Waterman Moylan
Engineering Consultants

Outline Construction & Demolition Management Plan

Balscadden Development, Howth, Co. Dublin

March 2022

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This document has been prepared and checked in accordance with
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Issue	Date	Prepared by	Checked by	Approved by
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Comments

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1. Introduction

Waterman Moylan have prepared the following Outline Construction and Demolition Management Plan for the implementation of the construction stages in support of a Strategic Housing Development (SHD) application for a proposed residential development in Howth, located between Balscadden Road, Main Street and Abbey Street.

The plan sets out typical arrangements and measures which may be undertaken during the demolition and construction stages of the project in order to mitigate and minimise disruption and disturbance to the area around the site. Of particular note, are the neighbouring residential properties, building of historical importance including the Martello Tower and Tower Hill, and the existing embankments and slope stability conditions around the site.

This plan will be used to guide the Main Contractor who will have ultimate responsibility for developing a more detailed demolition and construction management plan for formal agreement with Fingal County Council in advance of them commencing the demolition or construction works on site. This plan will provide Fingal County Council with an outline proposal of how construction will be managed to comply with Local Authority and statutory requirements and will be updated post award of planning to reflect specific planning conditions which may be applied to the development.

This plan should be read in conjunction with all other planning stage reports included as part of this planning application.

1.1 Site Location and Description

The proposed development relates to lands located to the south of the Martello Tower on Balscadden Road & the former Baily Court Hotel, Main Street, Howth, County Dublin. The subject site is bounded to the east by the Balscadden Road and by residential properties, to the west by residential and commercial buildings fronting onto Main Street and Abbey Street, and to the north by lands around Martello Tower. Of particular importance with respect to the development site are:

- The protected Martello Tower & Tower Hill of historical importance
- Howth Head Special Area of Conservation (SAC)
- Howth Head proposed Natural Heritage Area (pNHA)
- Historical Howth Sewer Tunnel that traverses the site
- Existing embankments and slopes stability conditions adjacent to the site

The overall site is approximately 1.43 Hectares, and is generally a greenfield site, with the exception of the disused sports building to the North and the former Baily Court Hotel to the South.

Figure 1 | *Site Location (Source: Google Maps)*

1.2 Site Topology

A topographic survey was carried out to determine the existing topography at the site. The site has two relatively flat areas, at the north and at the south, with a steep slope between the two, and with steep slopes around the boundary of the site.

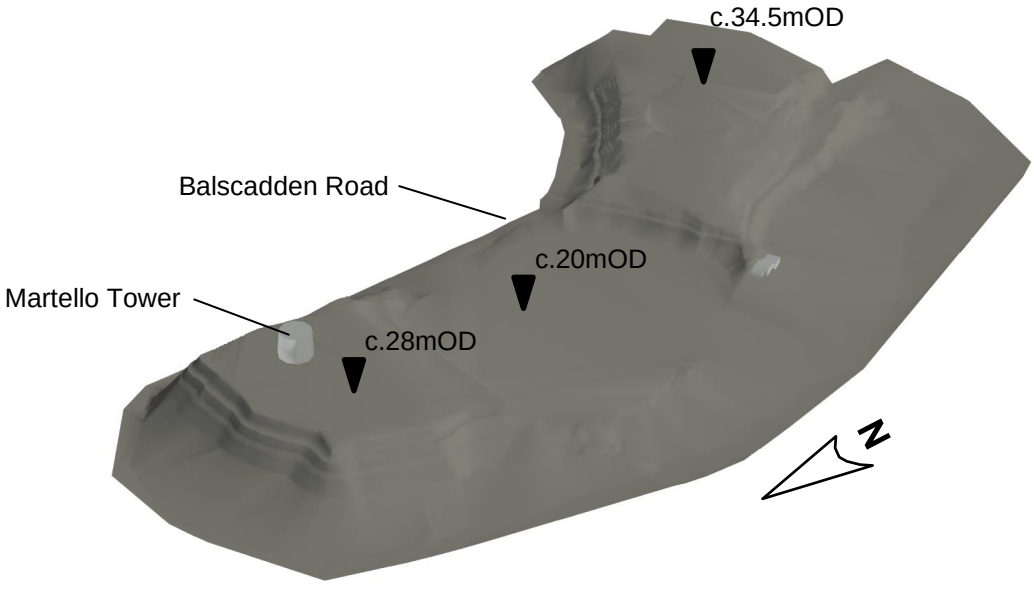


Figure 2 | *Site Topology*

The northern portion of the site is at a level generally between c.20m and c.21m OD Malin, while the southern portion of the site is at a level generally between c.33m and c.34.5m OD Malin. Levels fall away at the east of the site towards the Balscadden Road and rise towards the Martello Tower at c28m OD Malin.

1.3 Ground Conditions

Extensive geotechnical, hydrological and environmental site investigation have been undertaken for the site. The results from the site investigations have been used to inform the design of the foundations and retaining walls, a hydrological ground water study, a ground movement analysis and waste management strategy. The site investigation results will also be used at detailed design stage to inform the detailed structural design.

As part of the site investigation works, three boreholes to depth of 20m below ground level or refusal were advanced. Two boreholes were placed to the North-East of the site (at circa 19.5mOD) and a third borehole (at circa 19.5mOD) to the South-West adjacent to the former Baily Court Hotel Building. For the avoidance of doubt, the boreholes have been located at the lowest parts of the site. Standpipe instillations will be installed in each borehole to record ground water levels and will be monitored over the forthcoming period.

The observed borehole logs (at circa 19.5mOD to the North-East of the site indicated MADE GROUND, over dense SAND, overlaying stiff CLAY. Groundwater strikes were observed at 14m and 9.5m BGL in both boreholes.

A detailed Geotechnical and Hydrological Ground Water Report has been prepared for this planning application and should be referred to for further information.

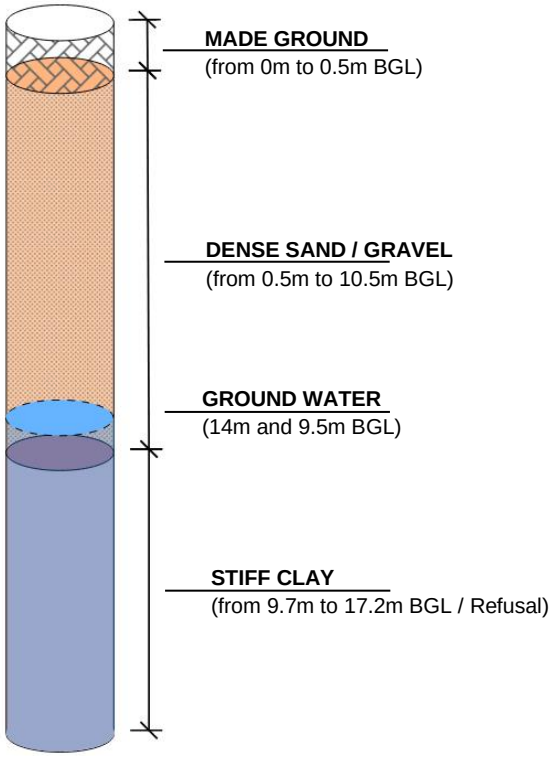


Figure 3 | *Site Ground Conditions*

2. Proposed Development

The development will consist of the demolition of existing structures on the proposed site including the disused sports building and the former Baily Court Hotel buildings and the construction of a residential development set out in 4 no. residential blocks, ranging in height from 2 to 5 storeys to accommodate 180 no. apartments with associated internal residential tenant amenity and external courtyards and roof terraces, 1 no. retail unit and 2 no. café/retail units.

The site will accommodate car parking spaces at basement level and bicycle parking spaces at basement and surface level. Landscaping will include new linear plaza which will create a new pedestrian link between Main Street and Balscadden Road to include the creation of an additional 2 no. new public plazas and also maintains and upgrades the pedestrian link from Abbey Street to Balscadden Road below the Martello Tower. Please see the accompanying Statutory Notices for a more detailed description.

The residential schedule of accommodation is set out in the Table below:

Description	Studio	1-Bed	2-Bed	3-Bed	Total
Block A	-	-	2	-	2
Block B	-	51	57	18	126
Block C	-	8	28	7	43
Block D	4	3	2	-	9
Total	**4**	**62**	**89**	**25**	**180**

Table 1 | *Schedule of Accommodation*

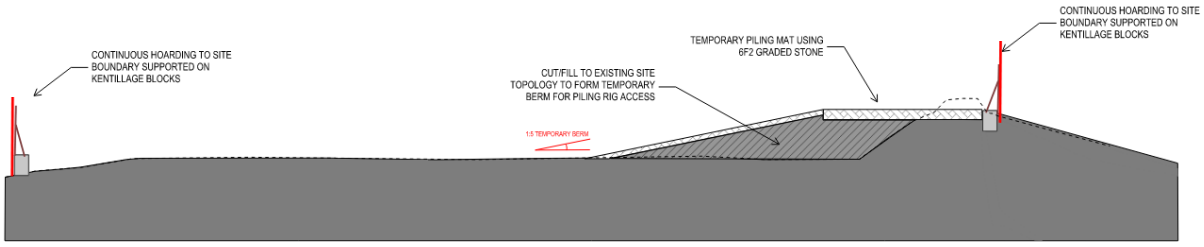
The development will include a single level basement under Block B, containing 139 car spaces, cycle parking spaces, plant, storage areas, waste storage areas and other associated facilities. Additional visitor cycle spaces are provided for at ground level.

The development includes all other ancillary site development works to facilitate construction and the provision of the basement car park, site services, piped infrastructure, a sub-station, public lighting, plant, signage, bin stores, bike stores, boundary treatments and hard and soft landscaping.

2.1 Sequence of Works

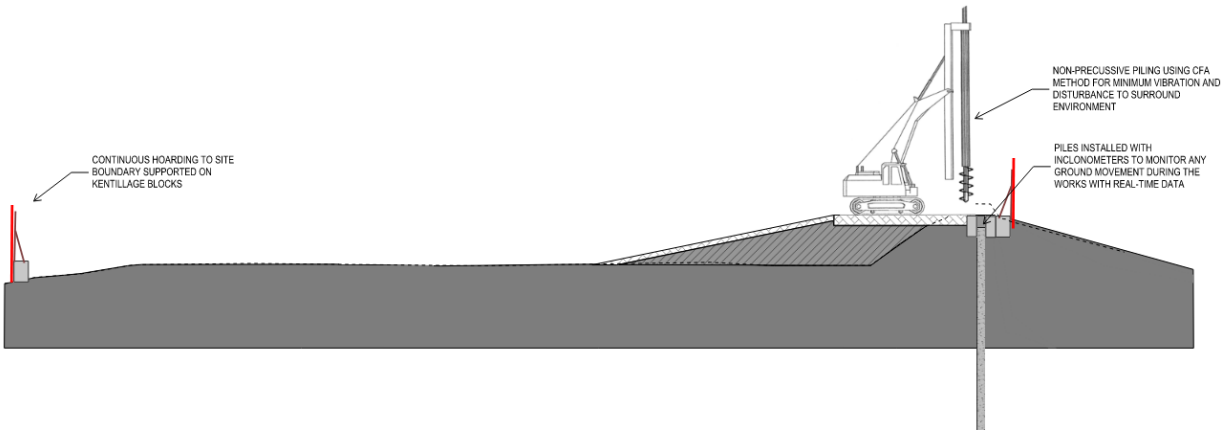
Refer to the drawings included in Appendix B for details of the structural frame, foundations and retaining walls. In summary, the proposed construction phasing consists of:

1. Site Preparation: Site Clearance, Demolition & Enabling Work



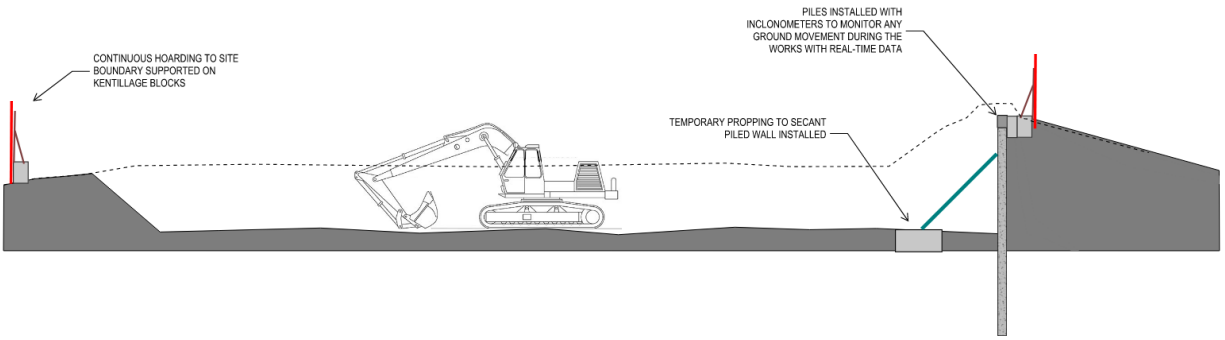
- Demolition of the disused sports building & former Baily Court Hotel. Demolition works will involve low intensity controlled methods (munchers, excavators, etc).
- Demolition will be undertaken systematically either top-down or phased using controlled methods.
- Demolition arisings shall be segregated into constituent stock-piles for removal from site.
- Installation of site set-up (site office, welfare, etc).
- Installation of temporary measures outlined in the Preliminary Construction Environmental Management Plan to protect the SAC/pNHA (slit trenches, etc).
- Provision of a temporary piling mat and berms between levels.

