Construction Methodology / Project Execution Plan

Contents

1.0 Executive Summary

We are delighted to present to you our Construction Management Plan for the delivery of the Lime Street Development (Commercial).

The Programme presented in this Technical Proposal is **22 months (96 weeks)** starting in Mid-Sept 2020.

We have studied the Documents, visited the site and the surrounding area on several occasions so that we appreciate the local area and get a thorough understanding of the logistics in getting resources and material to the site. Through these site visits and our own experience, there will be some disruption to the local residents in terms of increased traffic to the site, noise, dust, etc.
As a considerate contractor we have considered this disturbance and inconvenience to the local community in our methodology with the overarching aim to minimise disruption to the residents while still delivering a quality project in the shortest period of time.

To achieve the 22-month construction programme, reduce the disruption to local residence, and give more certainty to completion date, we propose to off-site manufacture the rising elements, landings and stairs flights. All floor slabs would be In-Situ as per the current design.

The precast rising elements offer the following advantages over the in-situ rising elements:

- Reduces the storage needed on site and makes site logistics more manageable and efficient
- Dramatically reduces the concreting labour requirements, particularly important in the present heated market where this type of labour is in short supply
- Reduces the disruption to neighbouring residents, from reduced deliveries, concrete placement, vibration and striking. Additionally, given the fact that the precast installation is a relatively quiet operation, we could see opportunity, with agreement, to work outside the prescribed planning hours and,
- Reduces the impact of inclement weather on the programme, especially impact of wind on the tower cranes.

From our detailed programme, find below programme summary and Construction sequence:

Figure 1 - Construction Sequence

The size and scale of BAM ensures we can attract both national and international subcontracting partners many of whom have experience of working with our European operating companies as part of the Royal BAM Group. In the current market it is of great advantage to BAM that we can leverage our International 'One BAM' database to select the 'best fit' Subcontractors and suppliers to deliver our Clients objectives and requirements within a timely manner.

Our strong understanding of this project comes in part from our extensive experience of executing developments in high density areas. For example, we have proudly constructed commercial and residential units at Mill Street, the 'Aloft' Hotel in Dublin 8; Boland's Quay and One Molesworth Place to name but a few. All these sites offered restricted working space on site, were located in heavily populated areas thus requiring close community liaison and also had limited storage on site thus needing a 'Just in Time' logistics method.

BAM has used its experience to establish the durations for the Façade, Electrical, Mechanical and Lifts installation. All durations, sequences and scope of works will need to be agreed with of all the Specialist Subcontractors.

BAM has a strong record of Health and Safety on all its projects. This record stems from the attitude of all our employees to 'make safety personal', as well as from our significant investment that we continue to make in our various health and safety programmes.

Finally, our way of working is proven to be open and collaborative, and we intend fully adopting this approach on this project. We understand the risks inherent in this project, and we will work with the various stakeholders to control these risks and complete the project on time and within budget.

We trust our submission is of interest and we thank you for providing us with an opportunity to present our capabilities and experience to you. We welcome an opportunity to present this proposal to you in due course so that you can be assured we have a solution that delivers.

Figure 2 - Crane Layout

2.0 Construction Methodology

2.1 Site Logistics

We recognise that the Key Critical Success Factor's for the client on this Project is speedy delivery to the highest standard of quality that reflects the client's brand and product and without hinderance and interference to the surrounding residential communities / residents.

BAM has reviewed in detail the site location and layout and believe that the following are the key items;

Site Specific Materials Delivery Plan

With limited areas to receive and unload deliveries on site it is imperative that the correct deliveries occur at the right time with the required components. BAM will create a site-specific materials delivery plan and a dedicated logistics team that will work closely with all project stakeholders throughout the project.

A robust Materials Delivery Plan is a live document that contains up to date short term programmes, based on constraint analysis of resources available on site and transparency of material availability and short response times within the local supply chain. For example, plasterboard can be brought to site relatively quickly directly from the supplier whereas the timber products needs to acclimatise on site for a week prior to installation and this has a long lead time meaning it needs to be stored within the blocks for a week before installation.

The plan will achieve the following:

- Monitor the Construction and Procurement Programmes to calculate daily / weekly deliveries in advance
- Coordinate with the construction teams and logistics manager to calculate daily delivery movements and tower crane availability to unload and distribute material
- Contain methods of pre-delivery Quality Assurance Inspections required by the Project Quality Management Plan. This will ensure that items being delivered are compliant and in accordance with the design / specification and are therefore fit for purpose
- Provide the suppliers with specific arrival times and contact details of site team to coordinate with. We will also actively encourage our supply chain to reach the site via the Dublin Port Tunnel and not take routes through the city centre
- Give daily notice to the site team on what is due and when and where it is to be unloaded and distributed
- Provide procedures to consider changes of plan at short notice to accommodate late deliveries or urgent requests.

Just in Time Deliveries and Pre-Delivery Centre (Off-Site)

As described above, all suppliers and subcontractors will have to buy into and work with the logistics team in planning deliveries in advance. We will discourage unplanned deliveries to site given the site and local constraints. We will set out at pre-award that parking in the neighboring estates waiting to access the site will not be tolerated. All deliveries must be pre-booked in and a time slot given that considers the previous delivery and time needed to unload that and get the transport off site. We will encourage Subcontractors and suppliers to hold material off site until it's necessary.

However, we do recognise that some materials being shipped from overseas will need to arrive in full / bulk and will need to be stored somewhere before installation on site. This is where we will fully utilise our head office and plant department facilities at Kill, County Kildare. We can use the land and facilities for off-site storage, minimising excessive storage on site where space will be at a premium. The distance from our Head office in Kill to the site is a little under 50km so less than an hour's transport time.

Management of Dirt and Dust

On a site as strategically challenging as this location it is imperative that pollutants such as noise, dust and vibration are properly controlled.

In relation to dust monitoring, which will be a potential risk during the concrete works of the sub and super structure of the blocks. BAM proposes to use dust suppression gauges or measurement devices. These can be measured on a weekly or daily basis and based on the levels monitored, additional dust suppression systems such as spraying, or misting can be utilised as necessary. A designated member of the BAM Engineering Team will be allocated to carry out this monitoring work.

BAM will manage the control of dust and dirt on site and surrounding roads / footpaths by the following methods:

- During concrete works to the substructure and superstructure, screens and spray techniques will be utilised where necessary
- The use of the screens and dust sheets will be utilised to minimise the nuisance caused by dust. We have identified it's the neighbouring properties adjacent to the site that are most at risk from dust. We will place dust screens strategically around the site and locally around work faces to minimise dust transfer to their properties
- Where required debris netting will be placed on the scaffolding of all superstructure scaffolds. These will be maintained and kept in good working condition throughout the build process
- All rubbish skips will be fitted with nets during windy conditions to prevent rubbish and debris blowing over the site into adjoining properties. Skips will be promptly removed from site when full
- Mini Skips and Wheelie Bins will be used to remove debris from each floor of each building to strategically located main skips. Mini skips will be placed on scaffold platforms but be lifted off by the end of each day
- Public Roads and footpaths will be inspected daily, and their condition closely monitored. The results of these inspections and the nature of the works on site at that time will dictate the extent and regularity of road cleaning required. A road sweeper will be utilised often and as required.
- A wheel cleaning facility will be provided for the works to ensure we minimise transfer of dirt and dust to the public roads / footpaths during basement works.

