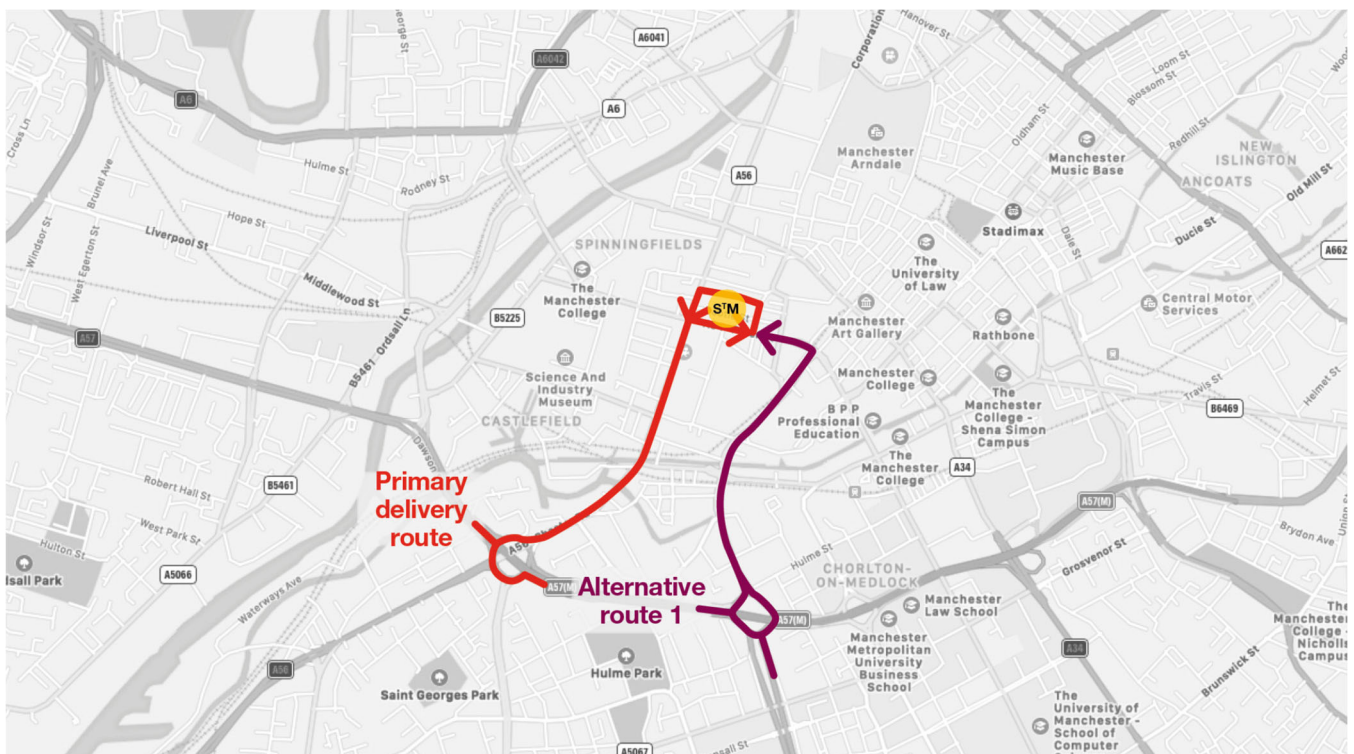
Contact and dialogue has occurred with the Manchester City Council Highways team to introduce the project and understand any issues or concerns before proposals are issued. A scheme has been discussed but cannot be finalised at this stage due to the rate of changes in the local area and surrounding projects, therefore the expected traffic management plan is shown below but should this need to be refined during the pre-construction period this will be discussed and agreed with the Highways team.

Temporary partial closure of roads and suspension of parking bays will be required to Jacksons row to facilitate the construction of the project and any temporary changes which need to be implemented to the surrounding roads by way of road closures or parking bay suspensions will be reviewed and agreed with Highways prior to the stopping up notices being issued to ensure that the most suitable approach is taken.

MCC Highways have advised of restricted delivery routes for use in the development. It is understood there are not any restricted delivery times to the city centre and as such the current programme does not reflect any restriction in delivery frequency. It is assumed deliveries can be made at any time during the approved site operation time periods. Overnight deliveries are not anticipated, but if required for any reason these will not be after 22:30.

Weight limits to roads surrounding the site and along the access and egress routes will be checked close to the commencement of the works to ensure that no restrictions have been imposed or changed. If there are changes the routes will be amended accordingly. The route will also be reviewed on a regular basis during the construction period in the event there are any road works or road closures that impact the routes.

The below images show the expected route to and from the construction site with an alternative route should there be any restrictions applied or during heavy traffic.

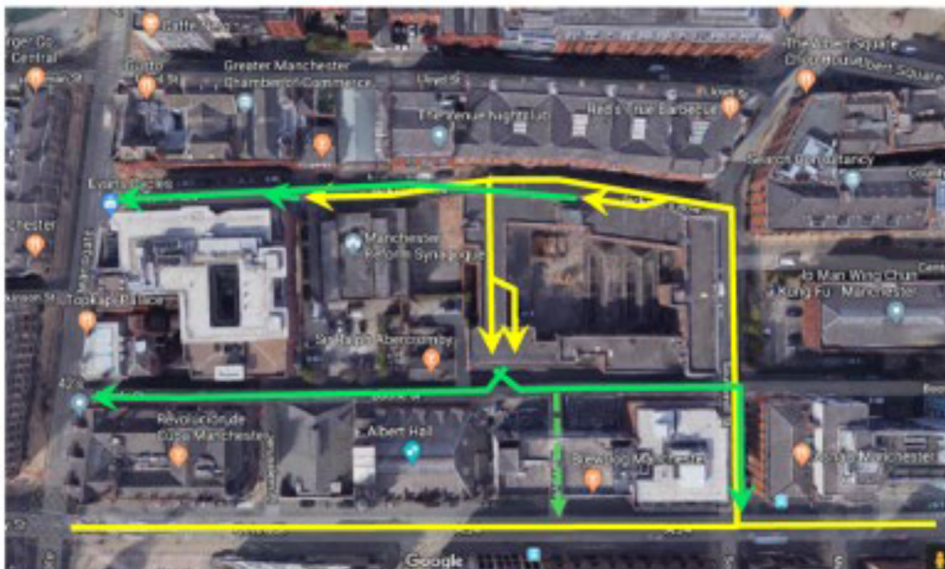


The images below show the logistics traffic flow around the construction site in the current circumstances. From the dialogue with MCC Highways and surrounding projects, namely the Town Hall refurbishment project incorporating the Alberts Square redevelopment, it is understood the intention is to switch the direction of the one way to Lloyd Street and the traffic plan will be updated to reflect this as and when this is introduced.