2. Construction: Piled Retaining Walls



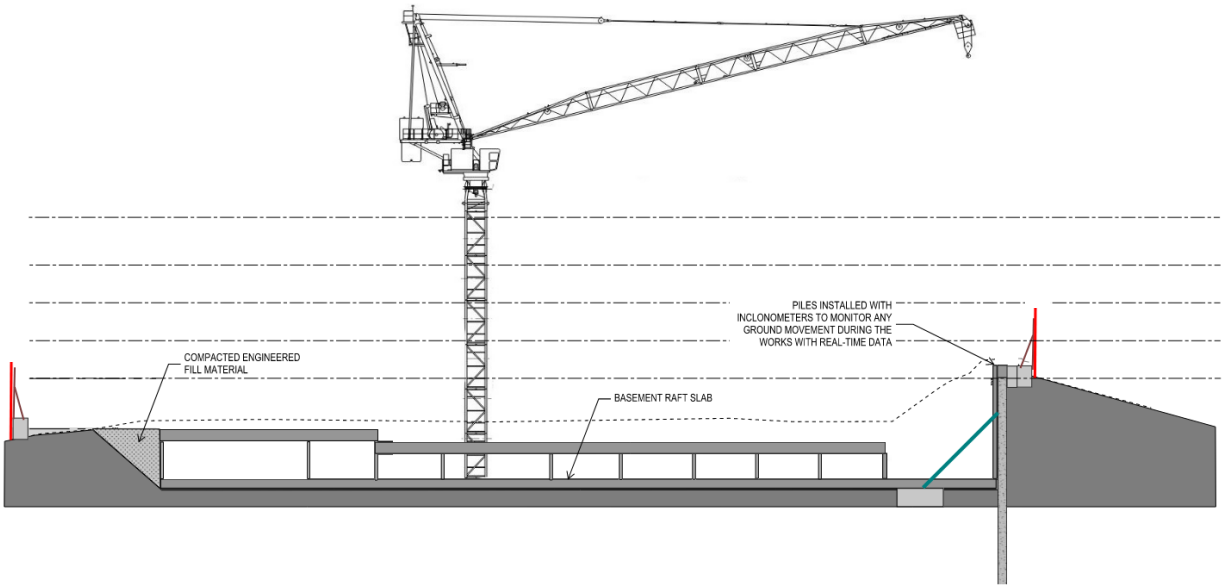
- Secant piled walls installed to allow for the bulk excavation and reduced level dig.

3. Construction: Bulk Excavation



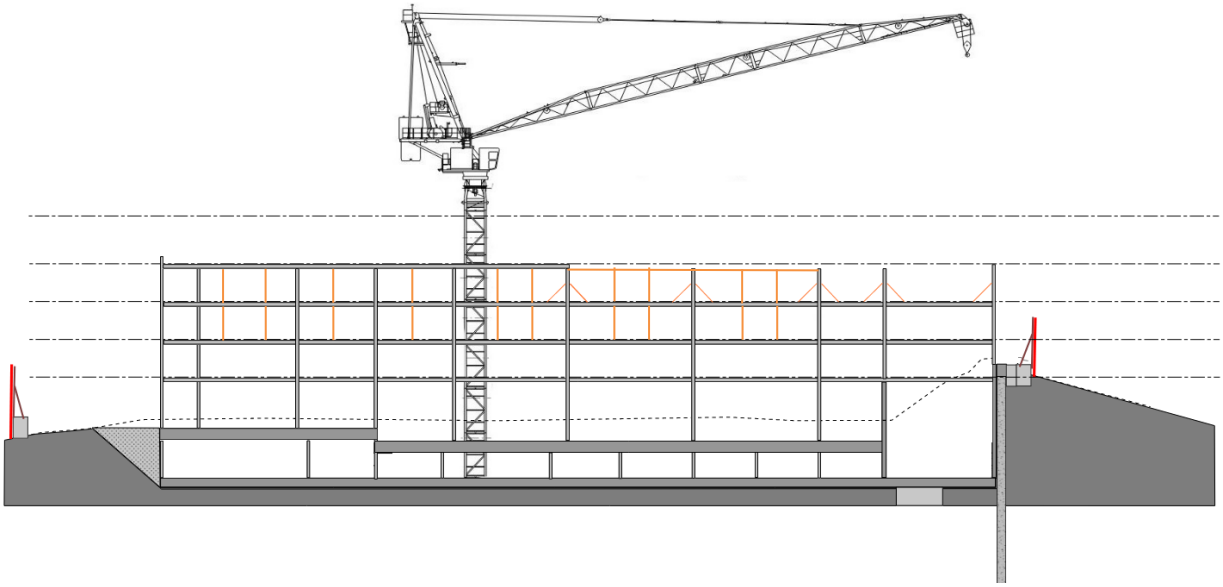
- Temporary works installed to temporarily restrain the secant piled walls during excavation.
- Basement battered open-cut excavation to the North and East boundaries with a safe angle of repose.

4. Construction: Building Foundations & Basement



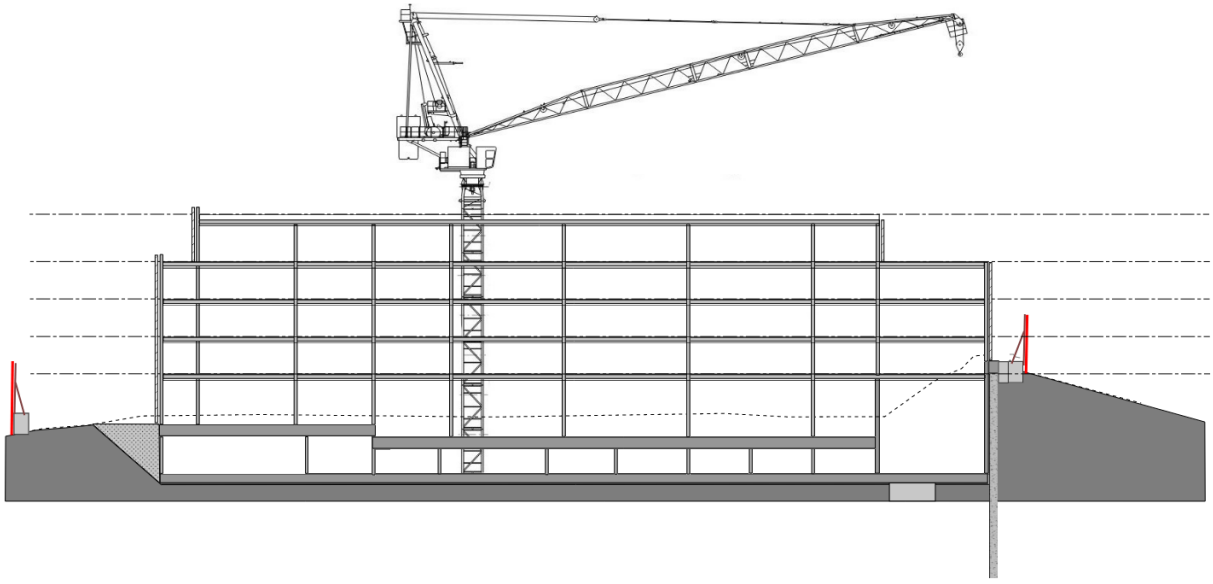
- Installation of the building foundations (comprising of shallow pad and strip footings) and basement retaining walls.
- Tower crane installation for the construction of the building frame.

5. Construction: Building Superstructure Frame



- Bottom-up construction sequence of the floor slabs and vertical elements.
- Elements of the building frame may be premanufactured off site for speed of construction, less formworks and on-site waste.

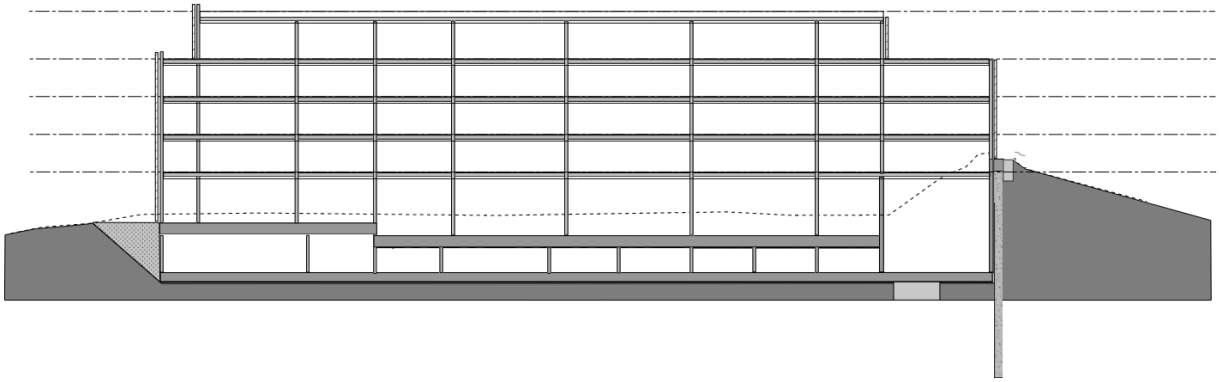
6. Construction: Cladding & Fit-out Works



- Temporary scaffolding may be required around each building during the construction of the building envelope.

- Elements of the building facade may be premanufactured off site using modular construction for speed of construction and less on-site waste.

7. Completion



2.2 Key Milestones

Anticipated Programme Durations	Key Milestones
8 weeks	Site Preparation
12 weeks	Construction – Excavation
78 weeks	Construction – Building Frame
24 weeks	Fit-Out Works
122 weeks total	Completion

3. Site Setup

Hoarding will be required to the entire site boundary. This will incorporate a primary vehicle and pedestrian site entrance located off Main Street. Secondary pedestrian entrances and emergency access route may be located off Balscadden Road.

Vehicle gates with barriers will likely be accommodated at a security hut combined with a secure turnstile to control pedestrian and vehicle access.

A preliminary site setup layout is shown in Appendix A.