BAM always operate a clean as you go policy throughout our operations. More detailed method statements specific to actual site conditions and work fronts will be established and utilised as the works progress.

Noise

We believe that the Precast Rising Elements will significantly reduce noise pollution of the project. Noise can be a long-term issue throughout the life of the project, and we understand the effects that this can have on neighbours.

We recognise that the site is within an urban setting and has no dual carriageways or major arterial roads around the immediate vicinity. Therefore, apart from peak times in the morning and evenings Monday to Friday, the area is not subject to significant volume of road traffic related noise. Furthermore, it is noted that there are no major sources of industrial noise within 1km of the site. Therefore, the ambient noise climate maybe classified as being typical of an urban environment. The local surrounding roads are not typically subject to significant road traffic volumes.

The proposed site and surrounding area can be classified as a noise sensitive location given the large number of residential units around the site. Therefore, we acknowledge that local residents will be noise sensitive and will not want to witness an unacceptable increase in the noise climate during the construction phase. The noise exposure during the construction phase is to be managed and controlled to acceptable levels.

Research shows that an increase in traffic flow of 50% will generally result in an increase of noise level of 2 dB. A change in traffic noise of less than 2dB is however generally not noticeable to the human ear. The noise environment as perceived by residents is therefore only slightly sensitive to the noise generated by a marginal increase in traffic flows. To reduce our impact on the local residents we will only conduct our activities in line with the Planning requirements on working hours (07:00 – 18:00hrs Monday to Friday; 08:00 – 14:00 hrs Saturdays). We will take all necessary measures on site to minimise disturbance and nuisance to neighbours from excessive noise.

We understand that the principle sources of noise during construction will be as follows:

- Engine noise from construction plant and traffic and their compulsory safety warning alarms
- Generators and Compressors
- Specialist Lifting and Access Equipment
- Tower Crane erection and removal. We have estimated we will require two Tower Cranes on site for the superstructure
- Power floating of concrete floors
- Vibrating concrete.

The following will form the basis of how noise will be managed and controlled on site:

- We will appoint a nominated person from our team to manage all environmental complaints we may receive from residents during the works. See section on Community Relations Liaison below
- We will implement a noise complaint procedure where the details of any noise related complaint will be logged, investigated and where required, measures will be taken to ameliorate the source of the noise complaint

- Appropriate signage will be erected on all access roads in the vicinity of the site to inform HGV drivers that engines will not be left on for idling for prolonged periods while on site and that the use of horns when entering or exiting the sites is always banned. Please refer to our Traffic Management Section in this proposal
- HGV's will not be permitted to queue or park on any local residential roads around the project site and this will be actively enforced by the site management
- All onsite generator units (if required) used to supply electricity to the site will be super silenced and located away from the immediate neighbouring properties
- All Plant and Equipment will be properly maintained and fitted with silencing equipment where practical and operated to prevent excessive noise levels
- We will position sound dampening screens and enclosures around excessively noisy static plant.
- BAM will ensure that all particularly noisy and disruptive works will be carried out where possible between the hours of 10:00 – 16:00hrs Monday to Friday
- We will conduct noise measurements on a routine basis to verify the effectiveness of all noise mitigation measures
- Noise containment measures will be further detailed in construction method statements as the works progress.

Vibration

As is required requirements vibration monitor positioning and frequency will be agreed with the Engineer before commencement of work. Data will be collected in real time, with trigger alarm levels as agreed with the Engineer. Data will be stored and submitted on a weekly basis unless agreed otherwise with the Engineer.

The works requirements specify the following limits for piling works;
Frequency ranges,

- 8mm/s for less than 10Hz
- 12.5mm/s for 10-50Hz
- 20mm/s for 50-100Hz (and above).

Should any of the vibration monitors activate the procedure is as follows:

1. Following the activation of the alarm, all works within the vicinity (within 40m radius) are to cease immediately.
2. Following a full inspection of the area an instruction will be issued to the contractor before he can recommence with works again.

2.2 Site Access and Egress

BAM understand that site access and egress for both material and workers will be key to the delivery of a successful project. We have engaged the services of Traffic Management Design Ltd to work with us to design a Temporary Management scheme associated with the site access and egress. Full details of the traffic management plan is available in Section 2.5.

BAM has also created a draft 4D programme of the building sequence to assist with the planning and site logistics. Please refer to section 1 detailed programme and sequence images.

As per the marked-up graphic below BAM propose creating a loading area on Lime Street and on Sir John Rogerson's Quay. This will involve closing the footpath on Sir John Rogerson's Quay and potentially relocating a bus stop. Carparking spaces will also need to be rented from Dublin City Council. BAM has a good working relationship with Dublin City Council and will utilise the experiences gained on over several City centre projects.

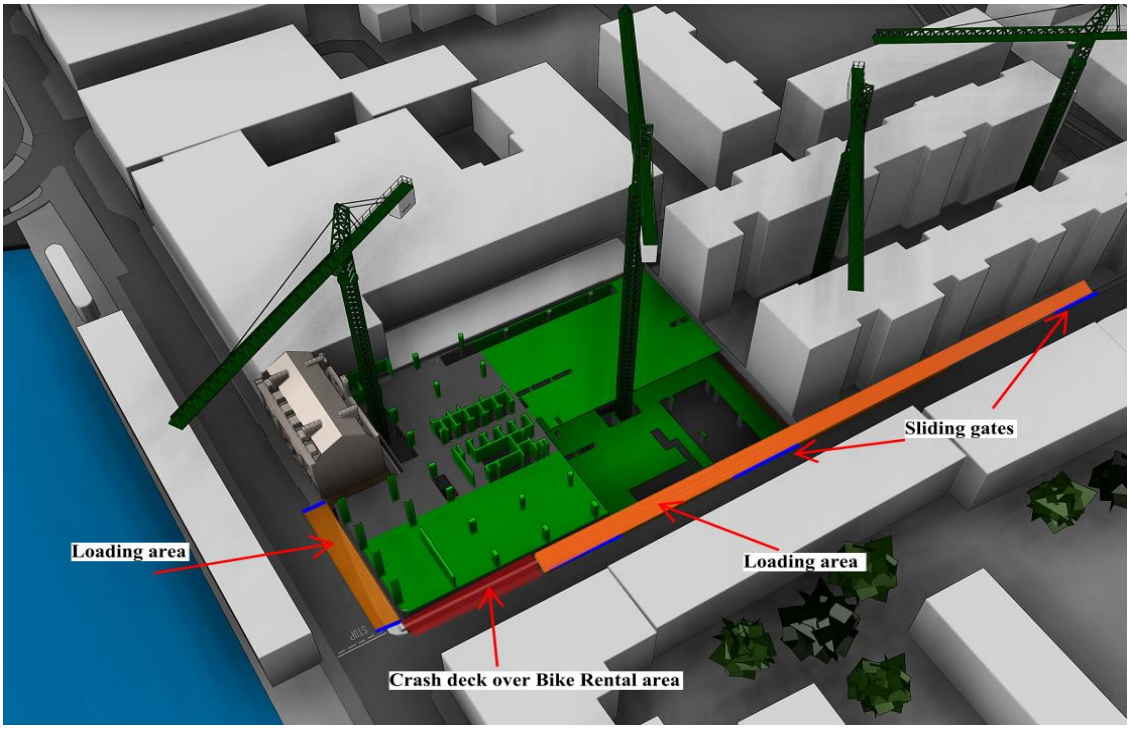

Figure 3 - Crane Layout and Site Logistics plan

All materials will be off loaded using 2 number Tower cranes. Materials will be loaded on the floors via cantidecks.

