

PARTX /
DCC PLAN 0017/17
COMP. REC. 17/10/18

BAM Building Ltd

New Children's Hospital -
Main Contract Phase A



Submission 002 Rev 04

Construction Management Plan - PHASE A

Live Working Document Amended As Works Progress



BAM Building Ltd

October 2018

SUBMISSION	REV.	STATUS	PREPARED BY	CHECKED BY	DATE
01	01	FOR REVIEW	S Hackett	D Devane	08/06/2017
01	02	FOR REVIEW	S Hackett	D Devane	28/06/2017
01	03	FOR SUBMISSION	Jim Dillon / Yvonne Brophy	Denis McCarthy	04/07/17
02	04	FOR SUBMISSION	Ron Wunderlich	Howard McDonagh	15/10/2018

CONTENTS

1.0 EXECUTIVE SUMMARY

2.0 INTRODUCTION

- 2.1 Project Setting
- 2.2 Description of Proposed Development
- 2.3 National Children's Hospital at St. James's Hospital
- 2.4 Contract Phasing
 - 2.4.1 Enabling Works
 - 2.4.2 Main Contract
 - 2.4.2.1 Phase A
 - 2.4.2.2 Phase B

~~PART X~~
DCC PLAN 0017/17
COMP. REC. 17/10/18

3.0 CONSTRUCTION MANAGEMENT

- 3.1 Introduction
- 3.2 Sequencing of Project
- 3.3 Site Management
 - 3.3.1 Health & Safety**
 - 3.3.1.1 Management to Lead
 - 3.3.1.2 Management Participation
 - 3.3.1.3 Lead by Example
 - 3.3.1.4 Safety & Health Plan
 - 3.3.2 Hoarding & Site Security**
 - 3.3.3 Site Compound**
 - 3.3.4 Site Access & Egress**
 - 3.3.5 Central Access Road Realignment**
 - 3.3.6 Deliveries to Site**
 - 3.3.7 Storage of Materials on Site (including harmful materials)**
 - 3.3.8 Removal of Materials from Site**
 - 3.3.9 Cranage**
 - 3.3.10 Water Supply**
 - 3.3.11 Groundwater Control**
 - 3.3.12 Hours of Work**
 - 3.3.13 Public Relations / Community Liaison**
 - 3.3.14 Environmental Management**
 - 3.3.15 Dust Control & Monitoring**
 - 3.3.16 Noise & Vibration Control & Monitoring**
 - 3.3.17 Vermin Control**
 - 3.3.18 Condition Surveys**
 - 3.3.18.1 Pre / Post Condition Surveys
 - 3.3.18.2 Structural Monitoring
 - 3.3.19 Quality Control**
 - 3.3.20 Document Control**
 - 3.3.21 Technical Submittals**
 - 3.3.21.1 Method Statements
 - 3.3.21.2 Material Approval Requests (MARs)

- 3.3.21.3 Contractor Submittals
- 3.3.22 Notice of Inspections - INF & BC(A)R**
- 3.3.23 Design Requirements**
- 3.3.24 Archaeology**
 - 3.3.24.1 Archaeological Requirements
 - 3.3.24.2 Archaeological Findings
 - 3.3.24.3 Reports
 - 3.3.24.4 Archiving
- 3.4 Waste Management**
 - 3.4.1 Introduction**
 - 3.4.2 Waste Management of Demolitions**
 - 3.4.3 Waste Management of Excavations**
 - 3.4.4 Main Construction Works**
- 3.5 Construction Traffic Management**
 - 3.5.1 Introduction**
 - 3.5.2 Traffic Management Proposals Phase A**
 - 3.5.2.1 Construction Access to the Site
 - 3.5.2.2 New Access to Mount Brown
 - 3.5.2.3 Traffic Management Through the Campus
 - 3.5.2.3.1 Current Arrangement
 - 3.5.2.3.2 From Month 9 (via the Temporary Central Access Road)
 - 3.5.2.3.3 From Month 18 (via the Permanent Northern Access Road)
 - 3.5.2.4 Construction Routes from the M50
 - 3.5.3 Traffic Management Plan**
 - 3.5.3.1 Introduction
 - 3.5.3.2 Contents of Traffic Management Plan
 - 3.5.4 Construction Vehicle Generation**
 - 3.5.4.1 Introduction
 - 3.5.4.2 Initial Phase (Months 1 – 6)
 - 3.5.4.3 Main Construction Phase (Months 7 – 15)
 - 3.5.5 Davitt Road Staging Area**
 - 3.5.6 Measures to Minimise Impact of Construction Traffic Generated by the Works**
 - 3.5.7 Mobility Management Plan**
 - 3.5.7.1 Pedestrian Access During the Works, including Wayfinding Strategy on Campus
 - 3.5.7.2 Car Park Management During the Works
 - 3.5.7.3 Registration of Contractors' Vehicles and Drivers with SJH
- 4.0 ENABLING WORKS**
 - 4.1 Introduction**
 - 4.2 Demolition**
 - 4.2.1 Building Demolition
 - 4.2.2 Demolition – Other Works
 - 4.3 Utility Diversions**
 - 4.4 Utility Tunnel**

4.5 Drimnagh Sewer

5.0 BASEMENT WORKS

5.1 Introduction

5.2 Site Set-up

5.3 Secant Pile Wall & Excavations

5.3.1 Secant Pile Walls – Waterproofing Requirements

5.3.2 Testing Requirements of Piles

5.3.3 Excavations

5.4 Below Ground Services

5.5 Basement Structure

5.5.1 Level B3

5.5.2 Level B2

5.5.3 Level B1

5.5.4 Level LG

5.5.5 Level 00

5.6 Waterproofing

5.6.1 Waterproofing System Requirements

5.7 Concrete Placement

5.7.1 Crack Control & Constraint

5.7.2 Concrete Finishes

5.7.3 Precamber

5.8 Frame

5.8.1 Structural Steelwork

5.8.2 Steelwork Contractor

Appendix A – Construction Stage Safety and Health Plan *(to be issued under separate cover)*

Appendix B – Environmental Management Plan *(included)*

Appendix C – Waste Management Plan *(included)*

Appendix D – Dust Minimisation Plan *(included)*

Appendix E – Noise & Vibration Monitoring Plan *(included)*

Appendix F – Vermin Control Plan *(included)*

Appendix G – Contractor's Mobility Management Plan *(included)*

Appendix H – Traffic Management Plans *(included)*

Appendix I – Central Access Road Layout *(included)*

Appendix J – Phase A 8 Month Programme *(included)*

Appendix K – Surveying & Movement Monitoring Plan *(included)*

1.0 EXECUTIVE SUMMARY

BAM Building Limited have been appointed Main Contractor for the construction of the National Paediatric Hospital Project at St James's Hospital Campus, Dublin 8.