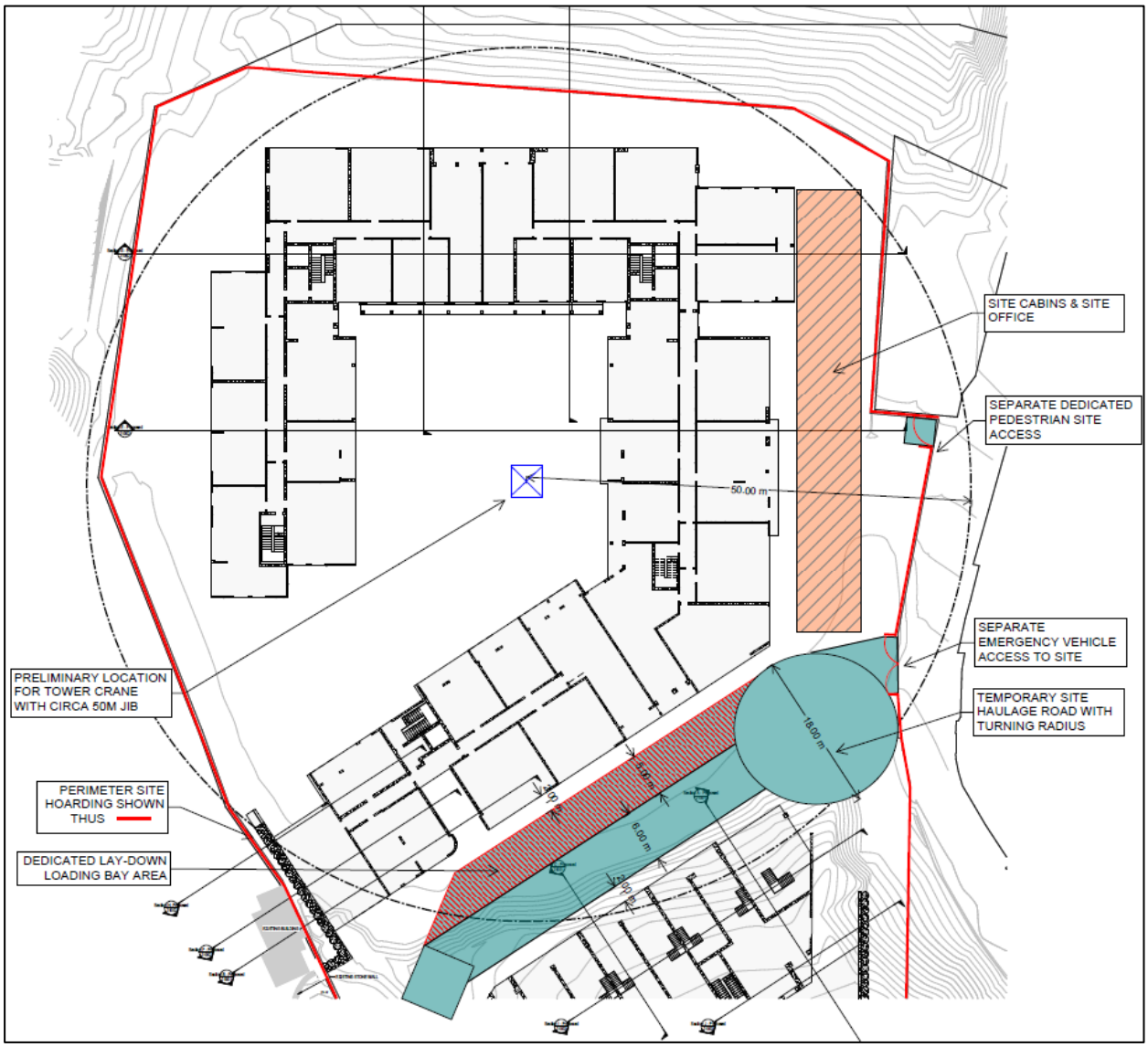


Figure 4 | *Proposed Site Setup (Northern Boundary)*

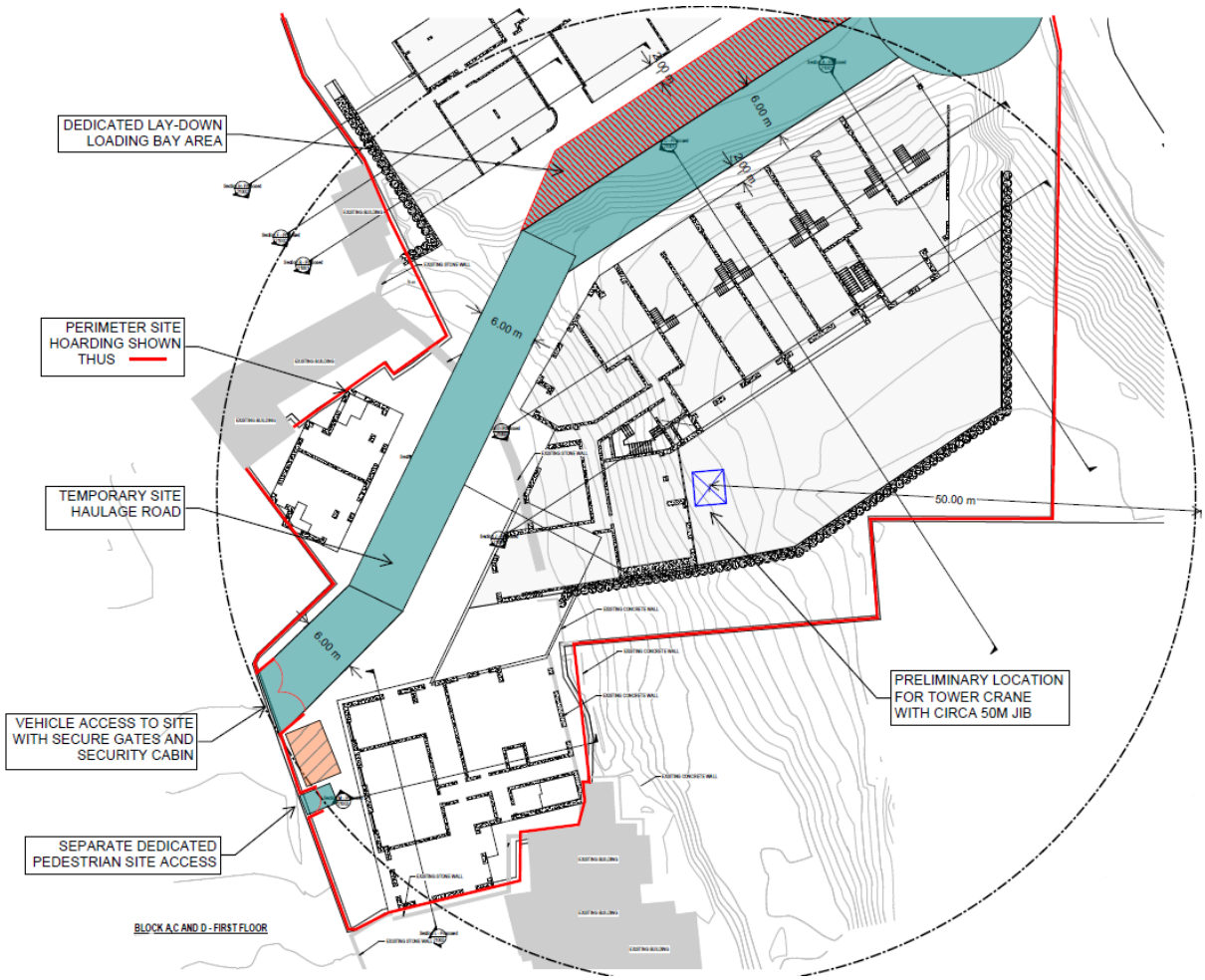


Figure 5 | *Proposed Site Setup (Southern Boundary)*

The Contractor will keep all public roads and footpaths entirely free of excavated material, debris, rubbish, construction materials and equipment.

3.1.1 Perimeter Hoarding

The hoarding will be designed at a later date by the Main Contractor and will be designed to minimise impact to the footpaths along Main Street and Balscadden Road. Where necessary, the hoarding may be designed to incorporate covered walkways to the agreement and approval of Fingal County Council.

The hoarding line will be provided along the site boundary. To the North of the site, there is an existing public access route between Abbey Street and Balscadden Road. Along this boundary the hoarding line will be located south of this existing pathway so that public access can be maintained.

The hoarding line will be maintained at all times during demolition and construction. In the event of any of the hoarding having to move outwards to facilitate construction activities, this will be done with the agreement of Fingal City Council including obtaining new hoarding licenses as required. If this encroaches on minimum footpath widths, the Main Contractor will erect diversions to opposite footpaths to the agreement of Fingal City Council.

Figure 6 | *Typical Perimeter Hoarding*

Where there are ESB/telecommunication kiosks, light poles and traffic signage on the footpaths these will be maintained by the Main Contractor where practical.

3.1.2 Site Compound

The site compound will consist of:

- Offices
- Meeting Rooms
- Toilet / Shower Rooms
- Drying Rooms
- Canteens
- Storage Containers

All cabins will be steel securi-type with steel lockable shutters to windows and steel lockable door. All cabins will come to site in good condition and will be maintained in good order throughout the project. Double stacking of cabins may be required with safe stairs and walkways provided to the upper levels of offices.

3.1.3 Access & Egress

Safety and ease of access to the site are to be provided for by the Main Contractor when planning the works. Separation of vehicular and heavy plant traffic from pedestrians and operatives will be implemented as far as is practical when considering the layout of the site infrastructure and access points.

Where a site access crossing is required on a pavement this will require a dedicated pedestrian management setup to ensure there are no incidents of crossovers between pedestrians and site vehicles. This may require a turtlegate barrier in addition to with semi-permanent barriers along the kerb edge, flagmen to control barriers and flagmen to watch truck movement and pedestrians.

3.1.4 Logistics

The site will require dedicated tower cranes to service the construction activities. This will include all stages of construction including the building envelope and fit-out lifting requirements. These may be complemented with teleporters, mobiles cranes, hoists and mobile concrete pumps as required.

The construction traffic and pedestrian routes are outlined in the Outline Construction Traffic Management Plan submitted as part of this planning application. In general, trucks will be off loaded from the designated laydown areas. Deliveries will typically be on a just in time basis and this system will be strictly controlled by Main Contractor who will organise the deliveries. The Main Contractor will advise their suppliers on the delivery routes, ensuring the drivers are made aware of the site location and the correct route around Howth town, in accordance with the Outline Construction Traffic Management Plan and Fingal City Council heavy goods vehicles cordon restrictions.

If any plant setups are required outside the site, a road lane closure may be required. The road closure license will be obtained from Fingal City Council and an agreed traffic management plan will be implemented as required. Any traffic management measures will be designed by qualified personnel in accordance with Chapter 8 of the Traffic Signs Manual and implemented by Signing, Lighting & Guarding (SLG) trained operatives.

The logistics plan will be presented to workers during the site induction. Refresher training in the logistics plan will be presented in toolbox talks.

3.1.5 Proposed Craneage Strategy

Tower cranes will be required during each of the construction phase of the development. The Main Contractor will nominate the locations of these once appointed but indicative locations are shown in Appendix A – Proposed Site Setup. Mobile cranes may also be utilised on a short-term basis throughout the construction period.

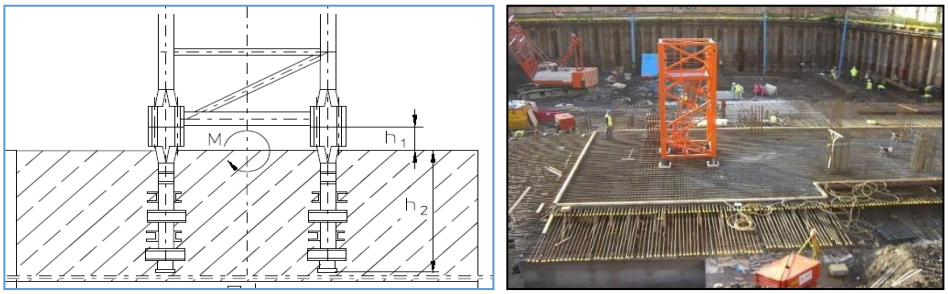


Figure 7 | *Typical Tower Crane Anchors*

3.1.6 Power, Waste & Drainage

A power supply from ESB Networks to power both the compound and the construction site will be applied for by the Main Contractor/Contractors. The size of supply will be calculated to ensure it is sufficient to power both the site compounds and construction site activities. A dedicated power supply will be provided for the tower cranes, task lighting, power tools and charging stations for plant such as electric hoists.

In the event of any delays securing the required power supply to power offices and cranes, generators may be required. Diesel generators will have sound enclosures and will be regularly serviced to prevent noise and odour pollution and setup in a spill tray to prevent any spillage contaminating the ground. Temporary site lighting will be installed to provide safe and well-lighted walkways around the site compounds and task lighting to the construction sites.

Water and drainage will be required to service the site toilets and canteen facilities. The Main Contractor will carry out a site survey to identify the locations of the water and foul drainage connections to the site. It will be the Main Contractor's responsibility to apply to Irish Water for connections to the water main and foul drain, ideally utilising existing connections.

3.1.7 Working Hours

The working hours will be dictated by the planning conditions and are expected to be as follows:

Days	Start Time	Finish Time
Monday-Friday	07:00	18:00
Saturday	08:00	14:00
Sunday	No work permitted	No work permitted
Bank or Public Holiday	No work permitted	No work permitted

Working times will be within the hours permitted by the Planning Decision for the development. It may be necessary to work outside these hours at times, for example for early morning concrete pours and late evening concrete finishing. The Contractor will consult Fingal City Council regarding out of hours working and local residents and businesses will be informed of any out of hours works required. A planning derogation will be applied for to Fingal City Council when out of hours working is required. The terms and conditions of the planning derogation will be strictly adhered to at all times.

3.1.8 Car Parking

In general, there will not be car parking for operatives on site. Personnel will be encouraged and informed of the numerous public transport options available to access the works.

3.1.9 Wheel Washing Facility Requirement

The Main Contractor will ensure that the enabling works package will include provisions for a wheel washing facility with water collection and filtering before any discharge to the public surface water drainage system. Trucks discharging concrete should have a wash out area to clean the chute prior to entering the wheel wash.

Figure 8 | *Typical Wheel Washing Facility*

3.1.10 Expected Vehicle Movement

An Outline Construction Traffic Management Plan has been prepared and details access routes, site signage, haulage license protocols and environmental control procedures. Reference should be made to the Construction Traffic Management Plan submitted as part of the planning documents.

Once the construction programme is finalised by the appointed Contractor, a detailed breakdown of the expected vehicle movements will be available.

3.1.11 Security

In additional to the perimeter hoard to the site, the following measures will be adopted by the Main Contractor for site security:

- A dedicated site security team with 24hr access to the site and direct contact with the local An Garda Siochana station.
- Each person on site will have been inducted and fingerprint access control will be used for site entry and exit. The Contractor will know who is on site at all times.
- There may be a site CCTV system monitoring the site.
- Hoarding lighting will be incorporated to increase the general illumination levels around the site with the exception of boundaries to residential gardens and houses.
- Siting the cabins behind the hoarding with windows overlooking the streets will provide a greater degree of natural surveillance to the area to ward against anti-social behaviour.

Figure 9 | *Typical Site Security Measures*

4. Demolition

Demolition of the disused sports building and former Baily Court Hotel building structures shall extend to the lines and levels indicated on the planning drawings with the disposal of all materials off-site. The demolition works wil will include breaking up and removal of the ground floor slabs, columns and wall stubs, strip foundations and dwarf walls. This will l involve low intensity controlled methods using munchers and excavators to segregate the materials into stockpiles prior to removal from site. The demolition works will be undertaken systematically either top-down or phased using controlled methods, in accordance with the current legal and industry standards including:

- BS 6187:2011 Code of Practice for Demolition
- SSWP 2005 Safe Systems of Work Plan – Demolition Form
- BS 5228 Code of Practice for Noise Control on Construction and Demolition Sites.
- BS 8004:2015 Code of practice for foundations (+A1:2020).