Primary Access and Egress Strategy showing routes to and from the site, red show 1-way roads and white show 2-way routes with current traffic flows:



red show 1-way roads (current flow on Lloyd St)
white show 2-way routes



Yellow shows the entrance to site
Green shows exit from site

Vehicle tracking has been undertaken, as shown below under logistics, to confirm that these routes are appropriate for the required delivery vehicles.

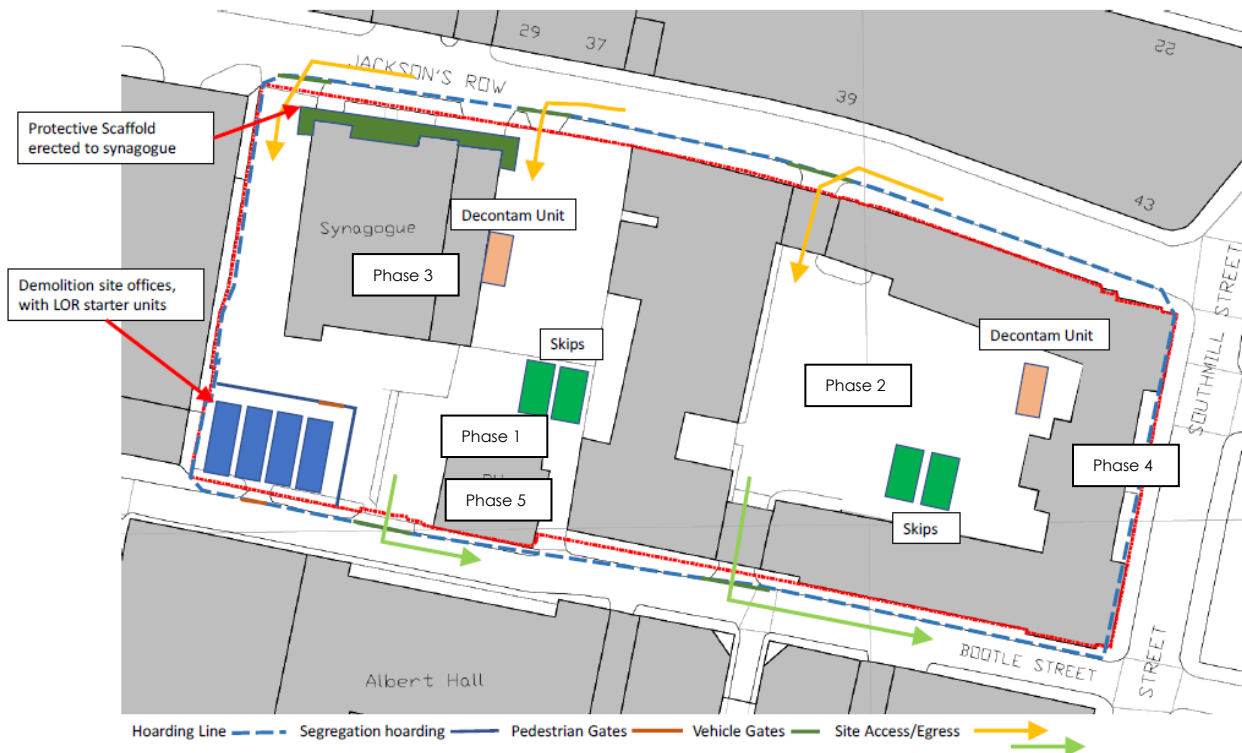
4.8 Contractor Parking

There is no opportunity for on-site parking for any staff or contractors vehicles, all staff and contractors will be made aware of pay and display car parks in the local area. Contractors and staff will be requested to make use of long stay car parks around the site and not the short stay bays on the roads close by to reduce the impact to the local neighbourhood and public. Contractors will be required to coordinate with the gate operative for the drop off and collection of tools in the same way as with materials.

All staff and contractors will be made aware of the public transport options available and will also be encouraged to use these where possible to cut down on the volume of traffic entering the city centre and locally around the site. Car sharing and greener methods of transport will be encouraged and actively promoted.

4.9 Logistics

Initially plant and equipment will be delivered to the existing surface level carpark located on Bootle Street whilst the initial site set up is established and perimeter secured. This will permit the commencement of the demolitions and site clearance works. High level logistics strategy is shown on the image below:



Vehicle tracking has been undertaken to ensure that the required size of delivery vehicles can complete the proposed route to and from the construction site, see below examples to confirm the proposed strategy in its current form is a workable solution. There are aspects of kerb lowering and footway reinforcement which is necessary for this strategy and these works will be undertaken as site enabling and establishment to ensure that access is possible, and footpaths are not damaged by vehicles 'bumping' the kerbs and corners.

Hoardings will be positioned to ensure that access, egress, deliveries, and waste collections are possible to the surrounding properties and businesses. Final positioning will be closely coordinated with input from the highways team before the submission of permit requests.

There is the potential for some parking bays to be suspended during the works to enable delivery access and to prevent full road closure. Again, this will be reviewed further with the Highways team before permits requests are submitted.

Highways will be contacted 6-8 weeks prior to submission of any permits or TTRO's to ensure that adequate time is provided to coordinate the plan and for approval periods.

Waste collections from the construction site will utilise the same access and egress routes as the deliveries. Waste collections from surrounding properties and businesses will be maintained.

The site management team will liaise with all surrounding businesses and property owners to understand what deliveries and waste collections occur to the premises, including times and frequency so that these are appreciated with the site logistics plan and can be maintained without disruption.

A full dilapidation survey of the roads and pavements surrounding the project will be undertaken prior to the commencement of any works on site in order to log the existing condition and as a point of reference at the completion of the project.

Dilapidation survey will include the adjacent and surrounding buildings to ensure there is no damage sustained to these during the works and tell-tale monitoring points will be positioned on any buildings with evident cracks or any which the property owners have concerns. This will be undertaken following consultation with property owners.