BAM have prepared this Construction Management Plan (CMP) and the construction methodologies set out within to demonstrate how works on the Hospital Campus and surrounding environment will be delivered for the Main Contract Phase A in a logical, sensible and safe sequence with the incorporation of specific measures to mitigate the potential impact(s) on people, property and the environment.

Chief among the challenges of the project is the introduction of construction activities, significant in scale and volume, on the operational adult acute hospital campus, adjoining sensitive Residential Properties, Luas Redline Tramline, Linear Park, South Circular Road and other public roads and areas.

A construction project of this scale, while planned to be as least disruptive as possible, can introduce a degree of concern and inconvenience for impacted surrounding/adjoining residents members of the public that use St. James's Hospital and hospital staff. BAM is committed to the success of the project and will establish the communications and resident/public engagement processes that will assist in bringing the main contract to fruition successfully in a harmonious manner. Stakeholder involvement from an early stage with a priority given to addressing issues raised will be an abiding principle throughout the course of this project. BAM are committed to limiting the effect of interruption caused by the works relating to traffic access/egress coupled with control measures to mitigate against and reduce levels of dust, noise and vibration.

This document sets out the strategies and control measures BAM commit to implement to service the works with respect to personnel, materials, accommodation and welfare facilities, removal of waste, movement of materials and personnel, security considerations and programme & logistics challenges for the scheme, whilst being mindful of the operational constraints within and around the site environs.

2.0 INTRODUCTION

The proposed National Paediatric Hospital development at St. James's Hospital Campus consists of 3 main buildings, namely:

- A 473 bed new children's hospital;
- A Children's Research and Innovation Centre;
- A 53 Bed Family Accommodation Unit.

2.1 PROJECT SETTING

Location - The project is to be located within the existing St. James's Hospital campus site boundaries;

Adjoining Owners – The site is in a busy city centre location and contains a number of adjoining residential and sensitive properties. The proximity of adjacent property owners presents a physical constraint which will require careful attention and management by BAM at all times;

Site Specific Constraints – The existing site has specific constraints relating to traffic management, existing services, ground conditions, construction methods to be used, materials, etc. Two key services constraints specifically highlighted are the location of the existing Drimnagh Sewer and the existing utility services tunnel;

St. James Hospital – The existing St James's Hospital will remain "live" and fully operational during the construction period. Maintaining safe pedestrian, vehicular and blue-light access to the campus is an absolute priority.

The total site area on the St. James Hospital campus is 19.48 hectares, of which an area of 4.85 hectares is proposed for the siting of the NCH.

2.2 DESCRIPTION OF PROPOSED DEVELOPMENT

The overall scope of the proposed development on the St James's campus comprises:

- The demolition of all buildings on the site of the new children's hospital and the proposed Children's Research and Innovation Centre (CRIC);
- A new children's hospital building;
- A two-storey underground car park and shared facilities management hub below the new children's Hospital;
- A Children's Research and Innovation Centre at James's Street;
- A 53 no. bed Family Accommodation Unit (FAU) at the entrance to the new children's hospital;
- Public realm improvements to the existing St James's campus spine road, the linear park at the Rialto Luas station and the public steps between Mount Brown and Cameron Square;
- Improvements to the road junction at the existing campus entrance on James's Street and a new campus entrance piazza from Brookfield Road / South Circular Road;
- A new energy centre for the new children's hospital and a new shared flue stack for the campus;
- A range of infrastructure works, including the diversion of the existing Drimnagh Sewer and revised boundary treatments.

2.3 NEW CHILDREN'S HOSPITAL AT ST. JAMES'S HOSPITAL

The new children's hospital will be a world-class facility providing secondary paediatric services for the greater Dublin area and specialist services for the country as a whole. It will be an academic health

sciences hospital that values world-class research, education and innovation, which in turn will drive excellence in clinical care.

The hospital will:

- Provide 380 in-patient beds including 60 critical care beds, all in single en-suite rooms;
- Provide 93 day care beds, 18 theatres, including three hybrid theatres to facilitate access to imaging during surgery;
- Provide outpatient consulting examination rooms ;
- Provide an Emergency Department and urgent care facilities;
- Make safe existing services/utilities and demolition of existing St. James's Hospital buildings/facilities;
- Provide significant utilities and services diversions including Drimnagh Sewer & Services tunnel;
- Provide 1000 car parking spaces;
- Provide an Energy Centre within the basement.

The proposed development consists of a 7 storey structure over 2/3 below ground levels within a gross internal floor area of 118,113m² with an additional 32,000m² provided for underground parking, bringing the total floor area of the building to 150,113m². The building is primarily organised vertically in four clear zones.

1. Facilities management spaces and horizontal distribution together with plant rooms and two levels of car parking (Levels B1 & B2);
2. Outpatients and Diagnostic and Treatment areas (4 floors-Levels LG, 00, L01 & L02);
3. Interstitial floor, accommodating plant rooms and administration/non-clinical spaces (Level L03);
4. Wards (3 floors-Levels L04, L05 & L06.)

2.4 NCH CONTRACT PHASING

2.4.1 Enabling Works Contract

BAM Civil Limited are already on site having commenced works on the Enabling Works Contract in July 2016. The Enabling Works Contract comprises of all works to clear the site, including service diversions and demolition of buildings, with works due to be completed in August 2017.

The BAM Enabling Works team will work in harmony with BAM colleagues joining the New Children's Hospital project, providing for the assignment of the Enabling Works to the Main Contract. This arrangement provides for a seamless transfer of existing Client and stakeholder team relationships at a critical point in this project phase.

2.4.2 Main Contract

The Main Contract is subdivided into Phases A and B

2.4.2.1 Phase A

- This CMP covers the works to be constructed under Phase A of the Main Contract, with works to include piling, excavation, diversion of services and commencement of construction of the structure up to lower ground floor level. Phase A will now include making safe in the medium term the existing building on the site of the proposed CIRC building on James Street. All works associated with making the building safe will be conducted in accordance with this document.

Phase A has an anticipated start date of July 3rd 2017, and will continue for 18 to 24 months and is dependent on the commencement of Phase B works.

The Pre Phase B Construction Engagement Process will run concurrently with the first 9 months of Phase A to establish the Adjusted Contract Sum and a Guaranteed Maximum Price for the Project.

The extent of Phase A works for the first 8 months is set out in the Phase A Programme attached in Appendix J.

2.4.2.2 Phase B

Phase B works will include all other works required to complete a fully commissioned children's hospital.

Total duration of Phase A & Phase B is 50 months.

3.0 CONSTRUCTION MANAGEMENT

3.1 INTRODUCTION

The following sections set out and describe BAM's sequencing of the project together with discussion on site management issues and logistics requirements.