The design, materials and workmanship of structures incidental to the demolition works shall be in accordance with the relevant Irish and British Standards. In particular the following standards shall be complied with:

Eurocode 0 – Basis of structural design

Basis of structural design	I.S. EN 1990: 2002
Basis of structural design	I.S. EN 1990: 2002

Eurocode 1 – Actions on Structures

Part 1-1: General actions - Densities, self-weight and imposed loads	I.S. EN 1991-1-1: 2002
Part 1-2: General actions - Actions on structures exposed to fire	I.S. EN 1991-1-2: 2002
Part 1-3: General actions - Snow loads	I.S. EN 1991-1-3: 2003
Part 1-4: General actions - Wind actions	I.S. EN 1991-1-4: 2005
Part 1-5: General actions - Thermal actions	I.S. EN 1991-1-5: 2003

Eurocode 2 – Design of Concrete Structures

Part 1-1: General rules and rules for buildings	I.S. EN 1992-1-1: 2005
Part 1-2: General rules - Structural fire design	I.S. EN 1992-1-2: 2005
Part 3: Liquid retaining and containment structures	I.S. EN 1992-3: 2006

Eurocode 3 – Design of Steel Structures

Part 1-1: General rules and rules for buildings	I.S. EN 1993-1-1: 2005
Part 1-2: GR - Structural fire design	I.S. EN 1993-1-2: 2005
Part 1-8: Design of joints	I.S. EN 1993-1-8: 2005

Eurocode 5 – Design of Timber Structures

Part 1-1: General - Common rules and rules for buildings	I.S. EN 1995-1-1: 2005
Part 1-2: General - Structural fire design	I.S. EN 1995-1-2: 2004

Eurocode 6 – Design of Masonry Structures

Part 1-1: Common rules for reinforced and unreinforced masonry structures	I.S. EN 1996-1-1: 2005
Part 1-2: General rules - Structural fire design	I.S. EN 1996-1-2: 2005
Part 2: Design, Selection of materials and execution of masonry	I.S. EN 1996-2: 2006
Part 3: Simplified calculation methods and simple rules	I.S. EN 1996-3: 2006

Eurocode 7 – Geotechnical Design

Part 1-1: General Rules	I.S. EN 1997-1: 2005

5. Construction Methodology:

5.1 Description of the works

The proposed development includes the construction of a residential development set out in 4 no. residential blocks, ranging in height from 2 to 5 storeys to accommodate 180 no. apartments with associated internal residential tenant amenity and external courtyards and roof terraces, 1 no. retail unit and 2 no. café/retail units. A brief description of each Block includes:

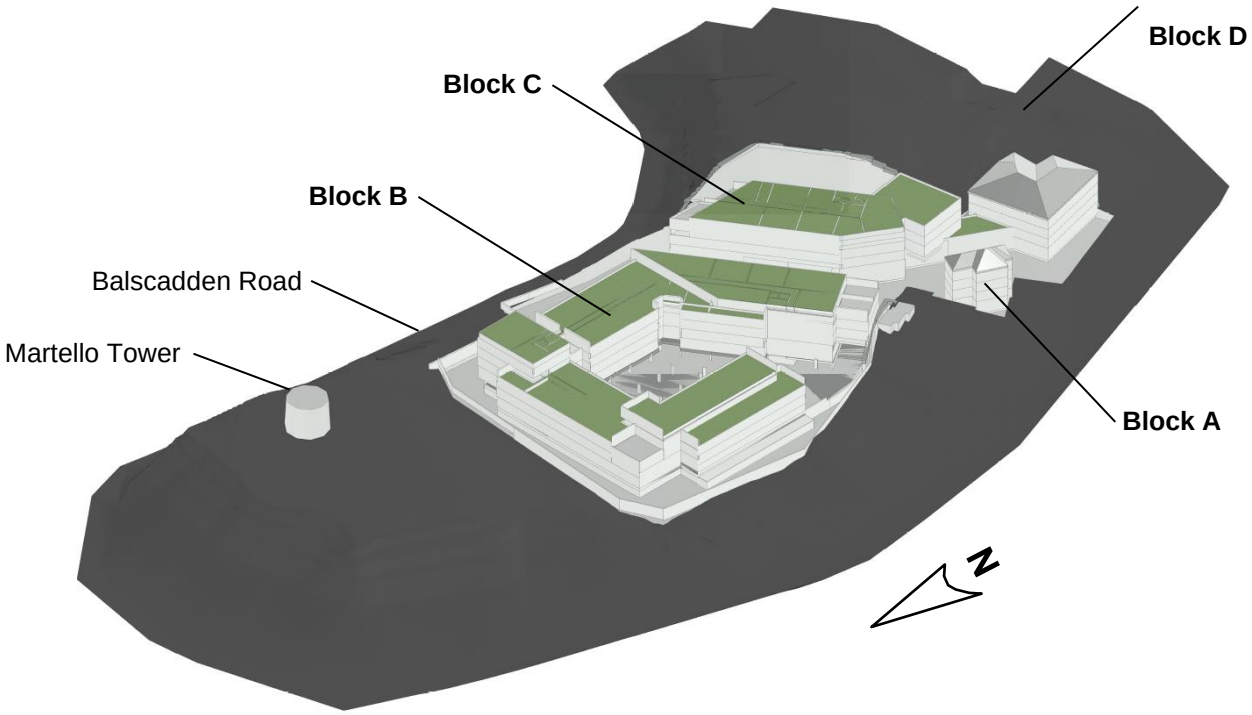


Figure 10 | *Proposed Development*

Block A

Block A comprises a three-storey residential building with retail/café space at Ground Floor. The structure will be formed in reinforced concrete flat slab construction with transfer down-stand beams located within the First Floor slab in order to provide a clear open-plan space at Ground Floor level. Elements of the structure may be prefabricated off-site using precast construction for speed of erection, less propping and formworks, and less site wastage. Foundations will consist of shallow strip and pad footings constructed in reinforced concrete.

Block B

Block B comprises a five-storey residential building over a single storey basement car park. The structure will be formed in reinforced concrete flat slab construction. Elements of the structure may be prefabricated off-site using precast construction for speed of erection, less propping and formworks, and less site wastage. Foundations will consist of shallow reinforced concrete pad and strip footings. The basement walls will be formed in reinforced concrete with the northern, southern and eastern boundaries formed from open-cut battered excavations. The western basement will be cast against the secant piled wall articulated along the western boundary to the site.

Block C

Block C comprises a five-storey residential building with plant and amenity space located at Ground Floor. The structure will be formed in reinforced concrete flat slab construction with transfer down-stand beams located within the First Floor slab in order to provide a clear open-plan space at Ground Floor level. Elements of the structure may be prefabricated off-site using precast construction for speed of erection, less propping and formworks, and less site wastage. Block C includes an external landscaped area that fronts the secant piled walls to the southern boundary of the site.

Block D

Block D comprises a three-storey residential building with retail/café space at Ground Floor. The structure will be formed in reinforced concrete flat slab construction with transfer down-stand beams located within the First Floor slab in order to provide a clear open-plan space at Ground Floor level. Elements of the structure may be prefabricated off-site using precast construction for speed of erection, less propping and formworks, and less site wastage.

5.2 Enabling Works & Piled Retaining Wall

The site enabling work will consist of site clearance of vegetation; installation of perimeter hoarding; demolition of the disused sports building and the former Baily Court Hotel; cut/fill of site topology to form berms and level platforms; and the installation of a piling mat at various levels. The proposed platform levels to enable the piled wall operation are shown in Figure 11.

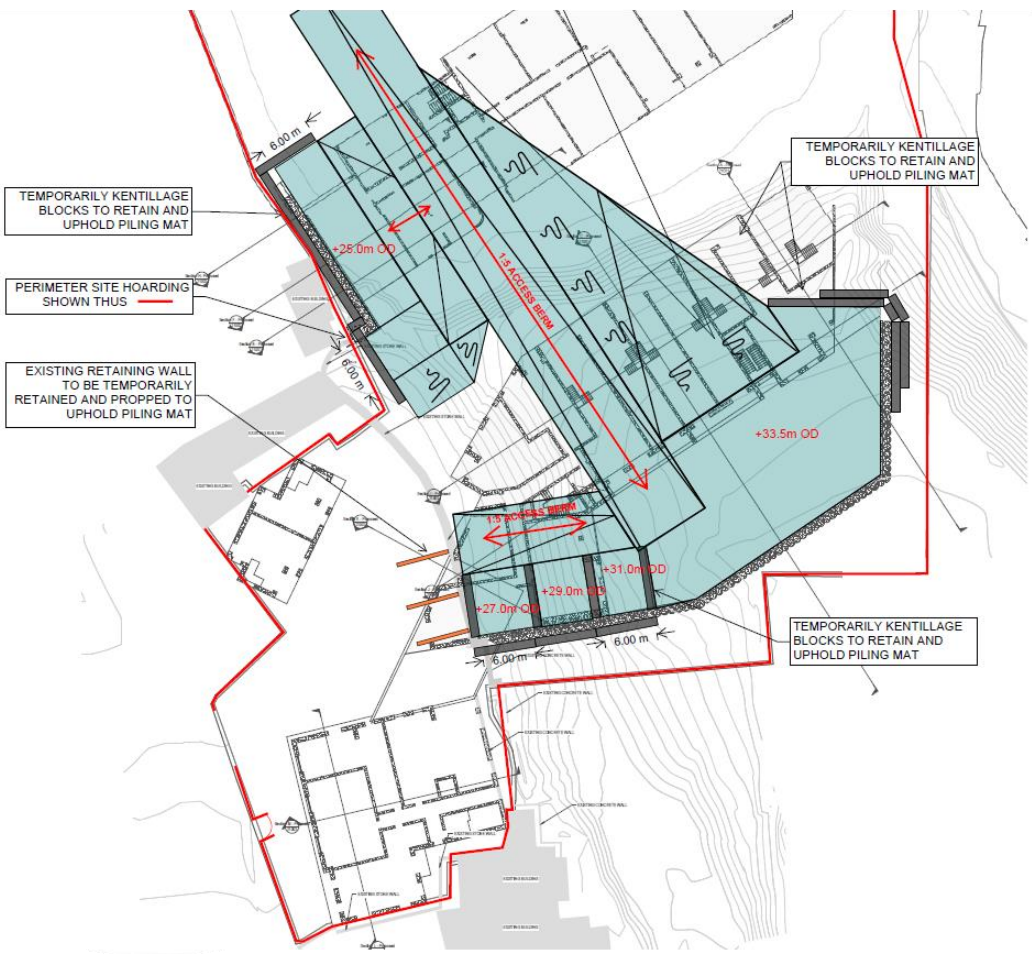


Figure 11 | *Preliminary Piling Platform Levels*

The secant piled retaining wall will comprise of interlocking 900mm and 1200mm diameter hard (male) and soft (female) piles, which will provide an inherently stiff and robust wall. In order to mitigate the impact to potential site hydrology the interlocking female piles will terminate 1m below the slab level to maintain permeability within the soils. The secant piled wall will be designed for a design working life of category 5 relating to an indicative working life of 120 years. Further details of the secant piled retaining wall are outlined in the Geotechnical Engineering Report included as part of this planning submission.

The secant piles will be installed using the continuous flight auger (CFA) piling method to minimise noise and vibration. The CFA piling method involves a hollow-stemmed continuous flight auger which is rotated into the ground to the required depth. As the auger is withdrawn, concrete is pumped down the hollow stem, with the flow rate and pressure set to maintain the pile shaft from collapsing and to prevent voids forming in the concrete. After the auger is extracted and the pile concreted to the surface, a reinforcing cage is then inserted into the wet concrete by excavator or by using a cage-vibrator. This piling technique minimises noise and vibrations.

Below ground obstructions (boulders, etc) be encountered during piling will be cored through using low vibration and ground movement methods. Displacement or driven piles shall not be used.

The secant piled wall will be continuously monitored for movement using inclinometers to measure lateral displacement to the head of the piled retaining wall as outlined in Section 7 of this report. Noise and vibration

monitoring regime shall also be established around the site and further details are outlined in Section 8 of this report.

On completion of the embedded secant piled wall the bulk excavation of the site will commence. The proposed formation levels is shown in Figure 12.

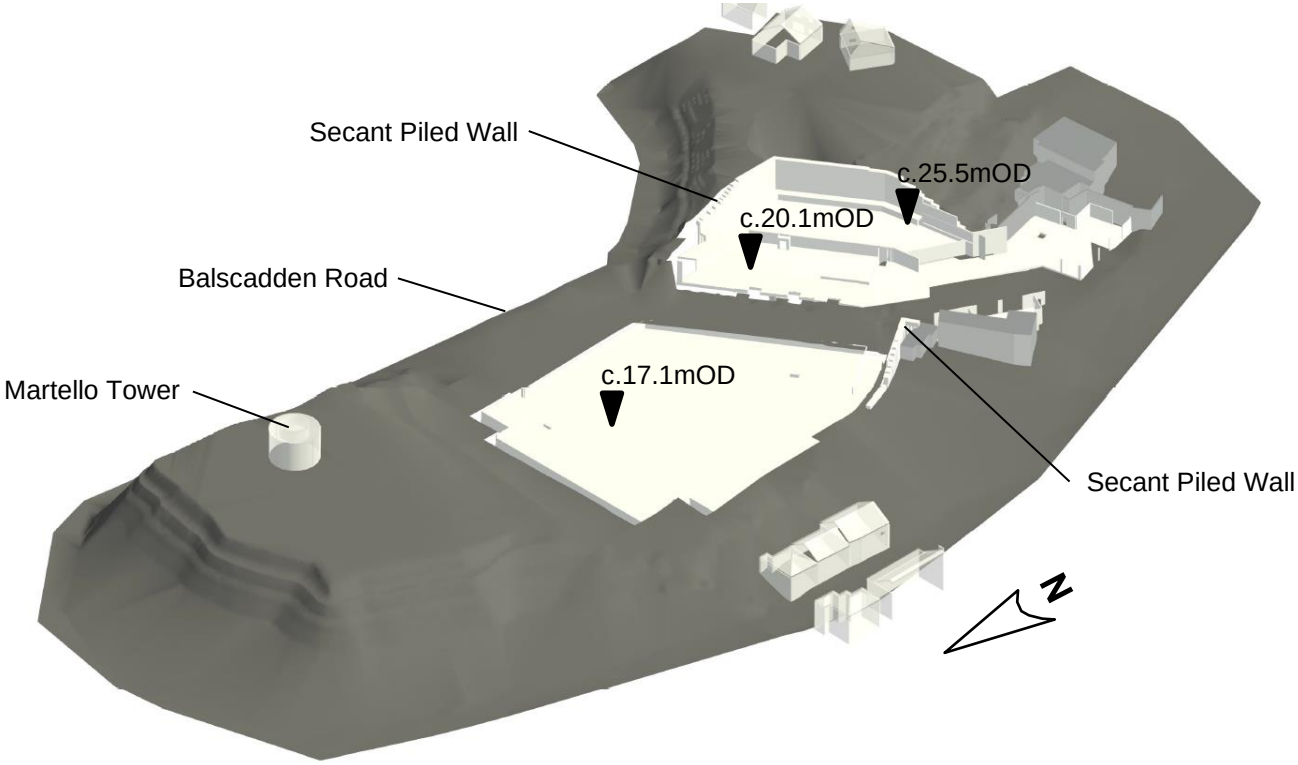


Figure 12 | *Proposed Formation / Lowest Excavated Levels*

5.3 Substructure & Foundations

The proposed foundations will consist of shallow ground bearing reinforced concrete strip and pad footings up to 850mm thick with ground bearing 350mm thick slabs spanning between the foundations. The foundations will support the rising columns and walls constructed in reinforced concrete.