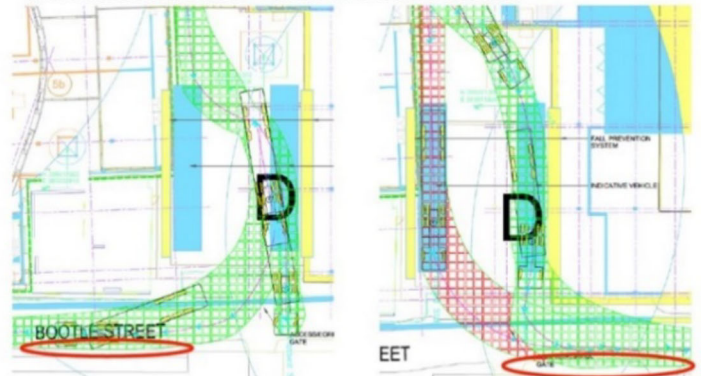
ST MICHAEL'S DEVELOPMENT – ACCESS OFF A34 ON TO SITE



ST MICHAEL'S DEVELOPMENT – ACCESS OFF JACKSONS ROW ON TO SITE



ST MICHAEL'S DEVELOPMENT – ACCESS OFF SITE ON TO BOOTLE ST



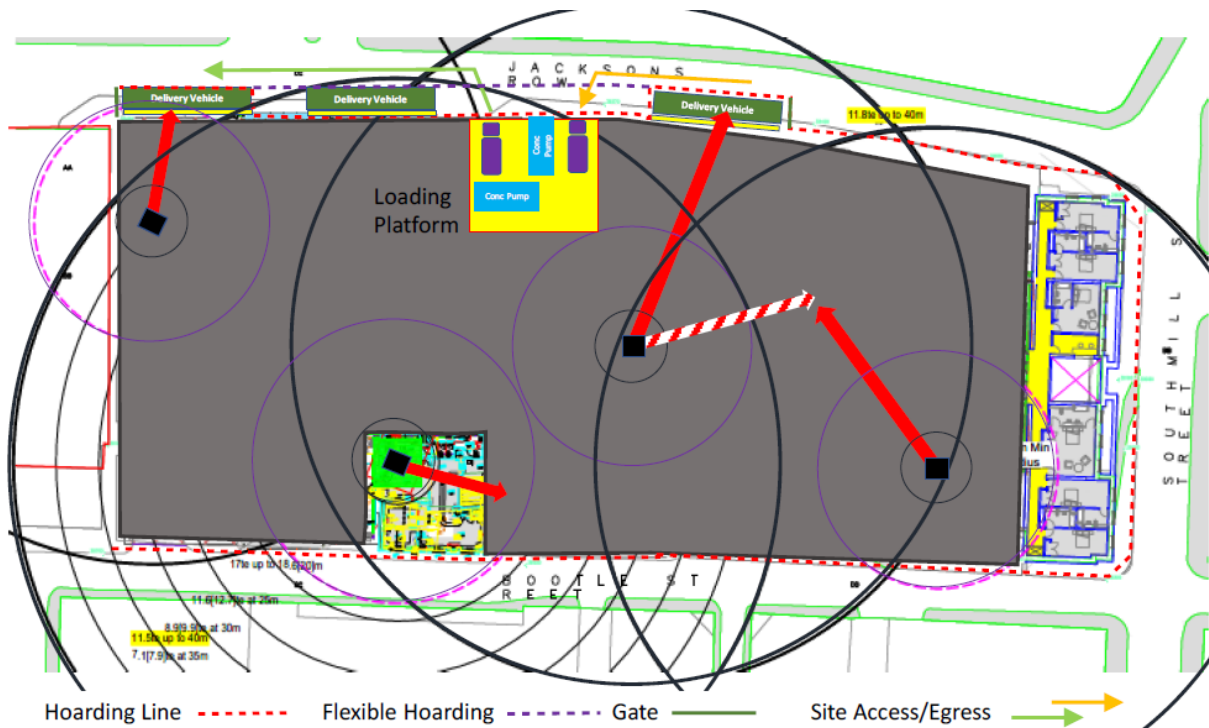
ST MICHAEL'S DEVELOPMENT – ACCESS OFF SITE ON TO SOUTHMILL ST



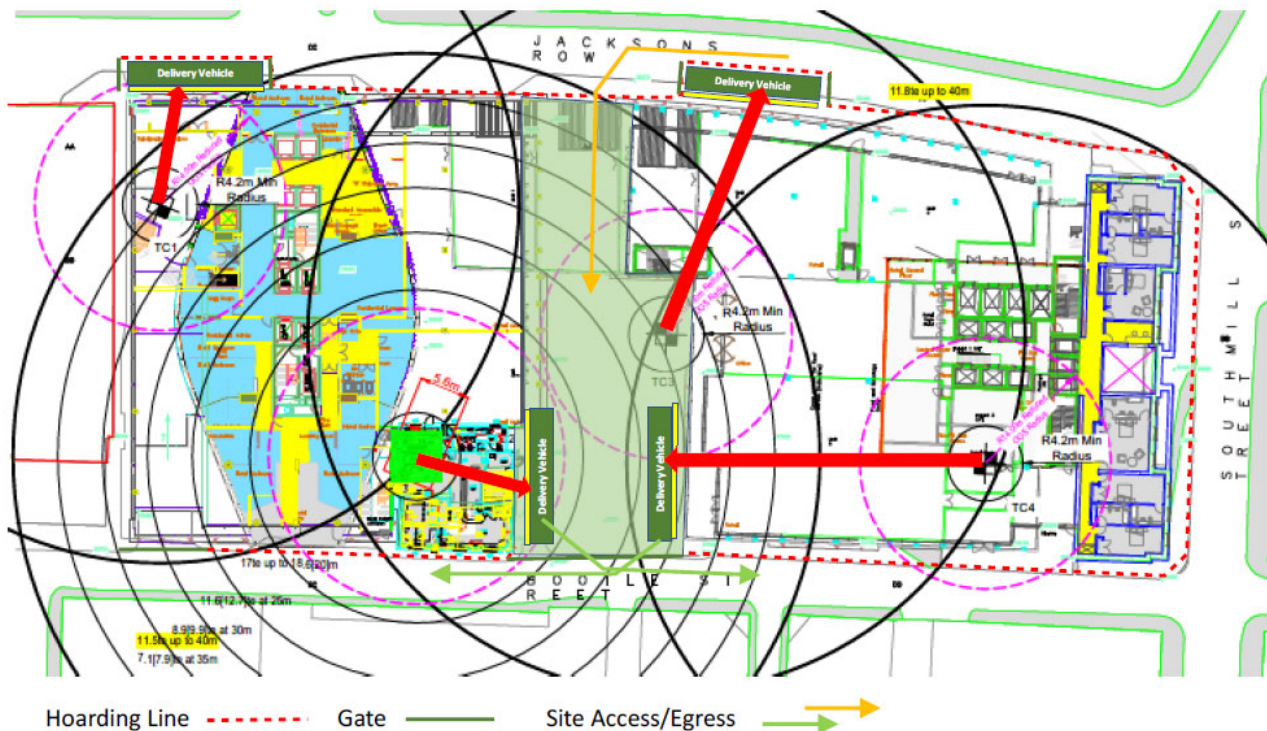
Site Access

- Access restricted to standard flatbed articulated vehicles
- Kerbs will have to be dropped for the duration of the works
- 3 no. vehicle marshals per vehicle to guide delivery from A34 to and from site
- Larger vehicles – out of hours
 - Reversed up Jacksons row off Deansgate

Materials distribution during the sub-structure works is shown on the below image:



Materials distribution at grade during the superstructure works is shown on the below image:

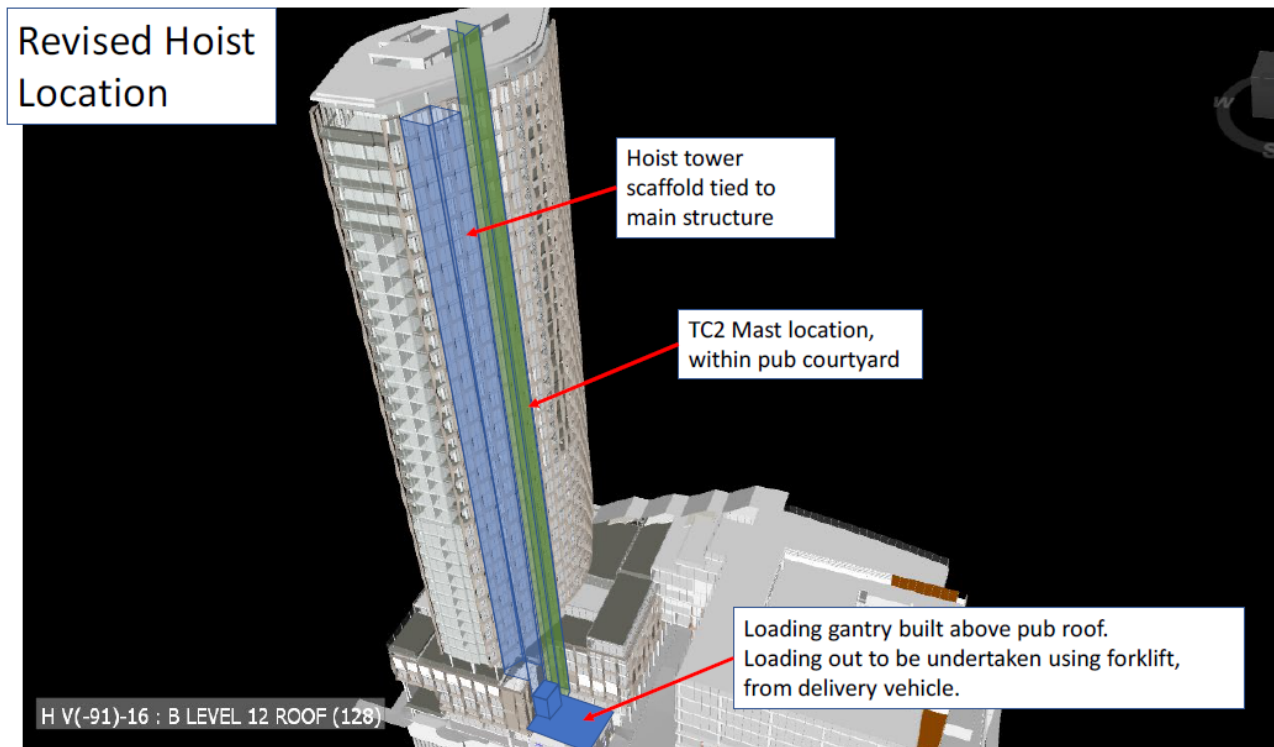


Tower cranes will be erected once the structure is up to grade. It is intended to utilise 4no. luffing tower cranes as indicated on the above plan, this is to minimise the oversailing of neighbouring buildings. All lifting of materials will be within the site boundary and there is no requirement to lift outside of the boundary or over a live highway. Each tower crane will have 4no. flood lights installed on its mast at approx. 30m and they will be used during working hours only, these lights will be directed

away from any residential buildings and into site only. These will be switched off out of house and low-level lighting only will be used for security measures.

The tower cranes will be powered by a temporary building supply. Anti-climb protection will be in place on the tower of each crane and anti-collision system along with aircraft warning lights will be in place on each crane jib.

Vertical distribution to the tower once out of the ground is via a hoist – following demolition of the single storey section of the Sir Ralph Abercromby pub and making use of the area for TC2 and the hoist. This is indicated in the image below:

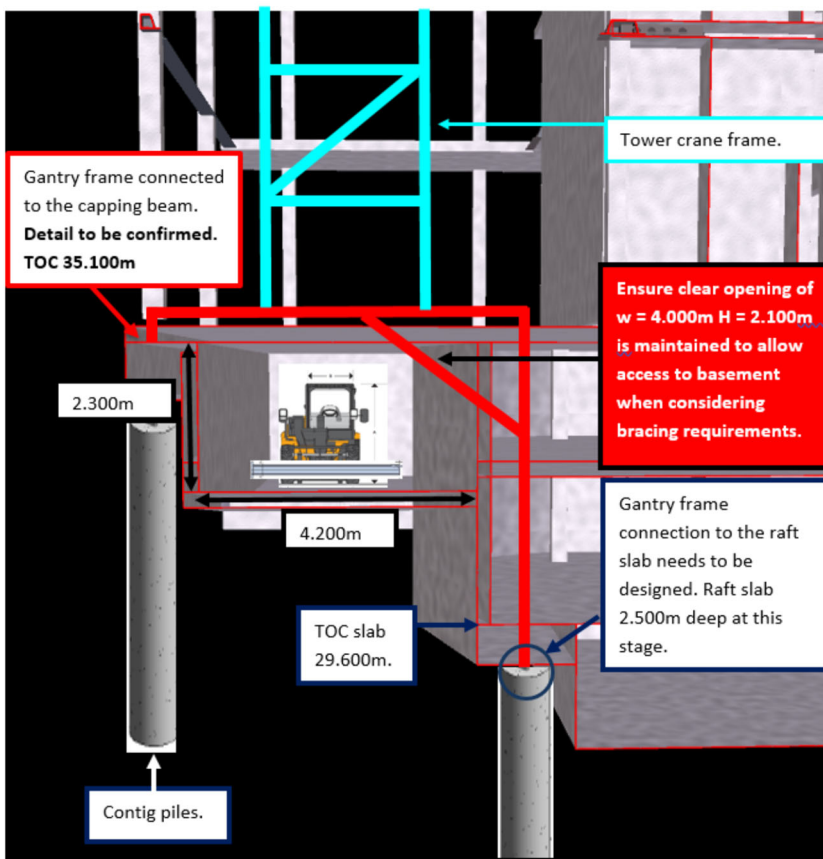


Distribution into the basement once out of the ground is via the basement ramp, even though TC1 is located over the ramp, temporary support and base will be provided for the tower crane to maintain the use of the ramp. Access will be needed into the basement throughout the project as this is the area is critical for plantrooms, substations/switchrooms and services distribution to the cores.

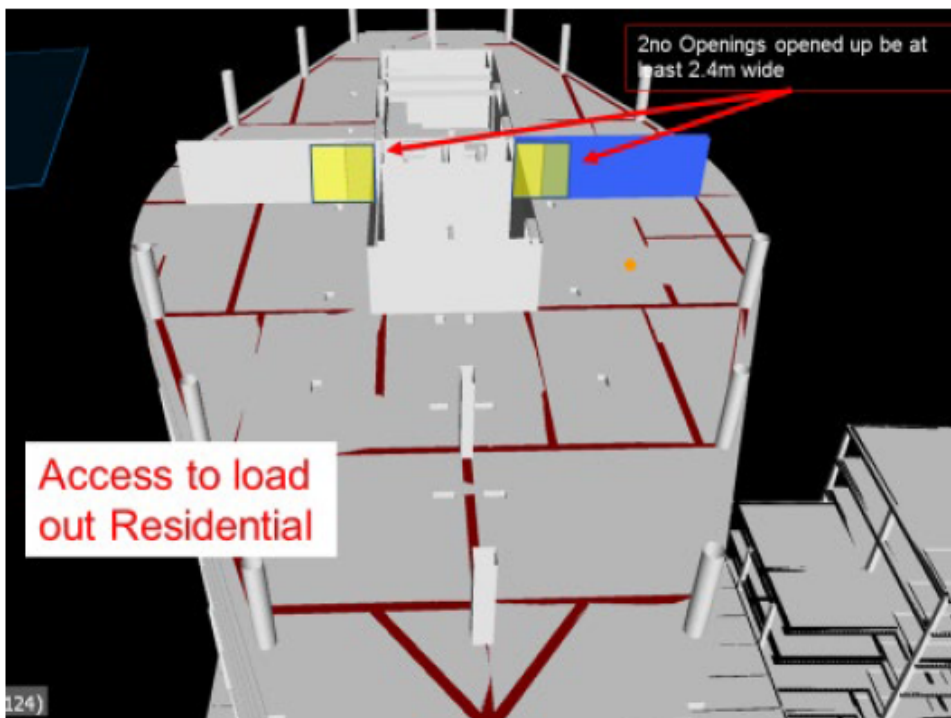
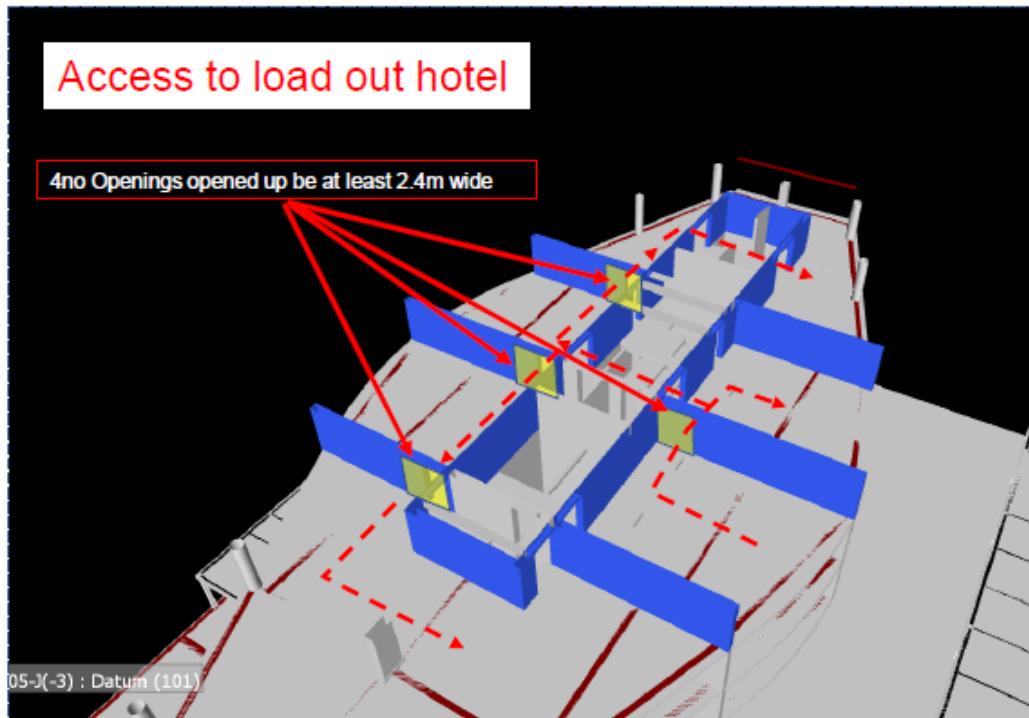
Proposed position of the Tower Crane Gantry frame (Plan)



Propose position of the Tower Crane Gantry frame (Section)



Distribution within floor plates is to be by rubber wheel / tracked plant to minimise noise impact. Openings will be left in the shear walls to allow glazing stillages which are 2.2m wide to be distributed around the floor plates.