3.2 SEQUENCING OF PROJECT

The NCH Main Contract will be carried out sequentially in line with the overall programme, with Start and Completion dates in accordance with Clause G of the Schedule Part 1 of the Conditions of Contract and the Schedule to the Conditions of Contract. The programme will be updated on a monthly basis for inclusion within the monthly Progress Report.

The Integrated Programme provides the following deliverables:

1. Master and Milestone Programme (Level 1)
2. Summary Level (Level 2)
3. Detailed Project Programme (Level 3)
4. Critical Path(s) Filter Layout
5. Manpower Plan (programme needs to be man-hour loaded to achieve this)
6. Bulk Quantity S-Curves (for the physical progress measure)

BAM will develop a Level 3 Construction Programme as well as a Mobilisation Plan, a first 120 Day Schedule which is the Contractor's Work Plan for the first 120 days of the project. It will cover all aspects of the project including off site, on site, town-planning, detailed engineering and design, procurement, submittals, staffing plans, resource plans, equipment plans etc.

The Programme will be included as part of the Project Execution Plan which will be developed in September 2017.

The construction programme for the Phase A Early Works project is set out in Appendix J which covers construction activities for the first 8 months of the Main Contract works.

3.3 SITE MANAGEMENT

BAM are responsible for overall site management for the duration of the proposed works. Anticipated numbers of construction personnel on site for the Main Contract Phase A will remain below 150 until early 2018, at which time the workforce is expected to start to grow significantly. At peak in 2019, there will be between 1,000 and 1,200 construction personnel on site. With this in mind, BAM have prepared a mobility management plan and arranged compound accommodation and facilities to cater for these peak numbers.

CONSTRUCTION TEAM PHASE A:

Contract Director – Denis McCarthy

Construction Director – Howard McDonagh

Contracts Managers – Darren Devane / Aidan O'Connell

Commercial Manager – Pat Murphy / Seamus Kealy

Project Manager – Eoghan Brannigan

Site Agents – Padraic Brennan / Peter Martin

Site Foreman – Larry Martin

Quantity Surveyor – Brian Shanahan / Willet Ho

Section Engineer – Albert Traynor / Rafael Galan

Logistics Manager – Jack Curley

M&E Manager – Sinead Rogan

EDMS Manager – Greg Byrne

Safety Health & Environmental Advisor – Derek Sheehan / Heidi Murphy

MEP Coordinator – Matthew Byrne

Programme Manager – Paul O'Connor

Communications Liaison Coordinator – Garry Keegan / Chloe Hugh

Temporary Works Coordinator – Jim Dillon

Specialist Subcontractors – the specialist subcontractors shall include but may not be limited to the following:

Activity	Name
Noise & Vibration Monitoring Consultant	Murphy Surveys
Airborne dust monitoring	Environmental Efficiency
Asbestos Removal	Grove Environmental Limited
Archaeology	ASCU Limited
Condition Surveys	ABL Surveyors
Structural Monitoring of buildings	Murphy Surveys
Demolition	John Ryan Construction
Traffic Management	Total Highway Maintenance Limited
Utility Diversions	BAM Civil Limited
Mechanical Diversions	Jones Engineering (appointed subcontractors)
Electrical Diversions	Mercury Engineering (appointed subcontractors)
Hoarding	Clifton Scannell Emerson
Temporary Works	Byrne Looby / Clifton Scannell Emerson
Piling	PJ Edwards
Materials Testing	BHP Limited / Roadstone
Domestic Waste Removal	AES
Bulk Excavation	McGuire Haulage
Dewatering	BAM Civil
Classifying excavated material	Mulroy Environmental

The exact scope of the work of each of the above will be developed in detail within a specific Method Statement, which will include resources, programme, materials, plant/equipment, environmental management and safety criteria.

3.3.1 Health & Safety

BAM have a proven track of delivering projects in the Healthcare Sector with professionalism and to the highest of safety standards. We not only consider the safety of those working on our site, but the safety of all individuals that are, or could potentially be, effected by the works involved in the completion of the NCH. BAM along with the NPHDB are committed to supporting safe and healthy working conditions, equipment and systems of work for delivering the NPH project without risk. BAM have a primary responsibility to all people within the campus and all work will be planned in advance working in co-operation with the NPHDB. It is an important project goal that everyone on the associated sites goes home safely every day.

As the site is located on one of the busiest hospital campus in Dublin, the safe and uninterrupted work flow will not be compromised by construction works and BAM will have a Live dedicated access road throughout the project and will be adhering to the "Safeway, it's the only way" and "Contractor Safety Code" manuals .

Its basis is founded on communication and ensuring that all personnel know what to do, and not being afraid to stop, think and ask for help or direction.

BAM will also respect the Dublin 8 and SJH communities by giving consideration to works impact, prioritising courtesy, minimising the impact of deliveries and protecting and enhancing their environment.

To achieve such a culture and overcome the various challenges on the project, a number of key enablers have been identified that provide focus for all involved in the NPH project. These are referred to as as "*Five Safety Enablers*":

1. LEADERSHIP – Visible and Proactive;
2. EXPECTATION – Setting the Standard;
3. KNOWLEDGE – Educate and Train;
4. COMMUNICATION – Consistent Message of 'Care and Concern'; and
5. INCENTIVE – Acknowledge and Reward.

The "*Five Safety Enablers*" are incorporated into BAM's Beyond Zero Programme and the Project Safety Management system (PSMS) enhancing NPHDB Health, Safety and Wellbeing vision. "*Best person for the job*", "*Top Down*" and "*Win-Win*" approaches will also be demonstrated and reinforced at every level of management through to the workforce so that there is no doubt about the behaviour that is expected on the project. Each member of the BAM site management team has a role to play in the PSMS and everyone is given the information, instruction and training in their role – e.g. Temporary works coordinator, Lifting Operations Co-ordination, Sub-contractor owners etc. Before commencing on the NCH all operatives will have completed the BAM Online induction. This ensures that all persons have received a consistent message of the Safety requirement. The site specific induction will also be an introduction to the BAM Management team and will highlight the specific hazards and rules. This induction is currently being held in the BAM Site Office on Monday, Wednesdays and Fridays @ 8am but will be reviewed as the project progresses.

Project Safety Goals & Objectives

The following safety goals & objectives apply to the NPH project, these are:

- ❖ Supporting the NPHDB to secure their Health, Safety and Wellbeing Vision;

- ❖ Securing and maintaining a safe and healthy workplace for all;
- ❖ Securing everyone's safety and health by attaining to the highest level of health and safety performance, care of public safety, management of risks, positive embedded attitudes etc.;
- ❖ Aspergillus Control measures in place at all times.
- ❖ Operate a good neighbour programme: Respecting the Dublin 8 and SJH communities by giving consideration to works impact, prioritising courtesy, minimising the impact of deliveries
- ❖ Protecting and enhancing the environment – Zero Environmental Incidents
- ❖ Injury free workplace.
- ❖ Promote a positive safety culture and encourage all operatives to attend Beyond Zero either before or within 2 months of completing their Site specific induction.
- ❖ Close out any issues raised by site operatives in a swift manner.
- ❖ Good communication between site operatives and BAM Management at all times.
- ❖ Elimination of Construction Dust.
- ❖ Working Safety at Heights - 100% Fall Protection at all times.
- ❖ Protection of the public
- ❖ Hospital protocol procedures to be adhered too.