The single level basement to Block B will be constructed in reinforced concrete. The walls will be 350mm thick reinforced concrete and constructed using open-cut battered excavation. The exception to this is the western boundary with the secant piled wall where the basement wall is 250mm thick and cast against the piled wall surface.

5.4 Super-Structure

It is proposed to construct the superstructures to Blocks A, B, C & D using flat slab construction with reinforced concrete blade columns. Parts of the structure may be prefabricated off-site using precast construction for speed of erection, less propping and formworks, and less site wastage – the viability of off-site construction will be determined by the Main Contractor. The structural solution provides economy of design whilst achieving the Architectural aspirations for minimum floor slab depths.

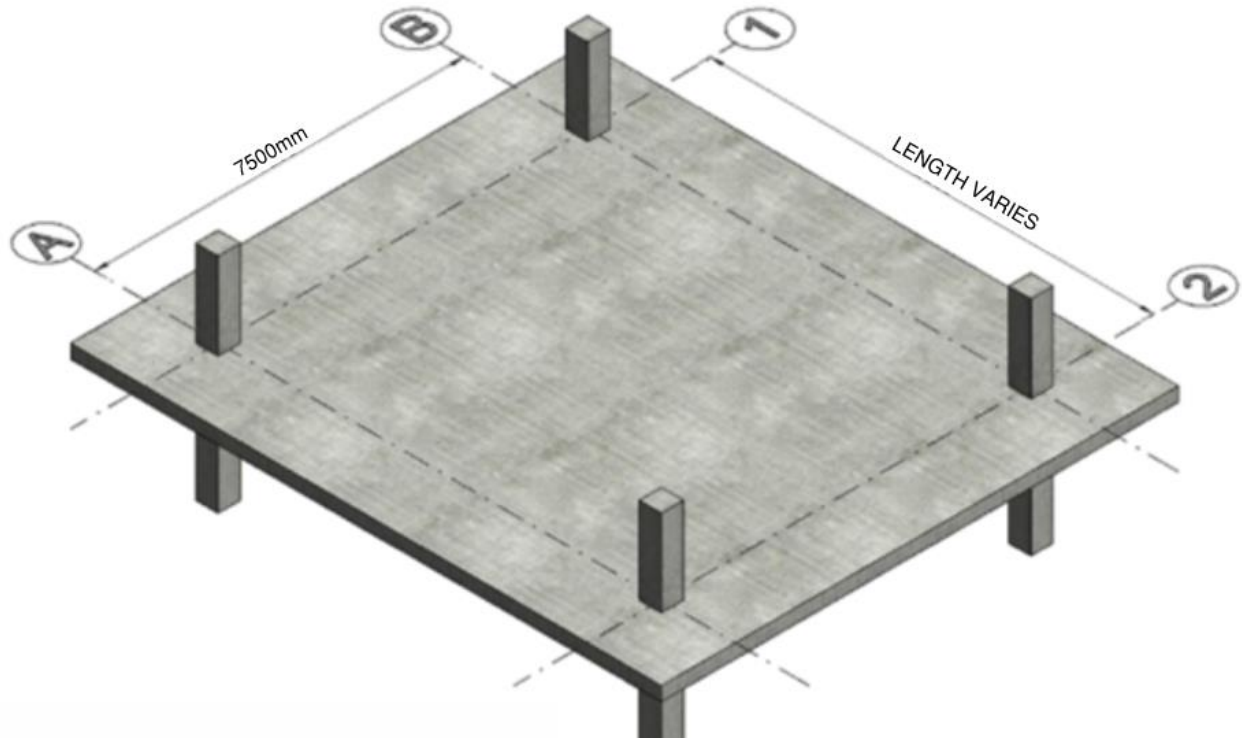


Figure 13 | *Typical Flat Slab Concrete Structural Grid*

The super-structure will likely use traditional construction techniques. The sequence of pouring the concrete stair and lift core and columns followed by the floor slabs will continue on a sequential floor by floor basis with formworks and temporary propping removed once the concrete has achieved sufficient strength.

Concrete placement will typically be via pumping for all large pours to free up the crane for other lifting operations. Wind and weather will be monitored and crane usage will be restricted as required during inclement weather to ensure safety of all personnel.

Figure 14 | *Typical Concrete Placement*

5.5 Building Envelope

The building envelope may be premanufactured off site using modular construction for speed of construction and less on-site waste. Panels would be erected via the crane on a floor-by-floor basis and fixed back to the primary structure for support.

Scaffolding will be required to the building perimeters where in-situ hand-set masonry is required. All scaffolding will conform to the HSA Code of Practice for Access and Working Scaffolds.

6. Construction and Demolition Waste Management

The following preliminary Construction and Demolition (C&D) Waste Management guideline provides information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with the current legal and industry standards including:

- The Waste Management Acts 1996 - 2011 and associated Regulations.
- Protection of the Environment Act 2003 as amended.
- Litter Pollution Act 1997 as amended.
- Eastern-Midlands Region Waste Management Plan 2015 – 2021 (note that no updated Waste Management Plan has been published to date).

These preliminary C&D Waste Management guidelines will be incorporated into the requirements for the Contractor and the Plan will be developed by the Contractor as the construction and demolition works progress.

Of particular importance, the C&D Waste Management Plan will aim to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water). The hierarchy of waste management sets out the guiding principles in order of importance as follows:-

- Reduction of the amount of waste generated by the construction process.
- Segregation of waste is a key concept that will be implemented during the course of the construction phase of the development to enable ease in re-use and recycling, wherever appropriate.
- Recycle waste material where feasible, including the use of excess excavations as fill material, recycling of various waste fractions such as metals, packaging etc.

6.1 Non-Hazardous Construction Waste

There will be waste materials generated from the demolition of the existing buildings on site comprising the disused sports building and the former Baily Court Hotel. The volume of waste generated from demolition will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated i.e. plasterboard on timber ceiling joists, steel embedded in concrete etc.

There will be excavated material comprising gravel, sand, stones, clay and made ground excavated to facilitate construction of new foundations and site formation levels. The preliminary estimated 63,619m^3 of material will need to be excavated to do so. There is limited opportunities for the reuse of excavated material onsite and it is envisaged that all material, will need to be removed offsite. This will be taken for appropriate offsite reuse, recovery, recycling and/or disposal.

During the construction phase there may be a surplus of building materials, such as timber off-cuts, broken concrete blocks, cladding, plastics, metals and tiles generated. There may also be excess concrete during construction which will need to be disposed of. Plastic and cardboard waste from packaging and supply of materials will also be generated. The contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Waste will also be generated from construction workers e.g. organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided on site during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

6.2 Potential Hazardous Wastes Arising

6.2.1 Contaminated Material

The works will include the excavation of a significant volume of soil. To reduce the quantity of soil to be removed from or imported into the site, the floor levels of the proposed buildings and roads are designed to match existing levels as closely as is feasible, to minimise the cut and fill balance. However, given the prominent location of the site on a hill, given the steep slopes on the site, and given that there is a large basement proposed, it is anticipated that there will be a surplus of soil to be removed from the site. It is currently estimated that there will be approximately 67,000m^3 of excess soil to be excavated and removed from the site (before any bulking factor has been applied).

Any surplus subsoil and rock required to be removed from site will be deposited in approved fill areas or to an approved waste disposal facility. Surplus subsoil will be stockpiled on site, in such a manner as to avoid contamination with builders' waste materials, etc., and so as to preserve the materials for future use as clean fill. The Construction Environmental Management Plan will include protocols for soil removal and will be implemented by the development's main contractor during the construction stage.

Preliminary environmental testing as part of the site investigations indicate that the soil is non-hazardous and encountering contaminated excavated material is not expected. Nevertheless, all site arisings will be appropriately tested, classified and disposed of by the appointed Contractor.

In the event that hazardous soil, or historically deposited waste is encountered during the site bulk excavation phase, the contractor will notify FCC and provide a Hazardous/Contaminated Soil Management Plan, to include estimated tonnages, description of location, any relevant mitigation, destination for disposal/treatment, in addition to information on the authorised waste collector(s).

In the case of topsoil, careful planning and on-site storage can ensure that this resource is reused on-site as much as possible. Any surplus of soil not reused on site can be sold. How-ever, topsoil is quite sensitive and can be rendered useless if not stored and cared for proper-ly. It is therefore important that topsoil is kept completely separate from all other construction waste, as any cross-contamination of the topsoil can render it useless for reuse.

It is important to ensure that topsoil is protected from all kinds of vehicle damage and kept away from site-track, delivery vehicle turning areas and site plant and vehicle storage areas.

If topsoil is stored in piles of greater than two metres in height, the soil matrix (internal struc-ture) can be damaged beyond repair. It should also be kept as dry as possible and used as soon as possible to reduce any deterioration through lengthy storage and excess moving around the site.

Records of topsoil storage, movements and transfer from site will be kept by the C&D Waste Manager.

6.2.2 Fuel/Oils

Fuels and oils are classed as hazardous materials; any on-site storage of fuel/oil, and all storage tanks and all draw-off points will be bunded and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and the site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil waste generated at the site.

6.2.3 Asbestos

Asbestos Containing Material (ACM) cement roof tiles are visible on the disused sports building.

Removal of asbestos or ACMs will be carried out by a suitably qualified contractor and ACM's will only be removed from site by a suitably permitted/licenced waste contractor in accordance with S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010. All material will be taken to a suitably licensed or permitted facility.

6.2.4 Other known Hazardous Substances

Paints, glues, adhesives and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

In addition, WEEE (containing hazardous components), printer toner/cartridges, batteries (Lead, Ni-Cd or Mercury) and/or fluorescent tubes and other mercury containing waste may be generated from during C&D activities or temporary site offices. These wastes, if generated, will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

6.2.5 Invasive Plant Species

Reference shall be made to the Outline Construction Environmental Management Plan and to the Natura Impact Statement, submitted as part of this planning application.

Japanese Knotweed (Fallopia japonica), which is listed on the Third Schedule of the Birds and Habitats Regulations, was not recorded on the site. Japanese Knotweed is an alien invasive species listed under schedule 3 of Regulations SI No. 477/2011. The Outline Construction Environmental Management Plan report concludes that it is not present on this site and there was no indication that it is growing in the immediate vicinity.

Three Cornered Leek (Allium triquetrum) was detected at the site in 2019, on the slopes facing the Baily Court Hotel. This species is listed in Part 1 of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011, as amended).

Assuming Three Cornered Leek is still at the site in the location it was previously detected, the following management will be undertaken:

- The contractor will engage with the National Parks and Wildlife Service prior to the removal of Three Cornered Leek from the Site.
- This species will be removed via chemical and/or mechanical means. Careful mechanical removal of bulbs followed by appropriate off-site disposal will reduce the infestation but is unlikely to destroy the seed bank. Mechanical removal may need to be repeated over a number of years to exhaust the seed bank. Herbicide application may be successful at reducing the spread of the plant. Applications of herbicide should be made in spring before flowering. However, similar to mechanical removal, multiple applications may be required due to the persistence of bulbs and of the soil seed bank. Disposal of material will be undertaken with due caution to prevent accidental spread of the plant. Waste materials containing Three cornered leek must be removed to an approved waste facility. Repeated treatments over successive years is typically necessary. Where physical methods are used, the treated area will also need to be monitored over a number of years for regrowth.

- Monitoring will be carried out for 2 years following treatment by a suitably qualified ecologist. Further monitoring may be required if treatment has not been successful. A site may be considered remediated after two consecutive growing seasons with no sign of regrowth from all of the previously identified stands.

Any material required on the site will be sourced from a stock that has been screened for the presence of any invasive species by a suitably qualified ecologist and where it is confirmed that none are present. All machinery will be thoroughly cleaned and disinfected prior to arrival on site to prevent the spread of invasive species.

Please refer also to the accompanying Natura Impact Statement, submitted as part of this planning application.

6.3 Main Construction and Demolition Waste Categories

The main non-hazardous and hazardous waste streams that could be generated by the demolition and construction activities at a typical site are listed below. The List of Waste (LoW) code (as effected from the 1st June 2015 and also referred to as the European Waste Code or EWC) for each waste stream is also shown.

Waste Material	LoW/EWC Code
Concrete, bricks, tiles, ceramics	17 01 01-03 & 07
Wood, glass and plastic	17 02 01-03
Treated wood, glass, plastic, containing hazardous substances	17-02-04*
Bituminous mixtures, coal tar and tarred products	17 03 01*, 02 & 03*
Metals (including their alloys) and cable	17 04 01-11
Soil and stones	17 05 03* & 04
Gypsum-based construction material	17 08 01* & 02
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Green waste	20 02 01
Electrical and electronic components	20 01 35 & 36
Batteries and accumulators	20 01 33 & 34
Liquid fuels	13 07 01-10
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Insulation materials	17 06 04
Organic (food) waste	20 01 08
Mixed Municipal Waste	20 03 01

* individual waste type may contain hazardous substances

***Table 2** | Typical waste types generated and LoW codes*

6.4 Demolition Waste Generation

The demolition stage will involve the demolition of the disused sports building and former Baily Court Hotel. The demolition areas are identified in the planning drawings provided with this application. The anticipated demolition waste and rates of reuse, recycling/recovery and disposal is shown in Tables 3 and 4 below.