4.10 Key MEP plant installs

It is assumed that the tower cranes will lift and position key plant and equipment items. The cranes loads and radius have been assumed at this stage and will need to be fully sized on receipt of final equipment information and loads. No additional or supplementary crange has been considered, nor any road closures for this installation.

4.11 Environmental & Site Waste Management Plan

A comprehensive Environmental and Site Waste Management Plan will be produced during the pre-construction stage to demonstrate the approach for control and minimisation of waste from the construction works. The process commences during the design stage through the selection of products and materials which are geared to use of recycled material and promote environmentally friendly manufacturing and minimise the extent of waste produced and maximise the recycling potential.

Through the procurement stage the contractor will engage with the supply chain; suppliers and installers, to identify waste minimisation actions and approaches whilst also setting the required management strategies for the project along with estimating waste volumes and establishing trackers.

A reputable waste management company will be procured to remove waste and recycling from site following collection into segregated skips on site. Monthly reports will be provided on the disposal of waste and recycling to confirm volumes.

The Environmental & Site Waste Management Plan will cover the following points: -

1. Waste Prevention
2. Waste Forecast
3. Waste Reduction and Reuse
4. Recycling
5. Non-hazardous waste carriers and disposers
6. Hazardous waste carriers and disposers
7. Management, communication and training
8. Continual improvement
9. Post Contract Review
10. Legislation and legal requirements
11. Documenting procedure

4.12 Air Quality

Dust Management

Control of activities in order to minimise the impact of the construction works to the local environment and air quality is of utmost importance to the safe running and management of the construction site. Industry best practice measures will be employed during all construction activities which have potential to generate airborne dust and pollution to prevent generation and spreading of dust such that significant impact to the surrounding properties and areas is prevented.

All activities and tasks will be assessed to ensure adequate prevention is in place, where this is not possible suppression and containment will be utilised. Dust levels will be monitored on a daily basis and recorded to ensure that acceptable levels of control are maintained.

Demolitions, Excavations and Earthworks

Demolitions, excavation and earth work activities are a potential source of dust generation if they are not adequately controlled. All activities and tasks will be closely reviewed and planned to ensure that appropriate mitigation methods are applied, the following are what will typically be adopted on site:

- Potential dust related activities will be damped down, especially during dry weather.
- Working areas will be stripped as required in order to minimise exposed areas.
- During excavation works and loading drop heights will be minimised to control the fall of materials thus reducing dust escape.
- Temporary cover may be provided for earthworks if necessary, completed excavation and exposed areas will be covered with permanent materials in order to stabilise surfaces as soon as practical.

Stockpiling of materials on site will be minimised as far as practical and given the site constraints long term stockpiling will not be possible.

Vehicle movements within the site will follow control measures implemented to provide a traffic flow and haul roads which will be dampened down during dry conditions to prevent the generation of dust.

Mitigation Measures

In accordance with the recommendations within the Air Quality Assessment undertaken by WSP the following mitigation measures will be implemented during the construction phase of the project to control and mitigate the effects of the construction activities on the surrounding area.

General Communication

- A stakeholder communications plan including community engagement will be developed and implemented.
- The name and contact details of person accountable for air quality and dust issues will clearly be displayed on the site boundary.
- Details of the regional office contact information will clearly be displayed on the site boundary.

General Dust Management

- A Dust Management Plan (DMP) will be developed and implemented following approval by the Local Authority. The DMP will include requirements for monitoring and visual inspections for dust deposition, dust flux and PM10.

Site Management

- All dust and air quality complaints will be recorded in a site record and causes inspected and identified. Appropriate remedial action will be taken in a timely manner with a record kept of actions taken including of any additional measures put in-place to avoid reoccurrence.
- The complaints log will be made available to the local authority upon request.
- Any exceptional incidents that cause dust and/or air emissions, either on- or off- site will be recorded, and the action taken to resolve the situation be recorded in the log book.

Monitoring

- Regular site inspections to monitor compliance with the DMP will be carried out, inspection results will be recorded, and an inspection log made available to the local authority upon request.
- The frequency of site inspections will be increased when activities with a high potential to produce dust are being undertaken and during prolonged dry or windy conditions.

Preparing and Maintaining the Site

- The site layout will be planned to ensure machinery and dust causing activities are located away from receptors, as far as is practicable within the site constraints.
- Where practicable solid screens or barriers will be erected around dusty activities or any stockpiles on site. The site boundary will also be formed with solid hoarding.
- Where practicable, specific operations where there is a high potential for dust production will be screened.
- Site runoff of water or mud will be prevented with local control measures.
- Site fencing, barriers and scaffolding will be kept clean using wet methods.
- Any materials that have a potential to produce dust will be removed from Site as soon as possible, unless being reused in which case they will be covered appropriately.
- Stockpiles will where possible be covered or screened to prevent wind whipping.

Operating Vehicle/Machinery and Sustainable Travel

- Operators will ensure all vehicles will be switch off engines when stationary - no idling vehicles.

- The use of diesel or petrol powered generators will be avoided as far as is practicable and use mains electricity or battery powered equipment will be used.
- A Construction Logistics Plan will be produced to manage the sustainable delivery of goods and materials.

Operations

- Cutting, grinding or sawing equipment will only be used where fitted with or in conjunction with suitable dust suppression techniques such as water sprays or local extraction.
- Adequate water supply provided to the Site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use of enclosed chutes and conveyors and covered skips.
- Drop heights minimised from conveyors, loading shovels, hoppers and other loading or handling equipment and the use of fine water sprays on equipment wherever appropriate.
- Equipment readily available on site to clean any spillages as soon as reasonably practicable.

Waste Management

- Waste material will be removed regularly.
- No bonfires and burning of waste materials on site.

Measures Specific to Demolition

- Effective water suppression is to be used during demolition operations. Hand held sprays are more effective than hoses attached to equipment and will be used as far as practicable to directed spray to where it is needed.
- Explosive blasting will not be used, appropriate manual and mechanical alternatives will be employed.
- Any biological debris will be bagged and removed or dampened down before demolition.