3.3.1.1 Management to Lead

All Director, Contracts Managers, Site safety Managers, Project Managers, Site Managers, General Foremen and all Site Management are to give the lead in all matters of Safety and Health and to stimulate a positive attitude on the part of all employees by stressing the need for care and safety. Management support for the Company Health and Safety Policy and subsidiary policies will be clearly demonstrable and visible to employees.

Everybody including workers and site supervisors are influenced more by what we do than what we say or write down. Senior management must lead by example at all times.

3.3.1.2 Management Participation

The Contracts Director Denis McCarthy who has responsibility for Safety, Health and Environmental issues, supports the Company Safety Health and Welfare Policy by a communication to all of employees at least quarterly. Denis will complete high visibility Safety, Health and Welfare tours every 6 months. This Safety, Health and Welfare Tour is a planned formal walk through the site, to visibly demonstrate support of the SMS. Senior Site Management (CM) will make a high visibility Safety, Health and Welfare tour on their sites every three months during which they see most of their employees and generally promote Safety & Health on site. A checklist derived from the site SH Plan and recent relevant incidents within the Company are used on this tour which is fully recorded. Managers from all levels participate in special Safety, Health and Welfare activities as the opportunity or need arises.

Site Management will encourage and involve employee participation in Safety, Health and Welfare matters e.g.

- Safe Work Plans.
- Involve some key experienced personnel and or Safety Representative in formulating safe solutions to special risk situations or recurring unsafe incidents.
- Involve some key experienced personnel (e.g. crane driver, section foreman) in accident /incident investigations and ask them to help for proposals to prevent recurrence.
- Get the Safety Representatives to accompany:- A General Foreman In an audit/ inspection of a site

3.3.1.3 Lead by Example

Correct on the Spot

It is the duty of the Director, Contracts Manager, EHS, and the General Foreman to see that their respective staff members correct unsafe situations practices and behaviour on the spot. Where members of site staff correct matters on the spot they are to be supported by their superiors and other members of staff.

Enforcement, Commendation and Discipline

Commendation is known to work better than discipline and is to be practiced at every available opportunity. All Company Management and Supervisors are to be involved. Enforcement of the safety rules on the site is essential. Discipline is to be used where persons persistently breach the safety rules. Where an employee's conduct, relating to safety or affecting other personnel's safety at work warrants disciplinary action, the following disciplinary procedure will apply, (except in cases of gross misconduct attracting summary dismissal).

Safety Disciplinary Report Card, First Offence: Verbal Warning/Yellow Card:

Initially the employee will be given a Verbal Warning (Yellow Card) by their supervisor. This should be recorded in the Safety Disciplinary Report Card Book as a First Offence / Verbal Yellow Card.

Safety Disciplinary Report Card, Second Offence: Written Warning (2nd Yellow Card)

In the event of a further breach the employee will be given a written warning. This should be recorded in the Safety Disciplinary Report Card Book as a Second Offence Written (Yellow Card), a copy of which must be sent to the Trade Union Representative as appropriate.

Safety Disciplinary Report Card, Third Offence: Suspension or Removal from site (Red card)

In the event of yet a further breach the employee will be given a Red Card, spelling out the consequences – including suspension or dismissal.

3.3.1.4 Safety and Health Plan

The NCH Safety and Health Plan will be the main tool for managing Safety and Health during the construction phase on site. It describes how Safety and Health will managed on the site and defines WHO and WHAT, WHEN and WHERE.

The Safety and Health Plan is a Live Document that has been populated from information contained within the preliminary Safety and Health plan and includes the following:

- Emergency Numbers
- NCH Project Site Organisation Team & Matrix of Duties
- NCH Project safety Policy & Objectives
- Overview of the NCH Project
- Main NCH hazards and risks including Sub-Contractors associated with the work on the site:
 1. Particular Risks (as per Schedule 1 of 2013 Regulations)

-
2. Generic Risks
 3. Job Specific Risk Assessments
 4. Occupation Health Hazards
 5. Contractors All Risk (CAR) Hazards
- Preventive measures to control those risks.
 - How they are to be managed and communicated.
 - How implementation is to be checked.
 - How contractors are coordinated.
 - How information and facilities are to be shared between contractors.
 - Site Safety Rules, Site Restrictions and Work Permits.
 - PPE Requirements for the site.
 - Emergency and evacuation plans including emergency drills.
 - Accident Reporting
 - Notifications to the HSA Authority: AF1 & AF2 Forms
 - Meeting Schedule i.e. Monthly PSDP/PSCS Co-Ordination Meeting / Joint Safety Committee (JSC) Meeting.
 - Traffic Management Plan
 - Scaffolding Plan
 - Lift Plan
 - Letters of Appointed Persons
 - A copy of the Preliminary H&S Plan
 - A Copy of the Environmental, Health & Safety Pre-Start meeting
 - Sub-Contractor Safety File Checklist.

NB: The above lists are no-exhaustive and will be extended as the works progress. All amendments will be recorded in the Safety & Health Plan which will be updated accordingly through the course of the works as per legislative requirements.

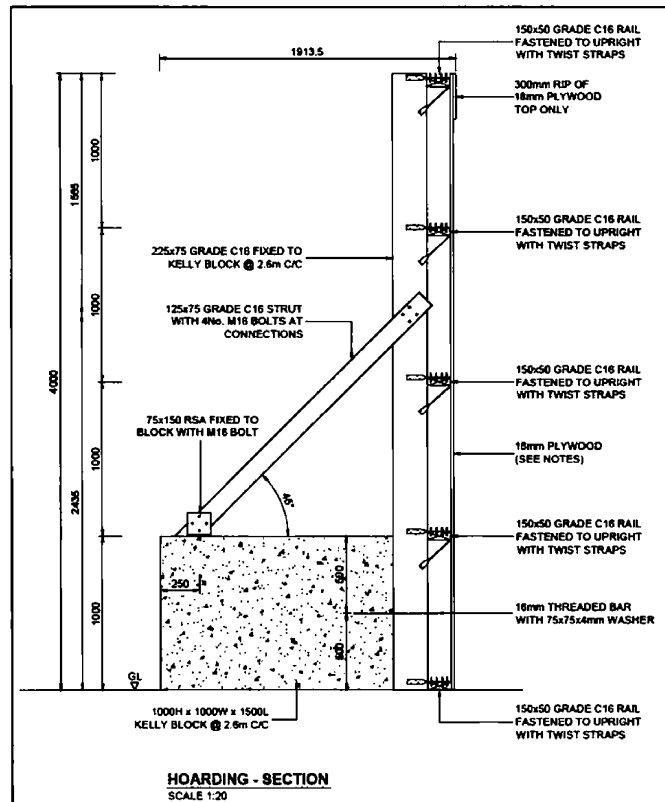
The 'Safety and Health Plan' includes means of communicating SHW needs with:

- The Client.
- P.S.D.P., P.S.C.S. (if relevant).
- Sub-contractors.
- Others affected by the works (other contractors, adjacent properties etc.).
- Stakeholders.