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	67	0	0	85	57	15	10
Concrete, Bricks, Tiles, Ceramics	488	30	147	65	317	5	24
Plasterboard	0	30	0	60	0	10	0
Asphalts	108	30	32	65	70	5	5
Metals	59	5	3	80	47	15	9
Slate	8	80	6	10	1	10	1
Timber	96	10	10	60	57	30	29
Asbestos	6	0	0	0	0	100	6
Total	**832**		**195**		**549**		**84**

Table 3 | *Estimated off-site reuse, recycle and disposal rates for demolition waste from the site*

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	63,619	0	0	0	0	100	63,619
Timber	100	10	10	55	55	5	5
Plasterboard	3	30	1	70	2	0	0
Metals	10	10	1	90	9	0	0
Concrete	280	30	84	65	182	5	14
Asphalt	50	0	0	0	0	100	50
Other	250	20	50	60	150	20	50
Total	**64,312**		**146**		**398**		**63,738**

Table 4 | *Estimated off-site reuse, recycle and disposal rates for construction waste from the site*

The hierarchy of waste management sets out the guiding principles in order of importance as follows:

1. Reduction of the amount of waste generated by the construction process.
2. Segregation of waste is a key concept that will be implemented during the course of the construction phase of the development to enable ease in re-use and recycling, wherever appropriate.
3. Recycle waste material where feasible, including the use of excess excavations as fill material, recycling of various waste fractions such as metals and packaging etc.

Skips will be provided for the disposal of wood from the site. It is envisaged that the majority of the wood for disposal will come from pallets used for the transport of construction materials.

Other non-hazardous waste generated by the site (packaging and running of site offices) will be collected in separate roll-on skips. Skips shall be covered to contain dust and airborne pollutants arising from the site and to prevent nuisance to persons in the locality.

Any hazardous material encountered will be disposed of to a suitably licence tip.

The Purchasing Manager shall ensure that materials are ordered so that the quantity delivered, the timing of the delivery and the storage is not conducive to the creation of unnecessary waste.

All waste materials (where necessary, after in-situ reuse and recycling options have been fully considered) shall be disposed of off-site, under the appropriate Duty of Care and subject to approvals/consents from the relevant statutory bodies. It is the responsibility of the Main Contractor to ensure that any company to whom waste is transferred is legally permitted to do so and that the facility they bring the waste to is licensed to handle that type of waste as outlined in the Waste Management Acts 1996-2005. The Waste Collection Permit Register, in accordance with the Waste Management (Collection Permit) Regulations 2001 will be consulted to ensure that waste carriers hold the appropriate permit.

6.5 Appointment of C&D Waste Manager

The Main Contractor will appoint a C&D Waste Manager. The C&D Waste Manager will have overall responsibility for the implementation of the project Waste Management Plan (WMP) during the construction phase.

Copies of the Waste Management Plan will be made available to all relevant personnel on site. All site personnel and sub-contractors will be instructed regarding the objectives of the Waste Management Plan and informed of the responsibilities which fall upon them as a consequence of its provisions. Where source segregation, selective demolition and material reuse techniques apply, each member of staff will be given instructions on how to comply with the Waste Management Plan. Posters will be designed to reinforce the key messages within the Waste Management Plan and will be displayed prominently for the benefit of site staff.

6.6 C&D Record Keeping

It is the duty of the C&D Waste Manager to ensure that necessary licenses have been obtained as needed. Each consignment of C&D waste taken from the site will be subject to documentation which will conform with *Table 3* along with Transportation Dockets to ensure full traceability of the material to its final destination.

Detail	Particulars
Project of Origin	*Balscadden, Howth, Co. Dublin*
Material being Transported	*Soil, Construction waste*
Quantity of Material	*To be completed by C&D Waste Manager*
Date of Material Movement	*To be completed by C&D Waste Manager*
Name of Carrier	*To be completed by C&D Waste Manager*
Destination of Material	*To be completed by C&D Waste Manager*
Proposed Use	*To be completed by C&D Waste Manager*

Table 5 | *Details of materials taken from site*

6.7 Surface Water Protection

Surface water discharges from the Site will not be permitted onto Balscadden road nor into Howth Head SAC during the construction phase. As such, there will be no surface water discharges to the east of the Site.

Silt traps, silt fences and tailing ponds will be provided by the contractor where necessary to prevent silts and soils being washed away by heavy rains during the course of the construction stage. Surface water runoff and water pumped from the excavation works will be discharged via a silt trap / settlement pond to the existing foul drainage network. Straw bales will be used at the outfall to filter surface water to remove contaminants.

Trenched double silt fencing will be installed along the eastern boundary of the Proposed Development Site (along the existing contours of Balscadden Road but outside the boundary of the SAC area) on the inside of the hoarding. The silt fencing will act as a temporary sediment control device to protect the SAC from sediment and potential surface water run-off from the Site. The fencing will be inspected twice daily based on Site and weather conditions for any signs of contamination or excessive silt deposits and records of these checks will be maintained. Ponded water will be pumped from the trench into a sediment tank and discharged based on site authorisations or disposed of via a permitted wastewater contractor. Under no circumstances will any wastewater generated onsite be released into nearby drains or Balscadden Road.

Following completion of any required initial dewatering of excavations for the basement, foundations, drainage pipes, water supply and utilities, it is expected that flows of water into the excavations will be relatively small. These flows will be managed by sump pumping on an as-required basis.

During any discharge of surface water from the excavations, the quality of the water will be regularly monitored visually for hydrocarbon sheen and suspended solids. Periodic laboratory testing of discharge water samples will be carried out in accordance with the requirements of the discharge licence obtained from the Local Authority.

The following measures will be undertaken to protect the existing surface water network and the Howth Head Special Area of Conservation:

- Designated impermeable cement washout areas will be provided.
- Run-off from the working site or any areas of exposed soil will be channelled and intercepted at regular intervals for discharge to silt-traps or lagoons with over-flows directed to land rather than to a drain.
- Silty water generated on site will be treated using silt traps/settlement ponds and temporary interceptors and traps will be installed until such time as permanent facilities are constructed.
- Storm drain inlets which could receive stormwater from the project will be protected throughout the Construction Phase. Inlet protection will be installed before soil disturbing activities begin.
- A regular review of weather forecasts of heavy rainfall will be conducted and a contingency plan will be prepared for before and after such events to minimise any potential nuisances. As the risk of the break-out of silt laden run-off is higher during these weather conditions, no work will be carried out during such periods where possible.
- Any imported materials will, as much as possible, be placed on Site in their proposed location and double handling will be avoided. Where this is not possible designated temporary material storage areas will be used.

- These temporary storage areas will be surrounded with silt fencing to filter out any suspended solids from surface water arising from these materials.
- Temporary hydrocarbon interceptor facilities will be installed and maintained where Site Works involve the discharge of drainage waters to nearby drains.
- All containment and treatment facilities will be regularly inspected and maintained.
- Refuelling of plant during the Construction Phase will only be carried out at designated refuelling station locations on site. Each station will be fully equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works on site.
- Only emergency breakdown maintenance will be carried out on site. Drip trays and spill kits will be available on site to ensure that any spills from vehicles are contained and removed off site.
- All personnel working on site will be trained in pollution incident control response.
- Any other diesel, fuel or hydraulic oils stored on site will be stored in bunded storage tanks- the bunded area will have a volume of at least 110% of the volume of the stored materials as per best practice guidelines (Enterprise Ireland, BPGCS005).
- If portaloos and/or containerised toilets and welfare units will be used to provide facilities for site personnel, all associated waste will be removed from site by a licenced waste disposal contractor.
- Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released into nearby drains.

7. Protection of Adjacent Structures, Embankments & Features

Of particular importance to the development are the nearby and adjacent structures and sensitive sloped embankments including:

- Martello Tower (protected structure) & Tower Hill embankment
- Sensitive Embankment along Balscadden Road
- Adjoining 66 & 68 Main Street properties
- Neighbouring Residential Properties
- Howth Sewer Tunnel

7.1 North Boundary - Martello Tower & Tower Hill Embankment

7.1.1 Predicted Ground Movements (North Boundary)

The Geotechnical Report includes a detailed Ground Movement Analysis and is submitted as part of the planning documents.

The Ground Movement Analysis considered each stage of the development including demolition, piling, bulk excavation and construction. Each stage of development was analysed for consequential ground movement to the surrounding area.

The overall aim of the Ground Movement Analysis included the predicted potential impact of the proposed development to the adjacent Martello Tower and Tower Hill. A building damage assessment was used in accordance with CIRIA C760 ‘Criteria of building damage assessment’.

The results predict that the potential damage for all Martello Tower and Tower Hill remains at categories ranging of Category 0 ‘Negligible’ to Category 1 ‘Very Slight’ damage during all construction and demolition stages.

The ground movements resulting from the works shall be monitored against baseline readings prior to and during each phase of construction. This will be carried out by establishing a continuous monitoring regime around the site, including the northern boundary and base of the Tower Hill. Further details of the movement monitoring regime are outlined in Section 7.

7.1.2 Ground Borne Vibration (North Boundary)

Current proposal for the method of excavation along the northern boundary include an open-cut battered excavation. This avoids the need for operations involving ground borne vibration that may affect the surrounding environment. Should large obstructions be encountered during the excavation, methods of removing the obstructions will involve low vibration techniques such as drill and burst.

Continuous vibration monitoring will be carried along the northern boundary and base of the Tower Hill. Further details of the vibration monitoring regime are outlined in Section 8.

7.2 East Boundary - Embankment to Balscadden Road

As part of the enabling works the existing embankment along Balscadden Road within the site boundary will be reinforced and stabilised using a proprietary soil stability system (Terram Geocell or similar). The soil stabilisation system will prevent soil slippages and instability. Further details for the soil stabilisation works are shown in the Geotechnical Engineering Report submitted as part of the planning documents.

7.2.1 Predicted Ground Movements (East Boundary)

Ground movement as a result of the works may affect the embankments along Balscadden Road. The Geotechnical Report includes a detailed Ground Movement Analysis and is submitted as part of the planning documents.

The ground movements resulting from the works shall be monitored against baseline readings prior to and during each phase of construction. This will be carried out by establishing a continuous monitoring regime around the site, including the western boundary and top of the embankments to Balscadden Road. Further details of the movement monitoring regime are outlined in Section 7.

7.2.2 Ground Borne Vibration (East Boundary)

Current proposal for the method of excavation along the western boundary include an open-cut battered excavation. This avoids the need for operations involving ground borne vibration that may affect the surrounding environment. Should large obstructions be encountered during the excavation, methods of removing the obstructions will involve low vibration techniques such as drill and burst.

Continuous vibration monitoring will be carried along the western boundary and top of the embankments along Balscadden Road. Further details of the vibration monitoring regime are outlined in Section 8.

7.3 Western & Southern Boundary – Residential Properties

Several residential properties have rear gardens that adjoin the site to the western and southern boundaries.

7.3.1 Predicted Ground Movements (West & South Boundary)

Ground movement as a result of the works may affect the adjacent residential properties. The Geotechnical Report includes a detailed Ground Movement Analysis and is submitted as part of the planning documents.

The results predict that the residential properties to the southern and eastern boundaries are not impacted by the proposed works.

The ground movements resulting from the works shall be monitored against baseline readings prior to and during each phase of construction. This will be carried out by establishing a continuous monitoring regime around the site, including the southern and eastern boundary and top of the embankment. Further details of the movement monitoring regime are outlined in Section 7.

7.3.2 Ground Borne Vibration (West & South Boundary)

Current proposal for the method of excavation along the eastern and southern boundary include a secant piled retaining wall. The proposed method of construction of the secant piled wall will involve the CFA method. The CFA method offers low noise and low ground borne vibration in comparison to other forms of construction. For the avoidance of doubt, impact, driven or displacement piling shall not be used.

Continuous vibration monitoring will be carried along the southern and eastern boundaries and top of the embankments. Further details of the vibration monitoring regime are outlined in Section 8.

7.4 Howth Sewer Tunnel

The Howth Sewer Tunnel passing though the site is a 6.0 feet (1830mm) diameter sewer and has an invert level of approximately +2.405mOD. It was constructed between 1955 and 1956 by tunnelling. From the record information (“The Construction of the Howth Tunnel” O’Shee, 1955), tunnel consists of reinforced

concrete segment rings approximately 7.0 feet (2140mm) external diameter beneath the site. This was used primarily within the boulder clay, limestone rock, dense clays and loose rocks that were not self-supporting.

The proposed development will be constructed on shallow strip/pad footings and raft slabs. The foundations will be shallow ground bearing slabs with the lowest proposed formation level at +17.1mOD. Between the proposed building foundations and crown of the tunnel there is 12.71m overburden of soil.

A detailed soil-structure analysis has been undertaken as part of planning to assess the additional building load over the Howth Sewer Tunnel. Details of the analysis are shown in the Geotechnical Engineering report, submitted as part of planning. Over the next stage a Build-Over Agreement will be required with Irish Water.

8. Movement Monitoring

8.1.1 Overview

Prior to demolition of the existing building and bulk excavation of the site, an external survey control system is to be established around the site, including all adjacent structures, embedded retaining walls and boundary conditions outlined in Section 5.

This will be carried out using either traditional closed traverse surveying techniques or continuous automated total station (AMTS) monitoring of movement, depending on the sensitivity of the site boundary.

The monitoring regime shall have co-ordinates which are directly correlated to the building grids and datum levels related to those shown on the Land Survey drawings, issued by the Architect. An initial control survey is to be carried out by the Contractor and may be independently checked and verified by the appointed survey contractor.