Figure 4 - Cantideck loading bays

2.3 Site Security

The site will be fully secured by a timber hoarding. The timber hoarding shall be as per the specification set out in the design documentation.

Summary below:

- Plywood Site Protect Plus
- Skirting 100mm x 25mm
- Capping/Head Board 100mm x 25mm;
- Vertical Cover Strips to Joints of Sheets 50mm x 25mm
- Marlet Company Signs will be provided free issue by Marlet for installation by Main Contractor
- Supporting Structure Member Sizes and Spacing of Kelly Blocks or In-situ Posts shall be determined by the Main Contractors Temporary Works Design
- Painting: RAL 5002.

A full time Gate Marshal will be monitoring pedestrian and vehicle access to ensuring safety and security. BAM propose using a remote CCTV monitoring system and mobile patrols to provide out of hours security on the site. As finishes progress, a full time out of hours security guard may be required, this will be closely monitored by the site management team.

2.4 Site Accommodation

Similar to the Residential development for the basement works BAM propose setting up temporary site offices and welfare facilities on the footpath on the West site of the site. See marked up drawing below.

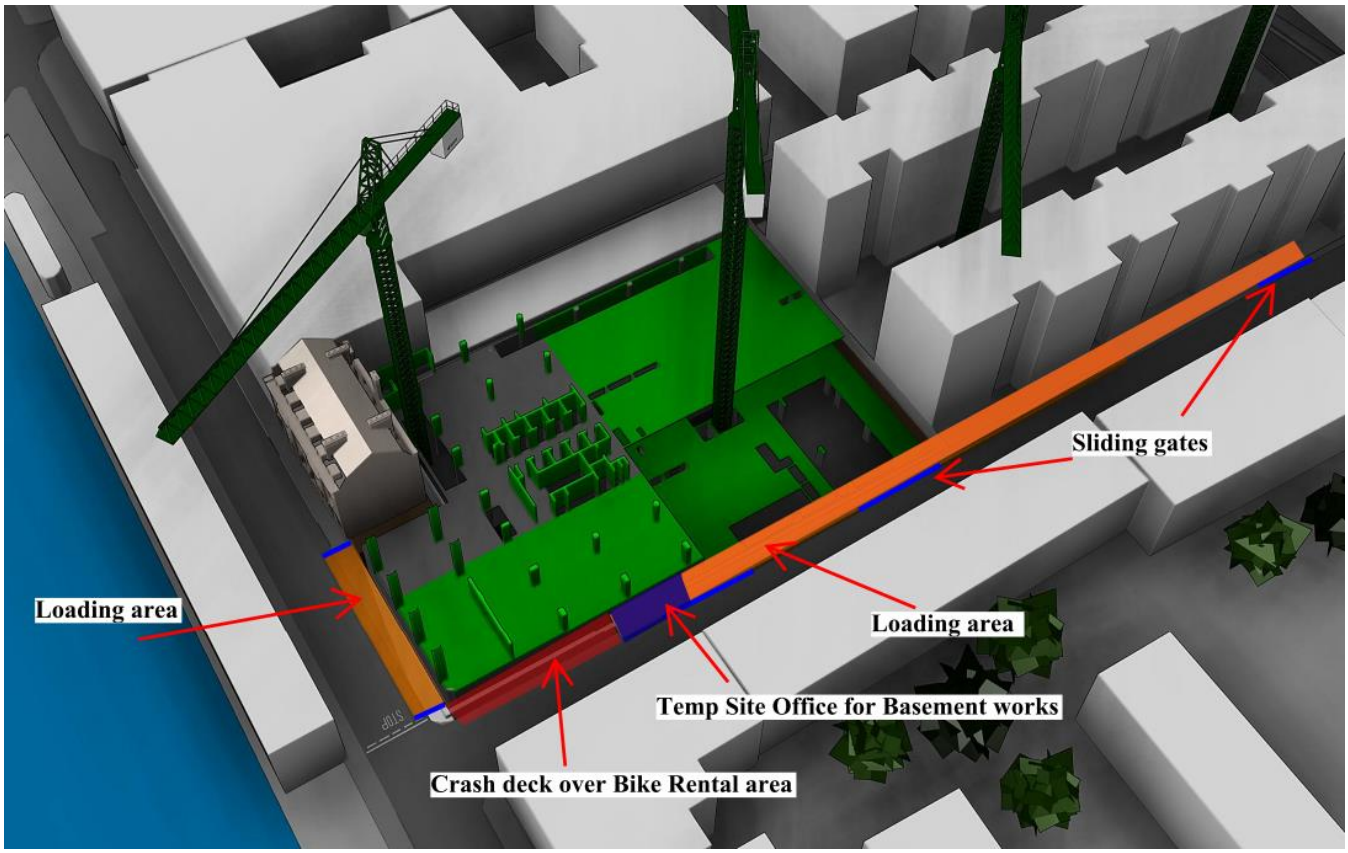

Figure 5 - Site Office Location

On completion of the Podium slab on the Residential site. BAM propose using the Basement area for site accommodation. BAM will create a temp access point off Lime street which will provide safe access for works and site visitors.

2.5 Traffic Management

Traffic Routes and Management

BAM has reviewed the site in detail and are fully aware of the challenges associated with constructing a large RC Frame building, with a Double-storey basement within Dublin City Council 'Restricted Zone for Heavy Goods Vehicle'.

Before starting on site, a detailed Construction Management Plan (CMP) and Traffic Management Plan (TMP) will be developed. The CMP will fully detail BAMs innovative ideas used on similar city centre projects, eg One Molesworth Street, Boland's Quay, National Children's Hospital, etc.
We have engaged the professional services of Traffic Management Design Ltd to work with us on this Tender to design a Temporary Management scheme associated with the site access and egress.

The construction will involve significant delivery of material to site via Heavy Goods Vehicles (HGV's). All HGV will deliver to the Site Via the M50 and the Dublin Port Tunnel.