Measures Specific to Earthworks

- Stockpiling of material on site will be minimised as far as possible, tight site constraints mean minimal space available for stockpiling of material.
- Stockpile surface areas to be minimised (subject to health and safety best practices and visual constraints regarding slope gradients and visual intrusion) to reduce area of surfaces exposed to wind pick-up.
- Where practicable, windbreak netting/screening will be positioned around material stockpiles and vehicle loading/unloading areas, as well as exposed excavation and material handling operations, to provide a physical barrier between the Site and the surroundings.
- Where practicable, stockpiles of soils and materials will be located as far as possible from sensitive properties, taking account of the prevailing wind direction.
- During dry or windy weather, material stockpiles and exposed surfaces will be dampened down.

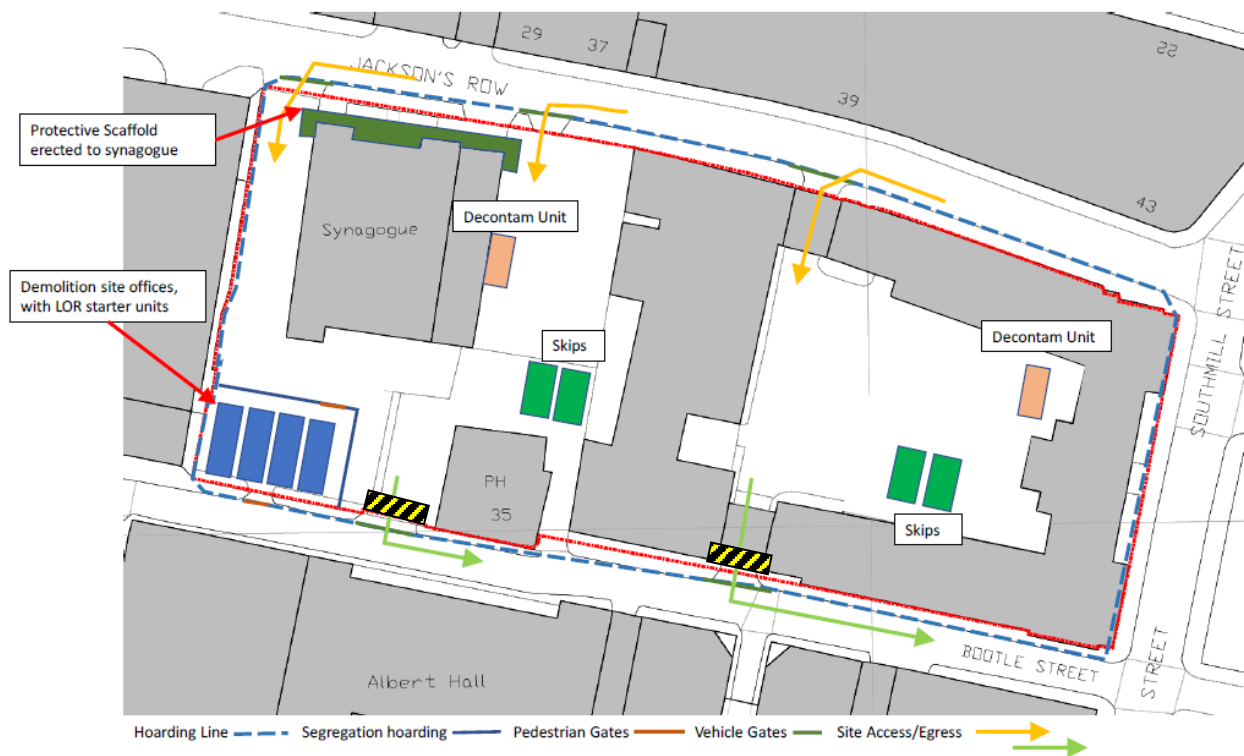
Measures Specific to Construction

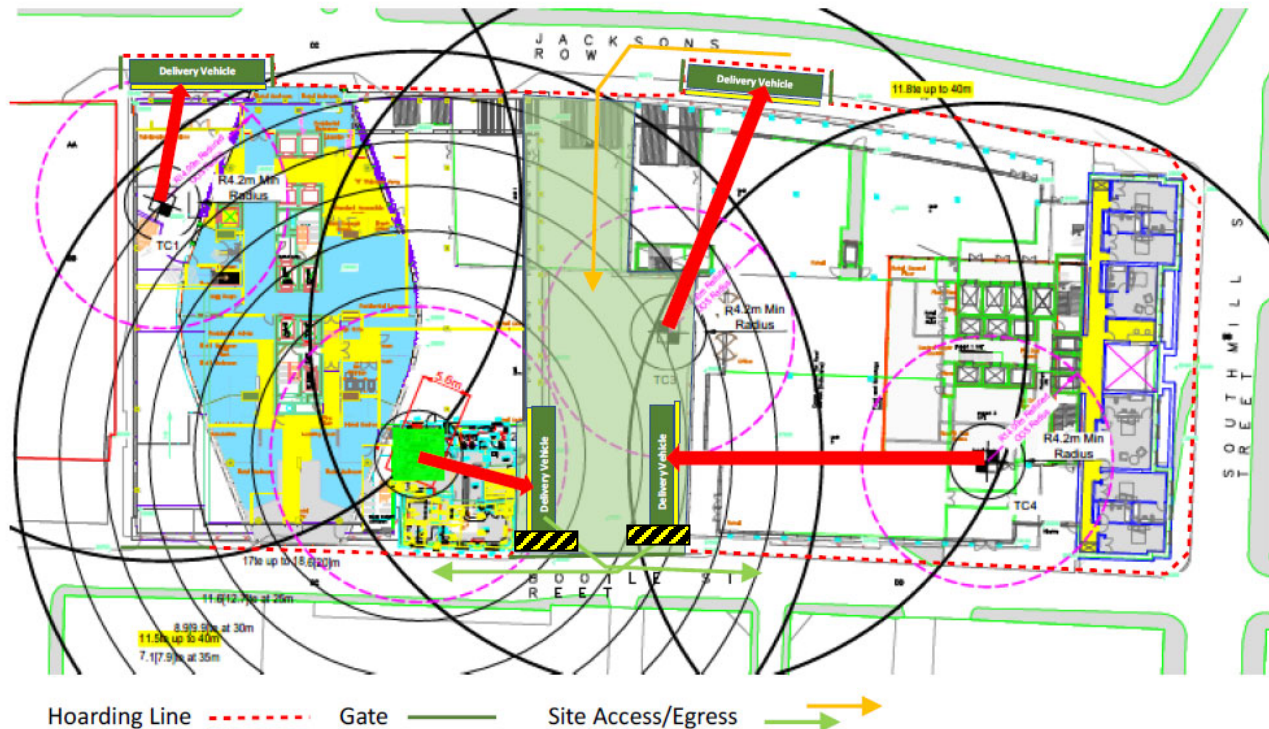
- If stored on site, sand and other aggregates to be in bunded areas and are not allowed to dry out, unless required to, in which case appropriate additional control measures to be in place.
- On site mixing of cement will not be used due to site constraints therefore bulk cement will not be delivered loose to site, ready-mix material will be used.
- For smaller supplies of fine powder materials care will be taken to ensure bags are sealed after use and stored appropriately to prevent dust.
- All construction plant and equipment is to be correctly maintained and in good working order and not left running when not in use.