The target locations shall be agreed with the relevant parties, including the architect, structural engineer, survey contractor and main contractor, and the target adhesive shall be tested to demonstrate that no damage will be caused to the existing building fabric or surface upon removal of the targets.

8.1.2 Proposed Monitoring Regime

The site boundaries and neighbouring buildings shall be continuously monitored for changes in vertical and lateral movement with real-time data available. The monitoring of movement will be measured against trigger levels with direct alerts (via email/SMS text) sent from the system to nominated persons.

The results shall be measured with co-ordinates in eastings, northings and elevation (E, N, Z) established. A minimum number of baseline co-ordinates shall to be recorded and checked for control purposes 2 weeks prior to commencement of the demolition works. The results are to be recorded and the directional change and quantum movement from the controls and previous readings calculated.

Trigger	Pile Head Movement	Action
Green	<12mm	No Action Required. Proceed with proposed construction sequence.
Amber	<16mm	Contact engineer. Frequency of monitoring to be increased.
Red	>20mm	Contact engineer immediately. Works to be suspended. Contingency Plan to be implemented and construction sequence may need amendment.

***Table 6** | Proposed Movement Trigger Levels – Bulk Excavation to Formation Level*

Trigger	Movement	Action
Green	<28mm	No Action Required
Amber	>32mm	Contact engineer. Frequency of monitoring to be increased.
Red	>36mm	Contact engineer immediately. Works to be suspended. Contingency Plan to be implemented.

***Table 6** | Proposed Movement Trigger Levels – Removal of Temporary Propping*

9. Control and Monitoring of Noise, Vibration and Dust on site

9.1 Condition Surveys

It will be necessary to carry out a detailed condition survey of all adjoining lands and properties prior to any works commencing on site, with particular attention paid to the protected Martello Tower noted previously in this report. In addition, baseline movement monitoring will be carried out in line with best practice.

9.2 Noise Monitoring

The Main Contractor will deal with the immediate dangers to hearing etc. associated with high noise levels and the impact of same on construction operatives by means of risk assessment and mitigation / precautionary measures and equipment, all in full compliance with the current Health and Safety legislation.

Noise on site shall comply with Safety, Health and Welfare at work (construction) Regulations 2006 to 2013, Safety, Health and Welfare at Work Act 2005, BS 6187:2011 - Code of Practice for full and partial demolition, BS 5228:2009+A1:2014 Parts 1 & 2 - Code of Practice for noise and vibration control on construction and open sites – Vibration, Environmental Protection Agency Act 1992 Sections 106-108, including all Local Authority specific requirements for this specific site.

A survey of baseline noise and vibration will be undertaken to gain an understanding of the typical range of the existing conditions in the surrounding area. Methods of minimising construction noise and vibration will be implemented where possible. The Main Contractor is to implement these recommendations and utilise the most efficient construction methods to reduce the impact on the neighbouring environment.

The nature of construction activities means that a certain level of noise is inevitable, but the appointed Main Contractor must endeavour to minimise this as far as practically possible and reduce the effect and any nuisance to the surrounding environment and neighbours.

Work methods are to be reviewed to ensure minimal noise and vibration are created; methods should include:

- Each item of plant used on site complies with the noise limits quoted in the relevant European Commission Directive 2000/14/EC/ [S.I. No. 632 of 2001].
- All plant and equipment liable to create noise whilst in operation will, as far as reasonably practicable, be located away from sensitive receptors and neighbouring occupied buildings.
- The use of barriers and hoarding to absorb and/or deflect noise away from noise sensitive areas, such as the adjacent residential buildings, will be employed where required and reasonably practicable.
- All plant, equipment and noise control measures applied to plant and equipment shall be maintained in good and efficient working order and operated such that noise emissions are minimised as far as reasonably practicable. Any plant, equipment or items fitted with noise control equipment found to be defective shall not be operated until repaired.
- Fixed items of construction plant shall be electrically powered in preference to diesel or petrol driven. The Main Contractor shall ensure that vehicles and mechanical plant employed for any activity associated with the construction works will, where reasonably practicable, be fitted with effective exhaust silencers.
- Machines in intermittent use shall be shut down or throttled down to a minimum during periods between works. Static noise emitting equipment operating continuously will be housed within suitable acoustic enclosures, where appropriate.

- Tower cranes will be utilized instead of crawler cranes as these are electrically powered and quieter in operation.
- Noise suppression hammers and shields will be used on rock breaking equipment.
- Working hours will be confined to those stipulated in the grant of planning permission.
- Noise emitting processes such as rock breaking can be suspended during sensitive hours, to be agreed in consultation with FCC and neighbours.
- Alternative work practices will be investigated where the noise emitted is reduced (for example prefabricating building components off site).
- Site deliveries will be confined to working hours and allocated offloading location will be utilized for all deliveries.
- The Site Manager will also continually review and monitor the noise / dust / vibration levels / risk throughout the duration of the project and if necessary, adjust / add to the control measures to be employed to reduce nuisance.

9.2.1 Measures to Mitigate Noise

Of particular consideration, is the noise from construction activities adjacent to the public footpaths, commercial areas (along Abbey Street) and the nearby residential properties. Noise mitigation measure will be proposed by the Main Contractor and may include:

1. The installation of a solid timber hoarding to provide noise insulation.
2. A high-level acoustic wrap applied to the scaffolding to provide some degree of noise barrier.
3. Particularly noisy works can have an acoustic noise control barrier put around them when the works are being carried out.
4. When jack hammers are used a “no racket” jacket will be applied which reduced the noise by up to 10db when 50ft away.

Figure 15 | *Typical Noise Mitigation Measures*

9.3 Vibration

During the course of the work proposed, ground borne vibrations could give rise to adverse effects to the nearby buildings, embankments and features outlined in Section 5. The following control measures are to be put in place during the works to ensure protection of these boundaries.

9.3.1 Proposed works and potential risks

Potential risks arising from Demolition and Construction Works identified:

(a) Vibration induced damage from demolition, piling and excavation works.

(b) Physical impact from machinery and /or swing of material deliveries

(c) General implementation of works such as landing shutters / reinforcement / steelwork deliveries in close proximity to the historic / protected structures.

(d) Works to the historic / protected structures themselves.

9.3.2 Vibrations Standards

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV). Guidance relevant to acceptable vibration within buildings is contained in the following documents:

- British Standard *BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration* (hereinafter referred to as BS7385:1993).
- British Standard *BS5228-2: 2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites – Vibration* (hereinafter referred to as BS 5228-2 2009+A1:2014).

9.3.3 Impact of ground borne vibrations arising from Proposed works

Peak particle velocity (PPV) is commonly used to assess the structural response of buildings to vibration. Reference to the following documents has been made for the purposes of this assessment in order to discuss appropriate PPV limit values:

- British Standard *BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration*.
- British Standard *BS5228-2: 2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites – Vibration*

BS7385-2:1993 and BS5228-2:2009+A1:2014 advise that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above for transient vibration. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table B.2 might need to be reduced by up to 50%. On a cautious basis, therefore, continuous vibration limits are set as 50% of those for transient vibration across all frequency ranges.

The documents note that minor structural damage can occur at vibration magnitudes which are greater than twice those presented in Table 6. Major damage to a building structure is possible at vibration magnitudes greater than four times the values set out in the Table. It should be noted that these values refer to the vibration at base of the building.

The vibration limit range for protected and historical buildings are equal to or up to 50% of those for light framed, depending on their structural integrity. Where no structural defects are noted, the same limit to those for light framed buildings apply. For other structures and buildings that are determined to be potentially vulnerable to vibration due to significant structural defects, a further stringent criteria has been applied for transient vibration. It is assumed that known buildings and structures of this kind, will be subject to condition surveys well in advance of the works, and any defects identified repaired. The results of conditions surveys will determine whether a building or structure is classed as “vulnerable”.

Table 6 sets out the limits as they apply to vibration frequencies below 4Hz where the most conservative limits are required. At higher frequencies, the limit values for transient vibration within Table B.2 of BS5228-2:2009+A1:2014 will apply, with similar reductions applied for continuous vibration and those for protected structures.

Structure Type	Allowable Vibration (in terms of PPV) at the Closest Part of Sensitive Property to the Source of Vibration, at a Frequency of 4Hz and less:	
	Transient Vibration	**Continuous Vibration**
Reinforced or framed structures. Industrial and heavy commercial buildings	50mm/s	25mm/s
Unreinforced or light framed structures. Residential or light commercial-type buildings	15mm/s	7.5mm/s
Protected and Historic Buildings	6mm/s – 15mm/s	3 mm/s – 7.5mm/s
Identified Potentially Vulnerable Structures and Buildings with Low Vibration Threshold	3mm/s	

***Table 7** | Thresholds relating to Transient and Continuous Vibrations in Buildings & Structures*

For the avoidance of doubt, due to the sensitive nature of the embankments and soil conditions around the Martello Tower, the lowest permissible vibration criteria in Table 6 shall apply relating to “Identified Potentially Vulnerable Structures” or an Allowable Vibration PPV of 3mm/s.

The relevant threshold values for all other existing buildings and structures adjacent to the site, shall be determined on a case-by-case basis following the dilapidation surveys ahead of works commencing on site. Where sufficient structural information is unavailable at the time of assessment, the lower value within the range in Table 6 will be used.

9.3.4 Mitigation Measures to be put in place prior to works

For controlling vibration reference should be made to BS 5228:2009+A1:2014 which offers detailed guidance on the control of vibration from demolition and construction activities. In general, BS5228:2009+A1:2014 advises the following:

- Use rubber linings in, for example, chutes and dumpers to reduce impact noise.
- Minimize drop height of materials.
- Regular and effective maintenance by trained personnel should be carried out to reduce vibration from plant and machinery.
- Hand demolition, cutting of the separation joints of the buildings in advance and small robotic breakers and ‘munchers’

Toolbox talks should also be carried out with personnel in respect to managing vibration on site. Exposure limits as set out in Regulation 4 of BS 5228:2009+A1:2014 will be reviewed, risk assessments carried out, detecting signs of injury, safe working practices and suppression techniques will all be incorporated. Methods of construction should be adopted to omit and or control vibration at the source, utilize lower levels

of vibration; use vibration pads and gloves where possible. Any activity which will generate vibration should as far as practicable be isolated from sensitive receptors. Level of protection and procedure put in place will be dictated by potential risk resulting from work to be carried out.

All works within the sensitivity zones of the site will be carried out using piling and excavation and assembly techniques to ensure vibration levels are kept below the threshold level. The proposed construction methodology for the structures directly adjacent to sensitive boundaries will be designed by the contractor to ensure that all protection measures are adhered to and that all new works are undertaken in such a way as to limit vibration.

9.3.5 Monitoring and Mitigation for Ground borne Vibrations during Construction Works

Detailed monitoring will be used to control the proposed works and to ensure compliance with the proposed control limits outlined in Table 6.

Vibrations movements will be actively measured during the works with a pre-determined plan of action ready to be put in place should actual measurements vary from the expected levels.

The works will have appropriate level of site management, on site monitoring and supervision. A site representative will be present during the works to ensure the levels are as expected and to supervise any measures should the levels be exceeded.

A real-time response remote monitoring system with warning system will be adopted to monitor vibration. This is to be continuously monitored by on site personnel during demolition; excavation; piling and general construction works. Review of the monitoring data will happen concurrently with the works to ensure that corrective action is undertaken if a limit is breached, or if the developing trend in measurements indicates a limit may be breached if works continue. This real time review and response of the monitoring data is critical to ensuring no limit is exceeded.

In the event that control limit is approached the contractor for the works will explore a revised approach for completion of the works.

In accordance with established good practice, baseline monitoring will be undertaken in advance of the proposed works in order to establish the existing environment around the historic structures and to verify the correct operation of the proposed instruments.

A series of trigger limits will be set for the works following what is commonly called a ‘traffic light’ system.

- For measurements below an ‘amber limit’ works can continue.
- For measurements between an ‘amber/red limit’ and below the ‘red limit’ operations will be suspended immediately. The construction methodology will be reviewed and adjusted as required to allow works to proceed on a manner that maintains the integrity of the historic structures.
- Works can continue between the amber and maximum red limit but only when methodologies have been revised to attempt to bring vibrations back below the amber level and also with a greater level of monitoring and control.
- Should vibrations go above the red limit works will be suspended for a full review of the exceedance event(s); revision of works procedures and approval by the clients’ representatives before operations can proceed again.

9.4 Air & Dust Management

A dust management plan will be compiled by the Main Contractor for the development.

The following precautions to minimise nuisance to the public and neighbouring occupiers caused by dust and dirt will be carried out by the contractor.

- Vehicle and wheel washing facilities shall be provided at site exit where practicable. If necessary, vehicles are to be washed down before exiting the site.
- Netting is to be provided to enclose scaffolding to mitigate escape of air borne dust from the existing buildings.
- Engines and exhaust systems should be maintained so that exhaust emissions do not breach stationary emission limits set for the vehicle / equipment type and mode of operation.
- Dust emission over the site boundary should be minimised using static sprinklers or other watering methods as necessary.
- No burning of materials to be permitted on site.
- Water sprays for dust suppression should be affixed to mechanical excavators/munchers involved in demolition works.
- Demolition waste should be removed from site as quickly as possible to minimise risk of dust generation and any fine material should be covered with a tarpaulin or similar material and tied down.
- Water sprays and cannons should be used where possible during cutting, with protective measures applied to retained finishes local to the cutting.
- Prior to commencement, the Main Contractor should identify the construction operations which are likely to generate dust and to draw up action plans to minimise emissions.