3.3.2 Hoarding & Site Security

As the location of the site adjoins residential properties and is within the confines of a live and operational hospital campus, the overarching consideration in all elements of the site set-up will be to ensure the works can be undertaken in a safe manner for the hospital, adjoining properties, members of the public and the Main Contractor and his staff. All hoarding will be erected and maintained, as necessary, by BAM while works are being undertaken.

The 3.0m & 4.0m high boundary hoarding currently in place for the Enabling Works Contract will remain in place for the Main Contract Phase A also. The temporary works design for the boundary hoarding structural supports has already gone through the Employer's Representative approval process.



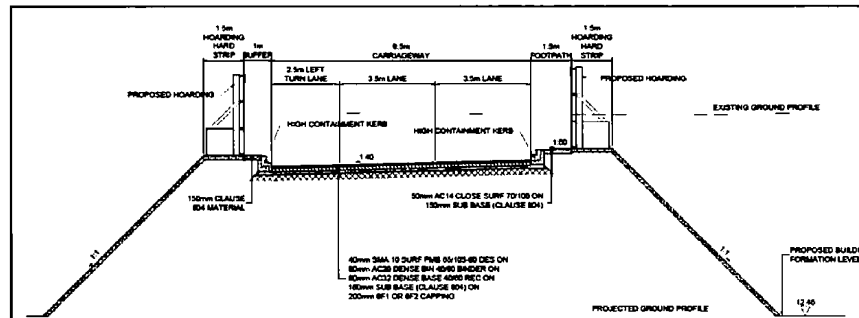
Extract from drawing no. 16_132_00_2408 - C02, "4.0m Hoarding Details"

The hoarding shall be erected in accordance with the hoarding layout drawing provided and shall be subject to the public relations and marketing requirements set out in the Works Requirements. The National Paediatric Hospital Development Board envisage engagement with Local Community groups,

schools and the children's forum group to embellish the hoarding with artwork or graphics which would be appropriate for the area, BAM will facilitate installation of such artwork or graphics.

Additional 2.4m high hoarding will be erected along the realigned Central Access Road (once constructed), with works for same to be carried out as follows:

- i. A detailed works activities method statement (including temporary works design of structural supports) will be submitted to the Employer's Representative for approval;
- ii. Permanent hoarding 2.4m high hoarding will be erected as shown on drawing "Access Road Cross Section" (drg. no. 16_132_00_2901-CM00 – see extract below);
- iii. Only competent and experienced personnel will be permitted to erect any element of the hoarding and all works will comply with the required Health, Safety and Environmental standards;
- iv. Photographic reprographics material in panel sizes of 2.4m X 1.2m, will be securely fixed to full external surface of the solid wooden hoarding;
- v. Regular inspections and maintenance will be carried out on all elements of the hoarding to ensure that all are in a safe and suitable condition;
- vi. Hoarding to afford tree protection as required in specific areas.
- vii. The hoarding line will be set out by the BAM Engineer and the ER will be invited to inspect this to ensure the alignment does not clash with the secant pile wall or any live services. Any alteration to the hoarding line shall be directed by the ER.



Extract from drawing "Access Road Cross Section" (drg. no. 16_132_00_2901-CM00) showing the new 4m high hoarding to be erected along the Central Access Road.

BAM's site offices of accommodation and welfare facilities are currently located in the old Private Clinic. This is an interim measure in advance of relocating same adjacent to Linear Park where there will be sufficient space to accommodate facilities to cater for the planned 1,000 – 1,200 construction workers the project will require at its peak in 2019.

BAM recognise that the installation of the hoarding along the Central Access Road as well as the amendments to the hoarding at linear park involve working in public areas on footpaths at tie-in locations. As a result, BAM will develop detailed traffic & pedestrian management plans that will be issued to the ER, Dublin City Council, SJH Management, RPA (Luas), Dublin Bus and all affected stakeholders for comment prior to any hoarding works commencing. All traffic and pedestrian

management plans that are implemented will be designed so that the public (including internal staff/traffic movements within the SJH campus area) are fully protected during the hoarding installation process. At all times access for blue light vehicles (emergency) will be prioritised. In addition, the relevant section of Dublin City Council will be consulted and any necessary licences obtained prior to hoarding being installed along public (DCC controlled) paths or roads. Where deemed necessary, temporary lighting will be installed if new hoarding alignments result in existing lights being behind new hoarding lines. All existing lighting within the main SJH campus will be replicated in full and installed adjacent to new routes to maintain adequate lighting levels at all times.

Another integral aspect of the hoarding installation is to design a barrier system that will attain the requirements as set out in the EIS in terms of noise mitigation. The perimeter hoarding will be constructed of suitable material density (generally 18mm thick plywood) to ensure that noise levels are maintained within the prescribed thresholds/allowable limits. Hoarding may be further supplemented using acoustic quilts in sensitive areas during certain construction activities to mitigate against noise impacts.

BAM will continue their inspection regime implemented for the Enabling Works Contract for the Main Contract Phase A also. This involves inspecting the entire hoarding system on a weekly basis for any defect, damage or environmental related failures i.e. wind damage, freeze/thaw action. Remedial works will be carried out promptly on any defective sections of hoarding that are found to have developed.

At designated sections along the hoarding line, access gates will be installed in order to allow safe access/egress to and from the works areas. These gates will be positioned at locations that afford the maximum visible sight lines to ensure that both the works and public are protected.

BAM have 24 hour security in place and are linked to SJH CCTV monitoring.
BAM will be responsible for the security of the site for the duration of the works.
BAM will:

- Install and maintain adequate site hoarding to the site boundary with adequate controlled access and
- egress points;
- Maintain site security staff at all times;
- Install access security in the form of turn-styles and gates for staff;
- Ensure restricted access is maintained to the works;
- Operate a Site Induction Process for all site staff;
- Ensure all staff have current 'Safe Pass' & Construction Skills Cards;
- Monitor and record all deliveries to site and all materials/waste taken off site for disposal to appropriate licensed facility.