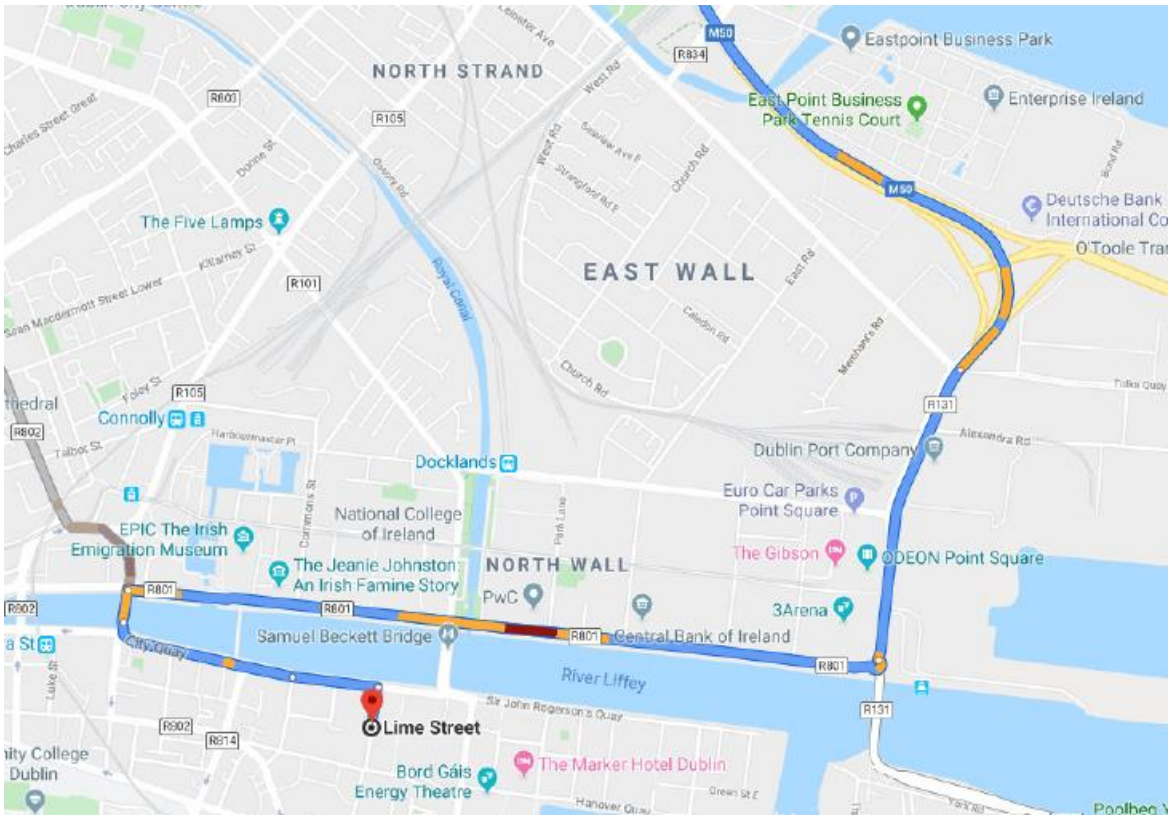

Figure 6 - HGV delivery route

A full-time gateman will be employed at the site entrance that will ensure members of the public are protected from entering and exiting construction vehicles. All deliveries MUST access the site immediately. Therefore, the use of 'just in time' deliveries will be crucial to the successful delivery of this project.

BAM will focus on pre-construction to ensure we are ‘ready to build’ in every aspect. We will build in a safe, lean way, validating quality as we go and finishing properly in a controlled manner, to deliver a defect free building. BAM will maximise the benefits of BIM and lean planning, to visualise work plans and logistics week-on-week. This will provide better control, safety and progress confidence.

BAM has reviewed the site layout and have sequenced the project to make maximum use of the site storage area.

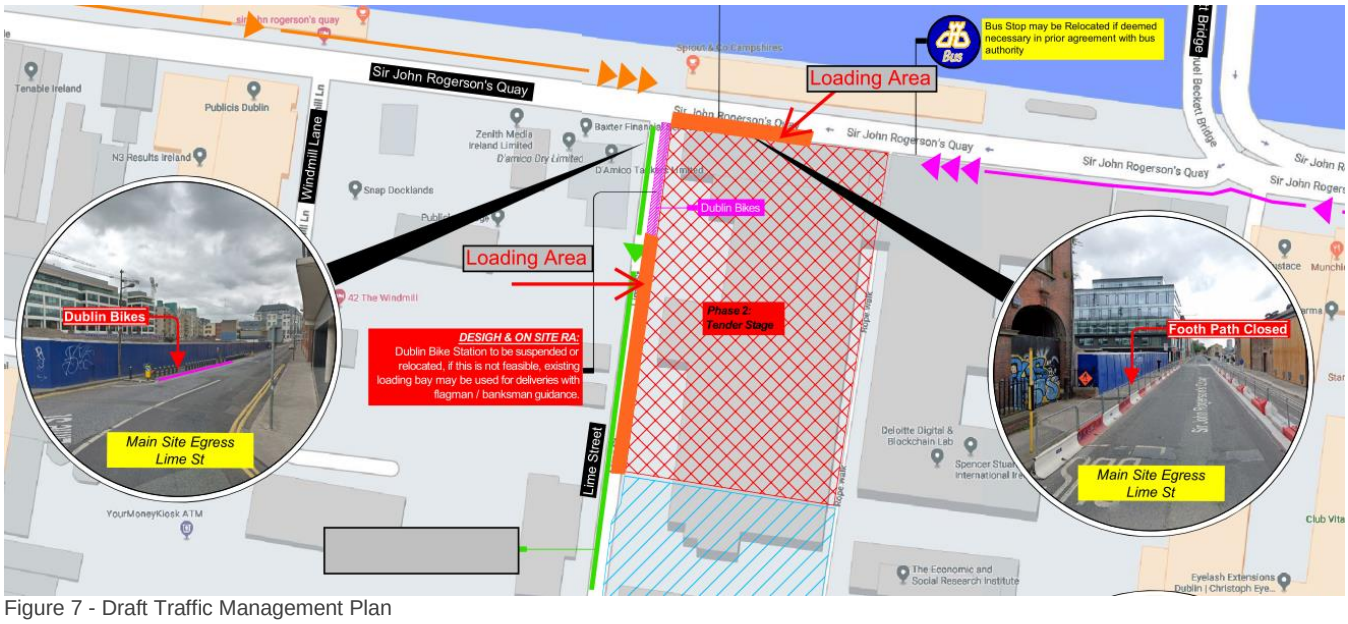

Figure 7 - Draft Traffic Management Plan

All deliveries will be controlled and managed to minimise disruption and inconvenience to local residents, general public and businesses in the area. BAM’s Logistics Manager will coordinate deliveries. Delivery vehicles during construction works will access the site via Lime Street where BAM propose setting up a loading/offloading area. Deliveries will be reviewed and scheduled to eliminate continuous deliveries and delivery times will be carefully considered to avoid significant traffic issues at peak traffic times.

Deliveries for the internal finishes will be closely coordinated and a material will be delivered to site ‘Just in Time’ and storage of materials on site will be kept to a minimum.

Housekeeping and the correct storage of material will be key to maintain a safe and productive site. BAM will insist on a ‘Clean as you go’ policy for all workers and Subcontractors on site. Waste material will be removed from each floor via the loading areas (Cantidecks) and will be transported to the appropriate skips using the tower cranes.