4.13 Wheel Wash

There is a need for vehicles to enter the construction area to make deliveries and to remove waste from site for recycling including excavated material, before any vehicles egress site and re-join the highway they will pass through a wheel wash facility in order to limit any debris that is transferred from the construction area out on to the highway, these will be positioned at each vehicle exit from the site. These are particularly important during the demolition, excavation and sub-structure phase of works due to the number of vehicle movements and the fact that earth, aggregate and waste material is been removed from site.

At present the logistics plans are as shown on the below images with the routes into and out of the construction area indicated, wheel wash facilities will be located as shown (with this symbol ) for each stage in the project. During times of high vehicle movements with the bulk excavation road sweeper facilities will also be on standby to ensure that the cleanliness of the highway is maintained.





4.14 Human Impact Management Plan

The impact of a construction site has on people, neighbours, and general public as well as those involved with the project, these can be both positive and negative in their impact. It is important to appreciate it is not only construction personnel that are affected by construction activities this scale and in this location. We will develop a plan, which will be a live document capturing elements which have a human impact as they become apparent and which seeks to maximise the positive elements and minimise the negative impacts of our works.

The following impact areas have been identified along with a short description of a mitigation strategy. Some items are covered already in the above sections however have been included below for clarity.

Traffic management - a full traffic management strategy has been developed to minimise impact on the local area. The primary approach is to segregate site activities from the public through hoardings, on-site traffic routes. All access into and around site controlled by qualified gatemen.

Signage - clear and relevant signage to be positioned around the site to highlight the dangers to the public and to operatives. All to be regularly monitored and updated as appropriate.

Vibration, Dust and Noise - the impact of dust and noise to operatives and the public is of great concern and all efforts to minimise both will be a priority throughout the construction. Our Strategy is outlined above.

Light pollution - as the project progresses and the building comes out of the ground there is increased possibility of light pollution for surrounding buildings and the public from site lighting. To mitigate this we will have site lighting set up on timers, which will cut the lighting apart from emergency lighting after site working hours.

The welfare of site staff and operatives is of paramount importance and all suitable measures to reduce the impact of construction on operatives and sub-contractors will be taken;

PPE- The correct PPE is supplied for all activities as a standard; boot, gloves, hard hat, glasses/goggles and hearing protection, any activities where it required to comply with the method statements and risk assessments that further PPE is required then this will be in place also.

Occupational Health - occupational health is taken very seriously and is part of the core strategy for the protection of operatives-

- HAVS information is displayed for all the operatives and records of HAVS exposure to be recorded and monitored.
- Standard 5 point PPE will be mandatory at all times; gloves, glasses/goggles, hat, boots and vest.
- Ear defenders / hearing protection during noise generating operations .
- Task specific PPE to be used where deemed necessary.
- Facefit test for all operatives so that they are using the correct masks.
- Health screening for all critical operatives.
- Working to address the correct attitude and mindset of operatives and contractors to all aspects of work through communication and training.
- Standard of welfare facilities which are kept to very high standard and cleaned twice a day minimum.
- Drying facilities are a standard.
- Good working conditions and welfare conditions are essential and a very high standard of welfare will be provided to make working conditions as comfortable as possible.
- Regular project and task specific toolbox talks will be delivered to all personnel on site.

Working Conditions

- Hot weather- supply sunscreens and toolbox talks on staying protected .
- Cold weather working- warm PPE supplied, training and awareness through toolbox talks and site information

Local Labour

As part of our human impact strategy we will be putting in place a local labour policy which will provide employment opportunities to local residents as labour will be sourced from the local Manchester area as and where possible along with engagement with local employment and training organisations to provide work experience and apprenticeships, providing a socio-economic benefit to the local community.

Community Consultation Strategy

All residents/neighbours and businesses will be contacted in advance of commencement of construction activities on site to inform them of the development, giving a point of contact and advising that there will be regular neighbours forums, so that they can be informed of what is happening with the project and also a forum for them to air their concerns or issues.

Throughout the construction phase we will endeavour to eliminate or reduce any negative impacts on the public, staff, and operatives. We have thought about and will put in place the right strategies to mitigate any negative impacts and will enforce these through the correct management and supervision of activities. Through training and information we hope to encourage a positive and safe attitude towards working practices and the impact their activities can have on neighbours, residents and local businesses.

Community Feedback & Complaint Procedure

The views and feedback from the local community are extremely important to the continuous improvement of the way that construction sites are managed to minimise the impact to the surrounding areas as well as an opportunity to rectify a situation whereby an occurrence may have had an impact.

The procedure to contact the construction team will be as follows: -

1. Points of contact to be displayed on the site hoarding and shared to the local community with the consultation and newsletter drops.
2. Contact can be made in the following form: -
 - a. In person to site personnel.
 - b. Via phone to the construction site office or contractors regional office.
 - c. In writing by letter or email to the construction site office or contractors regional office.
3. Log the contact in the site record, recording all details of the situation or incident.
4. Severity rating is applied to highlight significant and important items that need urgent attention and response. High priority items are passed to project and company director level.
5. Timeframe for responding is given and communicated to the person who made contact.
6. Appointed person within the site team undertakes investigation and produces report on the situation. Urgent items will be provided with a first response to within 24hrs and general items will be responded to within 7 days.
7. Rectify the situation and implement changes required to prevent re-occurrence.
8. Response is provided back to the person who made contact, providing update on what has been implemented to prevent re-occurrence and with a view of closing out the situation/complaint.
9. Escalation process will be in place for dealing with situations which cannot be resolved at site level and whereby senior members of staff need to be involved.

Considerate Constructors Scheme

The project will be registered with the Considerate Constructors Scheme and will follow industry best practice and the schemes codes of considerate practice with a view of achieving excellent scoring and a target level will be agreed with the client.