The hoarding line is likely to be adjusted significantly at 2no. stages in the project:

1. Following completion of the temporary Central Access Road – Month 9;
2. Following completion of the permanent Northern Access Road – Month 18.

A fire watch system regime has been implemented and appointed fire watch supervisors inspect the site at the end of each shift. At site inductions, all staff and operatives will be fully inducted into the

security, health and safety and logistic requirements on site, and will be made fully aware of their individual responsibilities with regard to security and will undertake their work in line with guidelines.

3.3.3 Site Compound

BAM's accommodation and welfare facilities make use of the existing buildings on site and are currently located in the old Private Clinic as an interim measure. The Site Compound will be established to the South of the proposed building adjacent to Linear Park by Month 4 where there will be sufficient space to accommodate facilities to cater for the planned 1,000 – 1,200 construction workers the project will require at its peak from 2019. Expansion of the Site Compound will be carried out on a phased basis, with each layout requiring minimal adjustment as additional facilities are added.

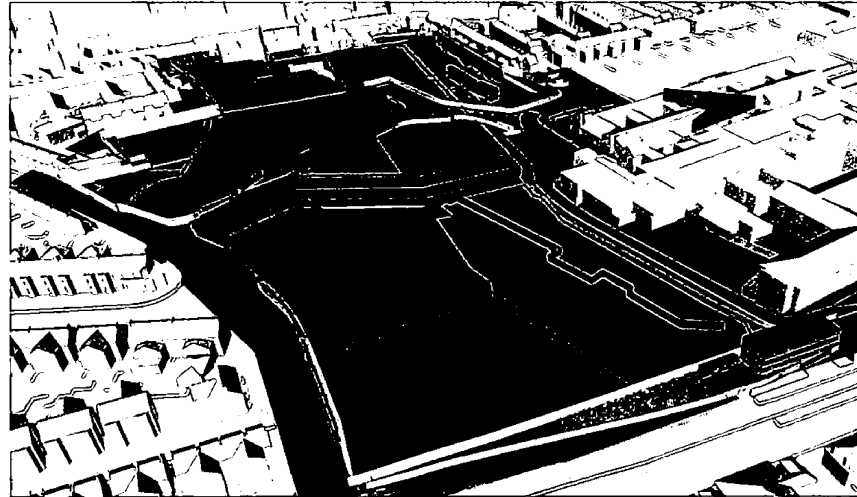


Figure above looking Northwards shows the proposed site compound adjacent to Linear Park

The Site Compound is to remain near Linear Park for the duration of the Main Contract works. Towards the end of Phase B, BAM will make use of the future development platform at the north end of the building and will establish a second compound at this location to facilitate travel distance of workers to the building.

3.3.4 Site Access & Egress

As the construction site is located on the campus of a live hospital, access to the existing campus must carefully and safely managed during the works. BAM will maintain protected vehicle and pedestrian/staff access routes as well as blue light and service vehicle access into and through the campus from the Rialto Gate, as well as to the Emergency Department, Energy Centre, Delivery Hub, south perimeter road. Use will be made of 2 main construction site access and egress points for the duration of the works, namely in the area of the existing Rialto Gate off the South Circular Road (Access A) and at Mount Brown (Access B) which will be constructed and operational from Month 4.



Extract from drawing 16 EM00X "Temporary Traffic Management Layout for Internal Site Traffic & Pedestrian Management to Facilitate Construction Works: Phase 1a & 1b".

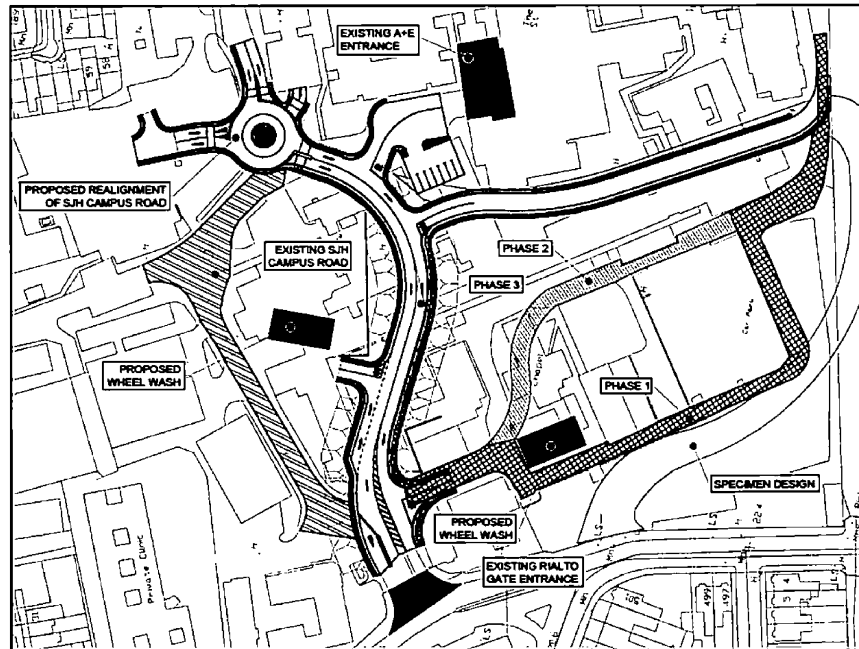
During the initial phase of works, access for emergency vehicles and any appropriate through traffic will be maintained by means of the existing road through the hospital campus. This will naturally split the site into 2 separate areas which will typically be served by the Rialto Gate Access A until Mount Brown Access B is operational (Month 4). At this point the northern portion of the site will be serviced largely by the new construction access point at Mount Brown. The Rialto Gate Access A will serve both portions of the site depending on the construction activity on-going. A Flag Man located at each access point onto the hospital/public road network will manage and marshal truck movements and Public/Hospital Users in a safe and controlled manner. The temporary Central Access Road will be operational from Months 9 to 18, at which time the permanent Northern Access Road will be operational. Refer to Section 3.5 Construction Traffic Management for further details.

3.3.5 Central Access Road Realignment

In order to maintain a road link between the Rialto Entrance & St James Hospital during construction of the Main Contract Phase A, the main road through the campus must be realigned. BAM have proposed a Central Access Road, utilising the existing Rialto entrance off Brookfield Road. This Central Access Road will be in place for a duration of 9 months until such time as the permanent northern access road is constructed, and will cross the works, emerging just north of the A&E access and south of the existing roundabout.