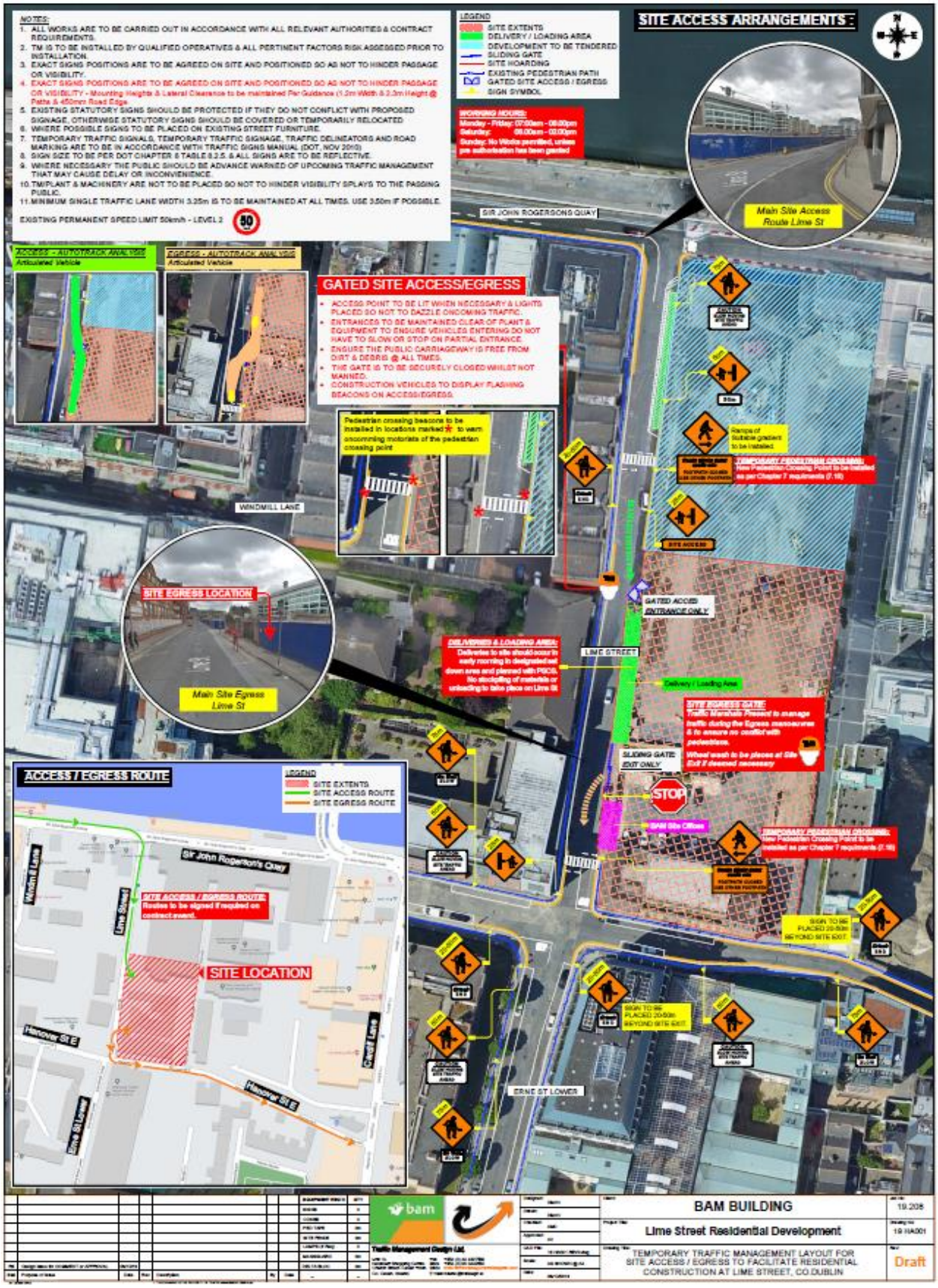

Figure 8 - Site Logistic Plan

2.6 Stakeholder Management including all relevant authorities within the jurisdiction of the project

Key Issues

We have identified the following as being the key elements for the Lime Street Project:

Traffic Movement Minimisation – even though there is a certain amount of space available on this site for laydown and storage of long lead items we will be using the following techniques to minimise traffic movements. On-site re-use and recycling, planned, just in time deliveries, prefabrication, reducing the quantities and frequency of deliveries. We will endeavor to schedule the majority of our deliveries outside of rush hour. All suppliers and subcontractors will be notified of this and no vehicles will be allowed to queue on the public road to enter the site.

Gate Marshals – monitoring traffic movements on and off-site and for ensuring safety and security. The gate marshal will ensure that no vehicles are allowed to queue on Lime Street.

Strict Highway and Haul Road Management – including dampening down to reduce dust during dry periods and wheel washes to keep roads clean. Segregated point of access and egress to site.

Neighbourhood Liaison and Communication – initial and regular briefings, noisy activity warnings and feedback sessions. Single point of contact for stakeholders and neighbours.

Community Relations Liaison

Upon receiving the Tender Documentation, it quickly became apparent to us that the Project Site is located within a heavily condensed Residential Area. This was confirmed when we conducted a site visit. Therefore, we recognise that from day one we need to establish open, communicative relations with the neighbouring properties and residents. We also have to communicate to the whole workforce that they need to be respectful of the area and not to be parking outside people's houses or blocking access roads. This we recognise will be a Key Critical Success Factor for the delivery of the project. The entire BAM team involved in the construction phase of the Lime Street Project will have direct responsibility for fostering excellent public / community relations among neighbouring residents and business groups.

In addition, we will appoint a Community Liaison Officer (CLO) directly to the Project. Garry Keegan has been specifically identified to take on this role. Cyril will be primarily responsible for instilling among all those involved in the project, from the workforce to senior BAM site management, the need for considerate and respectful attitude towards the public and local residents.

Garry is an experienced professional with many years' experience managing relationships with a wide variety of external parties and stakeholders on complex projects. He will be the main conduit for the receipt, processing and reporting of comments / issues and will be the main point of contact for the local residents.

Introductory Community Meeting

BAM will schedule a local community introductory meeting in a suitable local venue. Here we will present an overview of the development, our methodology and timeline for construction and to introduce key members of our team so that there is a face to BAM and who we are almost immediately. We will communicate ways that local residents can contact us during the project so that they can bring any concerns or issues to our attention. More importantly though, at this event, it is an opportunity for our Project Team to listen to and understand local residents concerns they may already have so that we may address them that evening or arrange to meet them again in the near future. At all times we need to ensure that the information we provide is concise, consistent and not contradictory.

Communication With BAM

We recognise that not all the local residents will be able to attend the Introductory Community Meeting and that regular two-way communication throughout the lifecycle of the project is key. Therefore, the general public and local residents will have the opportunity to raise observations, queries and complaints with BAM in the following formats:

Telephone / Help-line: a 24 / 7 telephone number will be made available for all general public enquiries and widely publicised on the site noticeboard on the site hoardings and in all general mail drops. All telephone enquiries will be received and logged by our Community Liaison Officer Garry Keegan. All queries and complaints will be responded to either via a written response or a follow-up telephone call.

E-mail: Similar to telephone enquiries, the general public will have the opportunity to make contact with BAM via e-mail with the contact address being made available in the same manner as the telephone help-line number detailed above. All e-mail enquiries will be registered and passed to the Community Liaison Officer Garry Keegan.

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3. All communications to BAM will receive a response by us within a period of 24 hours. BAM recognises that a delay or failure to respond is a significant contributor to the escalation of issues and the frustration of the local residents.

2.7 Basement Construction

As described in the introduction BAM propose completing the basement structure as In-situ concrete as shown in the contract documents. The secant piled wall, dewatering set up and bulk dig will be completed before BAM starting on site. A temporary access ramp is to be in place. This will provide access for the piling rig, concrete and materials to construct the basement. BAM have broken the basement into 4 Zones with a view to starting the piling of the foundation to the lift and stair 1 at gridline 3-5/E-C. As the piling progresses BAM propose to excavate and construct the lift pit base and rising walls.

On completion of the majority of the piling and groundworks, we will progress with the breaking down of the pile heads and the prepping of the RC Pads and stair core base. Once the pads are poured the area will be backfilled, drainage completed, and ground prepped for the RC slab. Rising elements will progress in the 1st zones straight after the Slab pour and this sequence will be repeated for all zones.

2.8 Innovative Methods for Co-Ordination and constructing the works

BAM is familiar with the services provided by Zutec and a comfortable with using Zutecs' Common Data Environment for:

- Drawing Revision Control
- Supply Chain Collaboration (Document Sharing)
- Document Management
- RFI Management
- Technical Submittals
- Comprehensive Auditing Capability.

BIM 360 Field

BIM 360 Field is a digital database which allows users to create checklists and carry out audits using an iPad or tablet.

BIM 360 Field will be utilised by BAM throughout the project to collate an Asset Register for BAM and the HSE codes will be attached to items of plant etc. as they are installed registering what they are to where they are within the building. Every document related to that item is uploaded to 360 Field.

BIM 360 Field will also be used to manage the commissioning certificates by tagging them to the specific piece of equipment / systems they relate to. To support the commissioning certificate, all field data / relevant information applicable to the testing of the equipment / systems will be recorded and will sit within a folder structure suitable to form part of the O&M.

In BAM we use BIM 360 Field for onsite auditing and inspections. Our quality and safety management systems, which BAM is currently implementing on sites are embedded within BIM 360 Field. On site, the inspector can open a checklist for example the Wall Closure checklist and carry out the inspection. The checklist is completed in the same manner as a paper copy. Images of the wall closure can be added to the checklist. Once complete, the checklist is uploaded to the cloud it can be accessed from any desktop/tablet or users that have access rights.

2.9 Proposed approach to execute the delivery and construction of the concrete frame, including any innovative methods that can deliver efficiency in the construction programme

As mentioned in the introduction BAM propose using precast rising elements and In-situ slabs.
The precast solution not only reduces programme duration it also dramatically reduces the labour and storage needed on site, to execute the construction and gives more programme certainty in that the build on site will be more efficient. It is well documented that there is a skilled labour shortage within Ireland at present.

We have reviewed the drawings and tender documents in detail and believe that a precast wall and Insitu slab is the best construction method for this project

Figure 9 - Precast Rising elements with In-situ Slabs

Figure 10 - Precast wall and In-situ Slab

2.10 Health & Safety Management

Health & Safety Overview

"Everybody Home Safe Every Day"

This is our message to all who work for us and with us. Safety is unconditional. It comes before programme or profit. After a hard day's work, we all want to return home safely again. Get up healthy the next day and start a new working day. A safe working day. Safety is something we work on together. That's why we make all our employees aware of their responsibility. Not just the 20,000 people on BAM's payroll, but also all our partners, suppliers and the clients we work with daily. We take responsibility for ourselves, for each other and towards society at large. On site, on the road and at the office.

Health and Safety and role as PSCS

Before the project commences a "Project Health and Safety" pre-start Meeting is held between the project management team and the company Health, Safety, Environmental and Sustainability (HSES) Manager. The "Project Health and Safety" Plan is then developed. Information is gathered from other stakeholders on the project ie the Preliminary Safety and Health Plan. The risk register for the project is also developed at this meeting. The Safety and Health Plan will be issued to the Employer for approval before any construction work starting on site. The Health and Safety Plan will be updated throughout the currency of the works and will be available on site for inspection by the PSDP and designers. The Chief Executive Officer (CEO) appoints in writing the Health and Safety Co-Ordinator (HSC), Construction Director and the Site Safety Manager (SSM).

Upon appointment, written confirmation of acceptance of the role of PSCS and details of the competent person responsible for PSCS will be issued to the Employer for approval.

As PSCS on the Lime Street Project BAMs duties will include the following:

- Development and update to Safety and Health Plan
- Co-ordination of the implementation during construction of the General Principles of Prevention as laid down in schedule 3 of the Safety and Welfare at Work Act 2005 when (1) deciding technical or organisational aspects (2) estimating the time required for completing the work or work stages;
- Co-ordinating the activities of all contractors (included specialist domestic Subcontractors) throughout the duration of the construction period of the project
- Preventing Unauthorised Persons Accessing the Construction Sites
- Coordinate arrangements for the provision and maintenance of the site welfare facilities
- Keep a CSCS and Safe Pass log of everyone working on the site. This must be kept for 5 years
- Appointment of Safety Advisor. When there are more than 100 persons on site at any one time a full time Safety Advisor is to be appointed in writing
- Arrange meetings or discussions between the different contractors working on a project, designers or other relevant persons to aid the co-ordination of the design process
- Issue AF2 notify to the H.S.A
- Facilitate putting a Site Safety Representative in place
- Arrange fortnightly PSCS/PSDP and design team Co-ordination meetings.

BAM will convene a pre-commencement launch meeting, immediately after contract award, which will be attended by all key project stakeholders supporting the project, including relevant decision-makers, client team members and the BAM Building project team.

The intention of the pre-commencement meeting will be to communicate to the integrated project team a clear understanding of the following:

- How BAM will manage the Lime Street project in an organized and controlled manner with clear and defined emphasis on Health and Safety for all parties working on site and those that interface with the site in various ways, eg deliveries
- An explanation of all procedures and documents that BAM proposes to use, in conjunction with Employer's requirements and best practice to maintain Health and Safety at a standard of excellence
- An explanation of our procedures *'on the ground'*, which will monitor and control site activities from a Health and Safety point of view, on a day to day basis
- A review of BAM documents including a detailed Risk Register, and agreement on continued management of a Risk Management Plan
- Communications and reporting mechanisms from the site team to the Client including regular communiques, meetings and method statement sign off, in line with the tender documentation
- Health and safety expectations including a review of the preliminary health and safety plan.

Safety Management System (SMS)

BAMs SMS is accredited to OSHAS 18001:2007. In 2019 we are being audited against the ISO EN 45001:2018 standard and anticipate accreditation to this standard. The SMS is designed to avoid accidents and to limit losses in a pro-active manner. The SMS is set out in the Safety Management Manual and includes both corporate and project operational procedures. The corporate section describes the corporate specific management procedures. The project section describes the safety management system operating on company projects. The SMS on our projects is audited internally by our Quality Manager, Brian Quinlan. Performance is communicated at Quarterly Safety Meetings (QSM's). The SMS is also audited annually by means of the Safety Behavioural Audit (SBA) which is carried out by the Safety Manager of one of the Royal BAM Group operating companies. A physical conditions audit is completed by the HSES Manager each quarter and as required to support the site team with their duties throughout the Project works.

Behavioural Safety Programme

Our behavioural safety programme which we implement on all BAM projects has been developed over the last eight years. It is a blend of applied behavioural science and project management skills. The aim is to improve safety performance on the project as well as delivering more robust adherence to our 'Your Safety is My Safety' programme. It is based on the concept of collective responsibility through the principles of behavioural science. The programme comprises of two phases. The first phase involves the delivery of workshops to all staff, supervisors and operatives who will be on site for more than three weeks. The programme focuses on supervisors and they are required to attend a supervisor specific induction within one week of arrival on site. This induction will be led by Site Manager, Bernard Fogarty and delivered to all direct project staff by Construction Director Ger Maloney. Subcontractor supervisors are also required to attend these supervisor inductions.