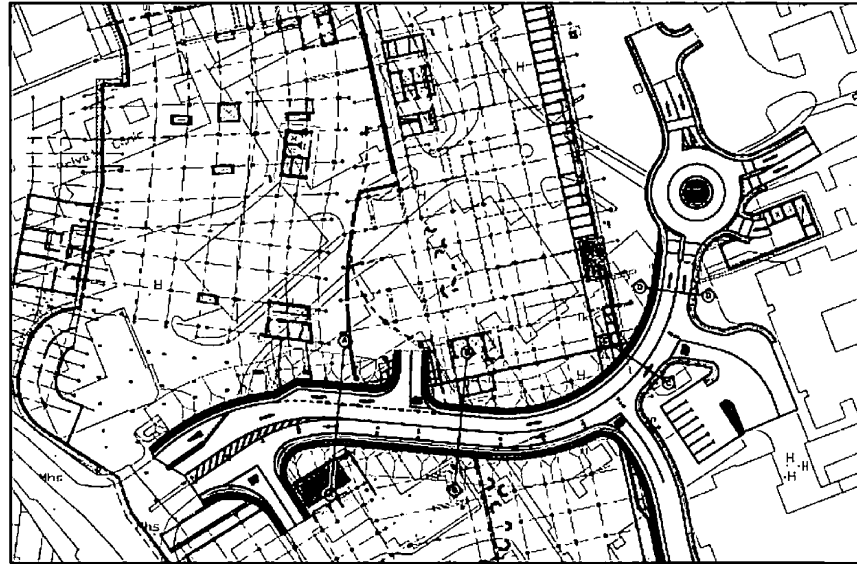
Design of the Central Access Road falls under Temporary Works, with a detailed design including alignment, slope retention (sheet piling will be required at 2 locations), drainage, hoarding, safety barrier, lighting, etc. to be submitted to the Client for approval in advance of commencing these works. A detailed method statement will also be submitted for approval.

Refer to Appendix I for proposed layout of the Central Road Access.



Extract from drawing "Proposed Access Road Phasing Arrangement", drg. ref. 16_132_00_2001-C01.
Refer to Appendix I for full set of temporary works design drawings.

The alignment of the Central Access Road is such that it runs parallel to a structural expansion joint (in the new building) providing an efficient and natural break point. It also avoids the new building's lift and stairwell shafts, allowing the structure to be constructed independently to each side, with infill works on the footprint of the access road to be undertaken immediately upon making live the permanent northern access road.



*Extract from drawing "Access Road Layout", drg. ref. 16_132_00_2200-C01.
Refer to Appendix I for full set of temporary works design drawings.*

The alignment is also optimised to ensure safe blue light / emergency vehicle access and egress to and from the A&E department, and to maintain the services access to SJH.

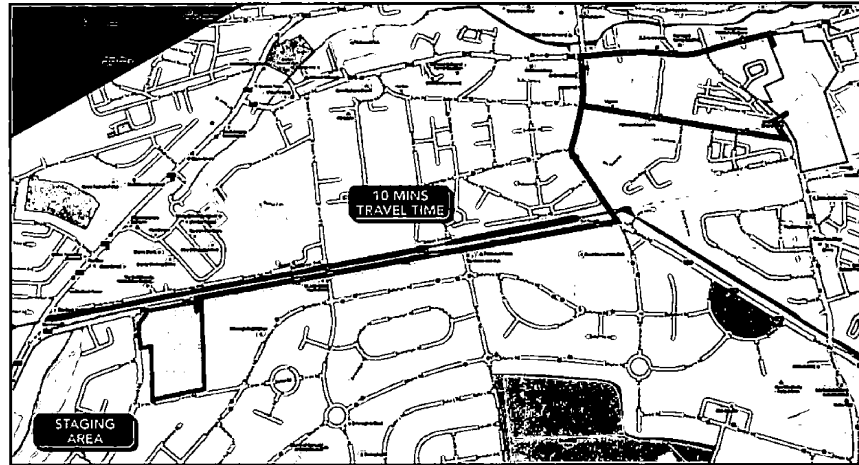
3.3.6 Deliveries to Site

Construction deliveries to site will make use of both the Rialto Gate and Mount Brown access points. BAM will adopt the "just in time" approach for the delivery of particular materials such as concrete formwork and reinforcement due to the minimal nature of space for storage of material on site. Deliveries of materials will be planned and programmed outside of the hours of 07:00 and 09:00 where possible, and only as they are required on site. These deliveries will be called in from the storage area at Davitt Road.

Works requiring multiple vehicle deliveries to site, such as large concrete pours, will be planned well in advance. Concrete pours of up to 2,000m³ are expected on site, with planning of these pours to include the subcontractors' commitment to ensure that trucks don't queue on the public roadways around the site. BAM will enforce the measure of all concrete trucks arriving to the first stage holding area at Davitt Road before proceeding towards the construction site at St James's Hospital campus when requested to do so by a traffic controller located at the works.

3.3.7 Storage of Materials on Site (Including Harmful Materials)

Whenever possible materials for construction activities shall be ordered as to prevent the minimum storage time and kept in the staging area at Davitt Road before release to site in line with the "just-in-time" approach.



Map details the location of the Davitt Road Staging Area relative to Saint James's Hospital.

Materials delivered to Davitt Road will be received and controlled by BAM, with gatemen/flag men available to ensure safe access/egress of all vehicles. Materials will be stored as per their respective material data sheets to minimise the potential of damage or wastage. Measures will include off-ground storage e.g. on pallets, remaining in original packaging, protection from rain damage or collision by plant or vehicles.

The staging area at Davitt Road will be secured and subject to 24 hour security supervision to prevent unauthorised access.

BAM will establish a designated fuelling point within each area of works to the north and south of the campus access road with all plant to be brought to these 2 points for filling. All fuels and chemicals stored will be clearly labelled.

Where mobile fuel bowzers are used the following measures will be taken:

- Designation of banded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Any flexible tap, valve or pipe will be fitted with a lock and will be secured when not in use;
- The pump or valve will be fitted with a lock and will be secured when not in use;
- All bowzers to carry a spill kit and operatives must have spill response training;
- Portable generators or similar fuel containing equipment will be placed on suitable drip trays.
- Fire prevention measures in the form of extinguishers will be located adjacent to fuelling areas.
- As a BAM policy fire extinguishers are also located in each excavating machine.

In the case of drummed fuel or other potentially polluting substances which may be used during construction the following measures will be adopted:

Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded areas;

- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site they should be done so secured and on spill pallets;
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

3.3.8 Removal of Materials from Site

The most intensive period of material removal from site will take place during the bulk excavation of the basement works. Excavations will be required throughout the site to facilitate the formation to basement levels, ramp access, construction of the utility tunnel, modifications to existing services including the Drimnagh Sewer and to facilitate construction of new services.

In total, an estimated 413,000m³ of made ground and clay material will be required to be excavated and removed off site. All excavated material will be disposed of in an approved manner using a licenced haulier to an approved licenced location. Copies of all collection, delivery and acceptance at approved licence location documentation will be kept on site.

BAM will make use of the Davitt Road staging area for empty trucks to wait before being called on to site, a measure which will prevent queuing of trucks on the public roadways to the site.

All trucks will have a built on tarpaulin that will cover the excavated material as it is being hauled off site and wheel wash facilities will be provided at all site egress points (refer to drawings provided in Appendix I showing wheel wash locations).

As previously stated, all vehicles will leave the site via Rialto Access A or Mount Brown Access B, with flag men posted to direct construction vehicles entering/exiting the site and manage public/construction vehicle movements.

OCSC document "*Soil Classification, Site Investigation & Groundwater Monitoring Report*" (doc. ref. no. NPH-C-OCSC-9010-0001) details areas on the site where hazardous material has been identified, and further areas which have been identified as "potentially contaminated areas". A specialist contractor will be brought in to classify the material in this area prior to excavation by:

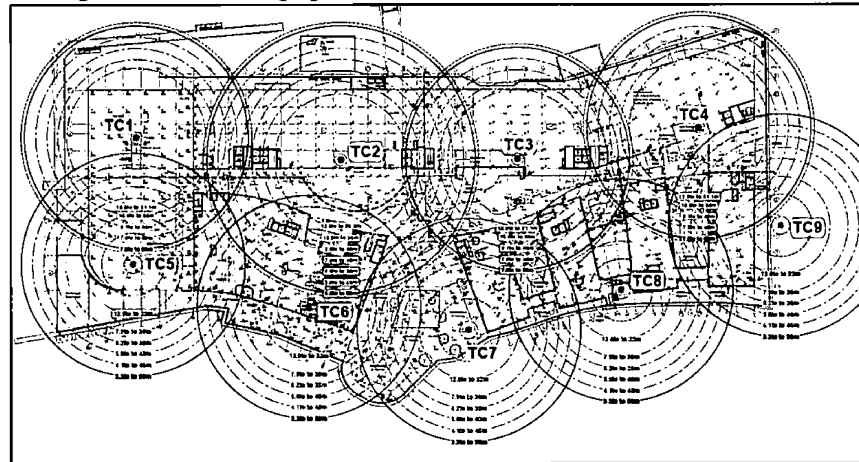
- (a) reviewing testing to date, and
- (b) carrying out further testing using an accredited laboratory.

In addition to this, WAC testing will be carried out on an ongoing basis throughout the bulk dig works to ensure excavated material being removed from site is sent to an appropriate location based on its composition.

3.3.9 Cranage

Cranes will be required for the moving of building materials around site such as formwork for concrete, reinforcement for concrete and general building materials. The use of cranes will also be required for the erection of the facade and installation of plant.

Initially the Main Contract Phase A will require the use of mobile cranes for construction of the utility tunnel and Drimnagh Sewer diversion etc. Early 2018 will see the erection of the first tower crane, with the programmed works requiring as total of 9 number tower cranes, 6 of which will be necessary to facilitate the construction of Phase A works during the first 15 months of the Main Contract. A dedicated crane co-ordinator will be appointed and will have overall control of cranes in terms of lifts/sequences, etc. In this regard, lifting plans will be developed and assessed prior to lifting occurring. These 6 cranes are highlighted as follows:



Extract from drawing no. ENG 2009A / D / 001 Layout of Tower Cranes, prepared for BAM by HTC Wolffkran Limited.

Planned timelines for when these cranes will be erected and in use on the NCH site are as follows:

Activity ID	Activity Name	Original Start	Original Finish	MS	2017	2018	2019	2020
Site Development		05 Feb 18	25 Feb 20					
Tower Cranes								
Erection		05 Feb 18	25 Feb 18					
Use		05 Feb 18	11 Feb 20					
D12870	Maintenance Tower Crane 8	05 Feb 18	11 Feb 20	SE				
D12840	Maintenance Tower Crane 5	06 Mar 18	02 Oct 19	SE				
D12850	Maintenance Tower Crane 9	11 Jun 18	27 Nov 19	SE				
D12850	Maintenance Tower Crane 6	27 Jul 18	03 Jan 20	SE				
D12810	Maintenance Tower Crane 2	27 Jun 18	17 Jan 20	SE				
D12820	Maintenance Tower Crane 3	18 Oct 18	05 Apr 20	SE				

Jibs will vary between 22m and 80m in length to provide the necessary site coverage.

3.3.10 Water Supply

BAM's current accommodation facilities in the old Private Clinic has a mains water connection. The Site Compound will also be mains connected.

Water will also be required for wheel wash and vehicle wash-down, dust suppression, curing of concrete in warm weather and general construction cleaning materials/equipment etc.

Water (grey water) will be recycled from the attenuation tanks for use during construction, toilets, and washing.

3.3.11 Groundwater Control

Groundwater will be directed in a controlled manner away from the cut faces, discharged under license to the storm sewer network (i.e. the River Camac), and continually monitored to ensure consistent quality.

Any discharge to storm sewer will be regulated under a Discharge Licence obtained from the Regulator (Dublin City Council) issued under the Water Pollution Act (Section 4 Licence).

Attenuation, pre-treatment and monitoring of discharge water will likely be required under any Discharge Licence (Section 16 Licence). Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, silt sacks and settlement tanks) and hydrocarbon interceptors. Active treatment systems such as Siltbusters or similar may be required depending on turbidity levels and discharge limits. Qualitative and quantitative monitoring will be implemented.

BAM will keep the works free of water by:

- lowering and maintaining the water level (dewatering);
- preventing water from entering the earthworks;
- arranging for rapid removal of rainwater etc. by channelling it towards the dewatering sumps;
- silt traps, hydrocarbon interceptors etc. to be used where required.

Groundwater levels vary across site. BAM are currently engaging with a specialist sub-contractor to establish the extent and duration of dewatering required. Once complete, BAM will issue for approval to the Employer's Representative a detailed dewatering method statement. BAM shall implement a monitoring programme as required under any Discharge License and to assess impacts of dewatering on the local groundwater regime and all monitoring results shall be submitted to the ER/Engineer on at least a weekly basis during excavation and basement construction and monthly (or other agreed interval) until project completion.

3.3.12 Hours of Work

Schedule of working hours (refer to contract):

Monday-Friday	-	0700-1900 hrs
Saturday	-	0800-1400 hrs

If BAM need to carry out specific works outside these times then prior approval will be sought in advance from the Employers Representative and the relevant Planning Authority.

Adequate notice will be provided in advance of the proposed commencement of the works to be carried out outside of the scheduled working hours to ensure all parties have sufficient time to review BAM's proposal.

BAM note that condition No.9 of the granted planning permission notes that HGV movements to site between 0700-0900 hours should be minimized. In this regard, deliveries to site will be staggered where required to prevent an influx of HGV to the site during these hours.