2.11 Waste Management

Waste Management Set Up and General Procedures

BAM will provide a dedicated fenced off waste handling and segregation area within the site Compound. This will be in the central podium area which will be accessible by both tower cranes. Construction and demolition waste of the non-bulk type will be brought to the waste compound for sorting and segregation into designated skips for off-site recycling or disposal. Skips / bins shall be distributed around the site for the collection of rubbish and non-bulk type waste, for transfer to the waste compound. A separate skip holding area shall also be established adjacent the kitchen / canteen. A covered miniskip / bin will be provided for all food wastes and emptied daily. Miniskips shall also be provided in the vicinity of the offices for office wastes.

The Site Foreman will:

- Oversee all waste handling operations
- Ensure the compound is kept tidy and in good appearance at all times, and
- Order and change skips as required.

The waste compound and other waste areas will be large enough to ensure safe delivery and collection of skips and waste containers. Each waste skip and bin will be clearly labelled as to the type of waste contained.

Recycling/Waste Management Goal

The recycling / waste management goal for the project is to manage all waste in accordance with the relevant statutory provisions and the waste hierarchy and to conduct all activities to:

- Minimize the generation of waste materials
- Maximize the reuse of materials on site
- Maximize the recycling of all recyclable wastes, and
- Minimize the volume of waste sent to landfill.

Waste and Recycling Targets

- 100% recycling of surplus reinforcement where possible
- Reuse of all earthworks materials on site – Zero export where possible (excluding contaminated materials)
- No contamination of skips – No additional costs due to inappropriate materials being placed in skips designated for particular waste streams.

Strategy to Achieve the Goal

Generally, the waste management goal shall be achieved through the implementation of several guiding principles in accordance with the waste hierarchy, namely:

- Giving preference to the purchase of materials with minimum packaging
- Storing materials in designated areas and separate from wastes to minimise damage
- Returning packaging to the producer where possible
- Maximising the reuse of soils and rock on site during the construction of the project
- Segregating construction and demolition wastes into reusable, recyclable and non-recyclable materials

- Reusing and recycling materials on site during construction where practicable
- Recycling other recyclable materials through appropriately permitted / licensed contractors and facilities, and
- Disposing of non-recyclable wastes to licensed landfills.

The waste management goal and guiding principles shall be given effect through the implementation of this waste management plan and appropriate procedures contained in the Environmental Procedures Manual.

Figure 11 - Chemical Store and Spill Kit

Waste License / Permit Requirements

The following statutory restrictions apply with regard to the collection and treatment of waste in Ireland and shall be complied with during all operations:

- All types of waste may only be collected and transported from site by a contractor who holds a Waste Collection Permit for the type of waste being collected, in accordance with the Waste Management (Collection Permit) (amend) Regulations 2008 – note that a Collection Permit is required for the County in which the waste is collected and every county through which the waste may be transported. However, the new 2008 Regulations have introduced a 'multi-region' waste collection permit which enables the transport of waste through many Counties on the same WCP. The Waste Company would have to apply for this multi-region permit from a specific Local Authority or may continue using the previous method. These new Regulations revoke all other Collection Permit Regulations
- Waste shall only be disposed of or recovered at a site which holds a Permit under the Waste Management (Facility, Permit and Registration) (amend) Regulations 2008. These new Regulations revoke all other Licensing Regulations
- Waste Management (Collection Permit) (amend) Regulations 2008 state we must obtain a copy of the 'end disposal site' Licence or Permit for the waste we are disposing of
- Copies of all relevant licenses and permits shall be kept on site and attached to this plan in Appendix 2

- Hazardous waste removed from site must be accompanied by a waste transfer form (WTF) in accordance with the European Communities (Shipments of Hazardous Waste Exclusively within Ireland) Regulations 2011 S.I. No. 324 of 2011
- The waste contractor will usually complete the form, which is issued by Dublin City Council.

Hazardous Wastes Management

Hazardous wastes pose a risk to the health and safety of personnel as well as the environment. The Site Safety, Health & Environmental Officer should be notified of any hazardous waste or suspected hazardous waste and consulted for assistance with handling procedures.

2.12 Temporary Works

From the outset of the project BAM will appoint a Temporary Works Coordinator, Bernard Fogarty. Bernard will coordinate and appoint Temporary Works Designer(s) to complete any Temporary works for the project.

The primary temporary works for this project are as follows:

- Hoarding
- Any temporary stairs of platforms associated with the site office set up
- Any traffic management required
- Retention of soil during pile cap and ground beam excavations
- Lifting of prefabricated rebar cages
- Falsework to floor slabs
- Propping to upper floors
- Falsework columns lift and stair-core walls. (Basement)
- Propping of Precast walls and slabs
- Mastclimbers
- Hoists
- Cantidecks
- Handrails to all leading edges
- Any off standard scaffold details.

2.13 Quality Control

Overview

BAM's Quality Management system is certified to ISO 9001 :2015. We successfully achieved certification renewal in April 2019 following a series of audits from the NSAI. Our Management System outlines the procedures to be followed to ensure successful delivery of construction projects in line with the project specifications. To implement our Quality Management System on site, a Construction Quality Management Plan will be developed for the Lime Street Project.

The Construction Quality Management Plan provides details of our Inspection and Test Plans, specific procedures, methodologies and resources, which will be implemented to deliver the required standards for each element of the works. These procedures will be developed in consultation with our Subcontractors, specialist Subcontractors, manufacturers, suppliers and the Assigned Certifier. The Inspection and Testing Plan will incorporate the Site Inspection Plan developed by the Assigned Certifier and will include provision for demonstrating compliance with the Works Requirements and Building Regulations.

Our Quality Manager, Brian Quinlan will be responsible for the implementation of our Quality Management Plan on site and ensuring high standards are achieved. Brian will develop the quality plan before commencement and issue as a draft for review to the client team. The Plan will remain a 'Live' document throughout the project to capture any changes, such as design, updated inspection plans, subcontractor list and details. To achieve high standards of Quality Assurance we believe that selection of proven Subcontractors is key to delivering high quality. A detailed analysis of the proposed contractors carrying out the work is required prior to appointment. This is centrally managed by BAM's Procurement Department, which tracks and documents subcontractor performance and data on a continuous basis. Assessment criteria include the following; Quality of safety documentation, on-site safety performance and statistics, performance on programme, financial soundness, quality of finished work, percentage of re-work required, period for close-out of snags, knowledge of, and history on the project site.

In BAM we use BIM 360 Field for onsite auditing and inspections. BIM 360 Field is a digital database which allows users to create checklists and carry out audits using an iPad or tablet. Our quality and safety management systems, which BAM is currently implementing on sites are embedded within BIM 360 Field. On site, the inspector can open a checklist for example the Wall Closure checklist and carry out the inspection. The checklist is completed in the same manner as a paper copy. Images of the wall closure can be added to the checklist. Once complete, the checklist is uploaded to the cloud it can be accessed from any desktop/tablet or users that have access rights.

Technical Submissions

BAM propose using a Common Data Environment (Zutec) so that it is accessible by the Design Team and Assigned Certifier throughout the project. Our Common Data Environment complies with ISO 19650 Parts 1 and 2 which will provide an efficient and lean technical Submittal process (see section 5.b for more details). A full submittal programme will be developed at the start of contract. Before issuing submittals to the client BAM will carry out a full technical review of products and drawings and will confirm specification compliance prior to issuing to the design team, the relevant team manager will review Submittals before them being issued

2.14 M&E Service Design Coordination

From the outset of the project BAM will appoint Mark McNally as Services Coordinator.

A detailed programme will be developed highlighting Specialist subcontractor information required and submittal dates. This will be tracked on a 'live' document and all information will be shared on Zutec for ease of approval. Fortnightly meetings will be arranged between all interested parties to review progress and highlight any programme slippages.

BAM will utilise digital technology throughout the project for co-ordination of all interfaces. The M&E specialist contractors will model/detail all services and Builder's Openings will be identified early for incorporation into the structure. BAM will hold co-ordination workshops with all relevant stakeholders and any clashes determined will be resolved during these workshops to ensure no hold ups or re-works on site. Clash detection will be undertaken and pre-information authorisation to ensure clash avoidance is being realised.

Commissioning

The soft landing of the Lime Street Project is directly related to the final validation and commissioning of the M&E services. We will therefore develop an extremely detailed programme to ensure the adequate time is allocated to each activity and each system. The commissioning will include a series of both off-site and on-site activities, inspections and tests and witnessing points, designed to ensure that the entire facility is fully functional at handover.

The Commissioning Team will influence the activities of all parties in order to make the building operate successfully by:

- Checking drawings for commission ability
- Preparing coordinated Commissioning Programmes and logic networks -M&E&FP – all disciplines
- Monitor the installations during construction
- Preparing system walkdowns
- Ensuring compliance with CSDs – Construction System Dossiers
- Auditing Contractors to ensure CSDs quality
- Organising/chairing meetings in respect to commissioning
- Conducting building fabric surveys
- Ensuring the system start up procedures are adhered to
- Pre-commissioning and commissioning witnessing and management
- Co-ordination and management of performance testing
- Collation of all commissioning and test results
- Co-ordination and facilitating client tuition
- Approving and commenting upon Protocols before client issue
- Auditing the O&M's regularly throughout the project
- Provide Client assistance during the final milestones of the project. Communication is key at this stage.

A dedicated M&E commissioning schedule for each system will be produced. This schedule will integrate with the overall construction programme and trigger when systems become available. It will also flag the importance of certain critical paths to the construction team such as power and water-on dates. Test certification dates and consultant witnessing dates will also be incorporated.
Equally, fit-out dates will be linked to the construction programme ie the Comms Room fit out will not commence until the building works is complete and rooms are clean. The commissioning programme will be a key focus for our M&E manager and coordinators.

The project milestones will be visible to all contractors to avoid any communication issues. This M&E commissioning schedule will be resource loaded and any float recognised by all parties. It will be the backbone of the project and all our M&E construction management and commissioning management will be aligned during its production and implementation.

Pre and final commissioning meetings will be organised with the M&E consultants, Employers Representative and M&E contractors. This will ensure that all systems are commissioned properly and to the correct specification. The schedule to reach each commissioning milestone will be reviewed at each meeting.

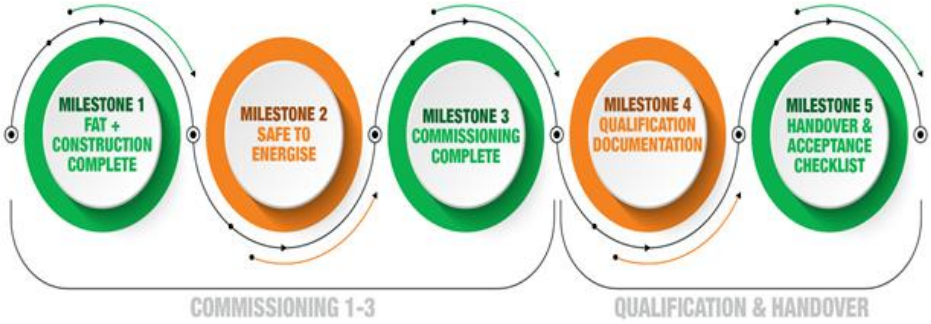

Figure 12 - The five milestones of commissioning and handover to achieve a soft landing

System integration is possibly the most exciting part of any project. The project comes alive with communication between the systems but in a very controlled and systematic way. The BMS, Fire Alarm and Security systems are normally the first to be integrated and tested, followed closely by the HVAC systems. The cause and effect will have been tested on an independent level at the operational and functional testing stage, but this is where it all comes together, and the final coding is tested. System flow charts and communication through each stage of system integration is key.

Prior to handover the following will be achieved:

- All CAT 1 & 2 snags completed
- Endurance test successful
- Commissioning reports completed, checked and verified
- Proof that Milestones 1-4 are complete and included in test packs
- O&M's have been signed off by BAM, and forward for acceptance to client representative
- End User Training has been completed. (See section below)

Training

A full training session on all the systems including will be carried out with the client representatives, FM Team and BAM. The extent of demonstrations and training will be determined at the pre-commissioning meetings. These demonstrations will be carefully planned with a calendar date and time of each training session. It is important to note that client training will not be carried out unless the systems have been signed off.

These training events cover proper operation, maintenance, repair, and diagnosis of the systems, equipment and components installed by the Contractor. We will also record all demonstrations completed and upload to the Digital Project Safety File. This ensures that re-training can be carried out on the systems operation as required, post-handover.

Many of the documents created and gathered throughout the 5-step process will be used in training. Training will be conducted both on site and in a meeting room setting as suits the subject matter.

All training sessions will start and end in a meeting room setting. A virtual system walkdown will be carried out via the BIM model before walking down systems on site. All training will include the correct documentation that will be handed out to all attendees as well as electronically in the training plan. The lead commissioning engineer for the particular systems will allocate specific days for these activities.

2.15 Façade Management and Coordination

Structure façade and Building Envelope

Delivering a quality structure and building envelope starts with the selection of quality materials and details. BAM has a dedicated team who will be responsible for ensuring that the entire structure and envelope is constructed in accordance with all the relevant specifications, drawings and approved material submittals.

Detailed and frequent inspections of concrete works will ensure that the rising structural elements are set out correctly, vertical and plum. The concrete elements will be inspected before pouring and post pour using our pre and post pour inspection sheets. Concrete cubes will be taken to verify structural strength and records of concrete deliveries and cube results will be maintained in our concrete register. Our team will carry out any other testing required under BC(A)R or noted on the Inspection Notification Frame (INF).

We will issue a fortnightly lookahead to the Structural Engineer and the Assigned certifier to give adequate notice of pours to allow the client team witness pours if so desired. As detailed previously we will use BIM 360 Field to carry out inspections.

A similar approach will be taken for the building envelope. Intensive initial workshops to ensure details are robust and buildable will be required at a very early stage of the Project. Our Façade Coordinator will be responsible for coordinating all the relevant interfaces on the Building envelope. Our Façade Coordinator will hold Weekly coordination meetings with all envelope stakeholders to include, but not limited to: Glazing contractor, Air tightness contractor, Roofing contractor, Architect and Structural engineer. Sequencing of the cladding and glazing will be coordinated. The sequence will match the construction of the rising concrete elements with the goal to achieve early weathering.