Figure 16 | *Typical Dust Mitigation Measures*

- In areas of poor natural ventilation, dust capture/extraction methods should be employed by the Main Contractor.
- The Main Contractor should allocate suitably qualified and experienced personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled.
- The Main Contractor will be required to appoint a senior member of its site management team to act as the liaison with third parties in respect of complaints regarding dust and or site activities.
- Monitoring of dust deposition should be undertaken at nominated boundary locations to ensure that dust levels comply with the TA Luft limit value of 350mg/(m²/day) based on a 30-day average using Bergerhoff gauges (Limits to be agreed with local authority).
- The contractor will carry out continuous dust monitoring in the Howth Head Special Area of Conservation (SAC) for the protection of habitats associated with that SAC.

10. Building Control Amendment Regulations

10.1 Quality Assurance during Construction and BC(A)R Compliance

The Main Contractor will need to demonstrate how they will be providing quality in construction. They shall comply fully with all requirements of the Amended Building Control regulations to the satisfaction of the Ancillary and Assigned certifiers.

The Main Contractor will be responsible for the preparation of benchmark samples of each new element of the works to the satisfaction of the Assigned and Ancillary Certifiers under the Building Control regulations (BCAR). Each benchmark sample will be considered a 'hold point' under the Preliminary Inspection Plan (PIP) and will be required to be offered up to the Certifiers involved ahead of the works starting - with a minimum of two days' notice (in writing).

The Main Contractor will be required to keep pre- and post-pour check sheets for submission to the assigned and ancillary certifiers where required.

Written acceptance will be required from the Certifiers after inspection of the benchmark samples before the rest of the works proceed.

Where 'specialist' suppliers are noted by the design team to have design responsibility, they will be required to provide Certificates of Design (Sd), Certificates of Inspection (Si) and Certificates of Completion (Sc). Ahead of appointment of the 'specialist' suppliers / designers - evidence of competency and Professional Indemnity insurance cover will be required for the approval of the Contract Administrator and Waterman Moylan.

This is to be confirmed by the Main Contractor once appointed and will include a quality check regime.

11. Liaison with Third Parties

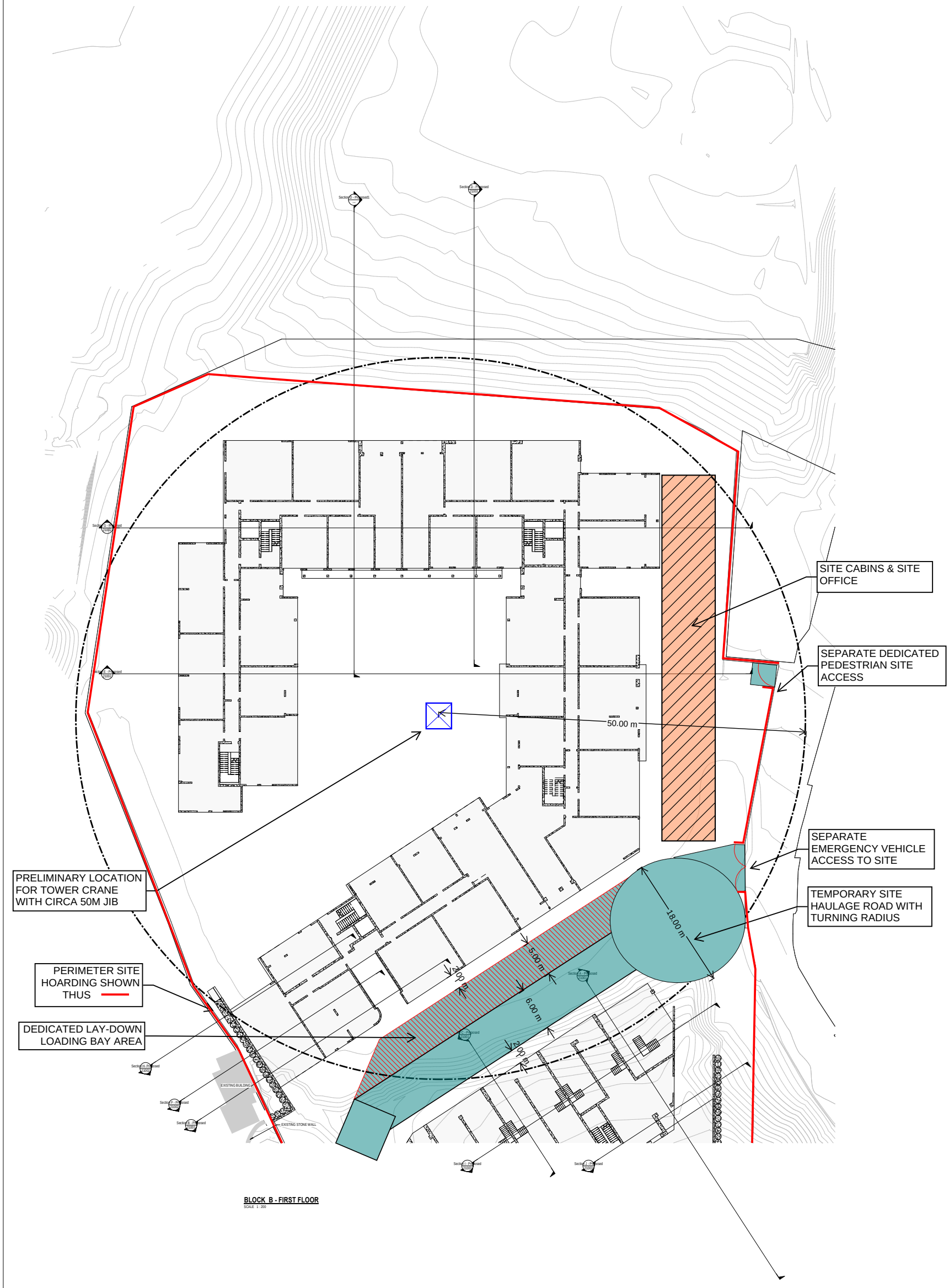
It is imperative that the Main Contractor engages in discussions with local residents, businesses and the general public well in advance of work commencing on site. Formal communication should be provided to immediate neighbours regarding activities or possible disruptions.

The appointed contractor will be required to adopt the practices covered under the 'Considerate Constructors Scheme' for establishing a good neighbour strategy and maintaining good relationships with neighbouring communities. The ideas described within this scheme will be implemented on site where applicable to minimize negative impact on local community and the environment.

Handling of any complaints must be logged and actioned quickly by the Main Contractor.

Appendices

A. Site Setup



BLOCK B - FIRST FLOOR
SCALE 1 : 200

This drawing should not be scaled. Dimensions to be verified on site.
Any discrepancies should be referred to the Engineer prior to work being put in hand.

GENERAL NOTES

1. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.
3. ALL STRUCTURAL CONCRETE TO BE GRADE C32/40 MIN. WITH 10mm MAX. AGGREGATE SIZE TYPE XA3 IN CONTACT WITH GROUND. UNLESS NOTED OTHERWISE.
4. COVER TO REINFORCEMENT BELOW GROUND LEVEL TO BE 75mm WITHOUT BLINDING OR SHUTTERING.
5. REINFORCEMENT TO COMPLY WITH B.S. 8666:2005 AND TO BE FOLLOWS: H - GRADE B500A, GRADE B500B OR GRADE B500C CONFORMING TO BS 4449:2005
   A - GRADE B500A CONFORMING TO BS 4449:2005
   B - GRADE B500B CONFORMING TO BS 4449:2005
   C - GRADE B500C CONFORMING TO BS 4449:2005
6. ALL STRUCTURAL STEELWORK TO BE GRADE S275 TO B.S.EN 10025.
7. THE DETAILS OF ALL WELDING CONNECTIONS SHOULD COMPLY WITH B.S. 5135.
8. FULL WORKSHOP DETAILS FOR ALL STRUCTURAL STEEL ELEMENTS ARE TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL INCLUDING DESIGN CALCULATIONS FOR CONNECTIONS.
9. ALL BOLTED JOINT CONNECTIONS TO BE BY MEANS OF GRADE 8.8 BOLTS TO B.S. 3692.
10. THE CONTRACTOR IS TO INCLUDE FOR TESTING OF WORKSHOP WELDS AND SITE WELDS IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIFICATION.
11. ALL BLOCKWORK TO HAVE A MINIMUM COMPRESSION STRENGTH OF 7.5N/mm² (S7.5) TO IS20 U.N.O.
12. CAVITY WALL TIES TO BE SIS STRIP TYPE WALL TIES AT 750mm c/c HORIZONTALLY AND 450mm c/c VERTICALLY, AT CONTROL JOINTS AND AROUND OPES'S TIES TO BE PROVIDED AT 225mm VERTICAL CENTRES.
13. ALL STRUCTURAL TIMBER TO BE GRADE C16 TO IS444 OR BETTER.
14. ALL REINFORCEMENT TO BE INSPECTED BY ENGINEER PRIOR TO POURING OF CONCRETE.
15. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY OR DETERMINE ALL DIMENSIONS AND LEVELS REQUIRED PRIOR TO COMMENCEMENT OF CONSTRUCTION OR PRODUCTION OF FABRICATION DRAWINGS.
16. FOR ALL SETTING OUT, REFER TO ARCHITECTS DETAILS.
17. PERISHABLE COMPRESSIBLE FILLER BOARD IS NOT TO BE USED.
18. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY WORKS REQUIRED IN ORDER TO CONSTRUCT THE BUILDING, WHILST MAINTAINING OVERALL STABILITY.
19. ALL PRECAST CONCRETE ELEMENTS TO BE CONSTRUCTED IN ACCORDANCE WITH SPECIALIST SUB-CONTRACTOR'S DETAILS AND SPECIFICATIONS.
20. THE FORMATION FOR ALL FOUNDATIONS IS TO BE INSPECTED BY THE ENGINEER PRIOR TO THE POURING OF ANY CONCRETE. THE CONTRACTOR SHALL NOT EXCAVATE BELOW FORMATION LEVELWITHOUT PRIOR WRITTEN INSTRUCTION FROM THE ENGINEER.
21. ALL MATERIAL & WORKMANSHIP TO BE IN ACCORDANCE WITH ENGINEER'S SPECIFICATIONS.
22. ALL BACKFILL MATERIAL SHALL COMPLY WITH THE PROVISIONS OF SR21 AND I.S. E.N. 13242:2002. TESTING SHALL BE BE CARRIED OUT BY THE CONTRACTOR AT THE SOURCE OF ANY MATERIAL PROPOSED AS FILL TO VERIFY THE MATERIAL COMPLIES WITH THE GUIDANCE GIVEN IN SR21. WRITTEN CONFIRMATION ON COMPLIANCE MUST BE ISSUED BY THE CONTRACTOR PRIOR TO ARRIVAL OF MATERIAL ON SITE.
23. ALL BLOCKWORK / CONCRETE INTERFACES TO BE TIED USING STAINLESS STEEL WALL TIES AT 225mm SPACING (VERT.)
24. ALL INSULATION, DPC & RADON DETAILS TO ARCHITECT'S SPECIFICATIONS.
25. REFER TO PRECAST SUPPLIER FOR PRECAST FLOOR PROPPING REQUIREMENTS.
26. ALL PRECAST CONCRETE UNITS TO HAVE 100mm MIN. BEARING ONTO MASONRY WALLS/CONCRETE BEAMS/CONCRETE WALLS.
27. USE JOIST HANGERS AT ALL TIMBER TO TIMBER JOINTS.
28. BOTTOM OF TRENCHES TO BE CLEANED AND SIGNED OFF BY ENGINEER PRIOR TO THE POURING OF ANY CONCRETE.
29. CONCRETE TRENCH FILL UNDER FOUNDATION STRIPS TO BE C20/25.
30. ALL FOUNDATIONS TO BE FOUNDED ON FIRM VIRGIN GROUND.
31. ALL WALLS TO BE LOCATED CENTRALLY ON FOUNDATIONS (U.N.O.).
32. ALL ROOF BRACING TO SPECIALIST TIMBER TRUSS DESIGNERS DESIGN & SPECIFICATION.
33. ALL WORKS CARRIED OUT MUST COMPLY WITH THE RELEVANT PARTS OF THE CURRENT BUILDING REGULATIONS AND TECHNICAL GUIDANCE DOCUMENTS ENSURING THE WORKS ARE CARRIED OUT USING 'PROPER MATERIALS WHICH ARE FIT FOR USE FOR WHICH THEY ARE INTENDED AND FOR THE CONDITIONS IN WHICH THEY ARE TO BE USED'.
34. ALL MATERIALS USED SHALL BE (CE) MARKED IN ACCORDANCE WITH THE EU CONSTRUCTION PRODUCT REGULATIONS (CPR) (No.305/2011). REFER TO ANNEX IV OF THE REGULATIONS FOR THE LIST OF APPLICABLE PRODUCTS. ALL MATERIALS USED SHALL BE (CE) MARKED IN ACCORDANCE WITH THE EU CONSTRUCTION PRODUCT REGULATIONS (CPR) (No.305/2011). REFER TO ANNEX IV OF THE REGULATIONS FOR THE LIST OF APPLICABLE PRODUCTS.
35. REFER TO PILING SPECIFICATION FOR TESTING REQUIREMENTS

Rev	Date	Description	Drawn By	Checked By

Amendments

Project: BALSCADDEN, HOWTH

Title: SITE SETUP
NORTHERN BOUNDARY

Client: MARLET PROPERTY GROUP

Architect: PLUS ARCHITECTURE

Waterman Moylan
Engineering Consultants

Block S East Point Business Park Dublin D03 H3F4
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Status: PLANNING

Drawn By	Designed By	Checked By	Approved By
PFG	PFG	RN	RO

Waterman-Moylan Ref.	Date	Scales @ A1
21-032		1 : 200

File Path

Project - Originator - Volume - Level - Type - Role - Number: 21-032-WMS-C-01-SK-S-002

Revision:

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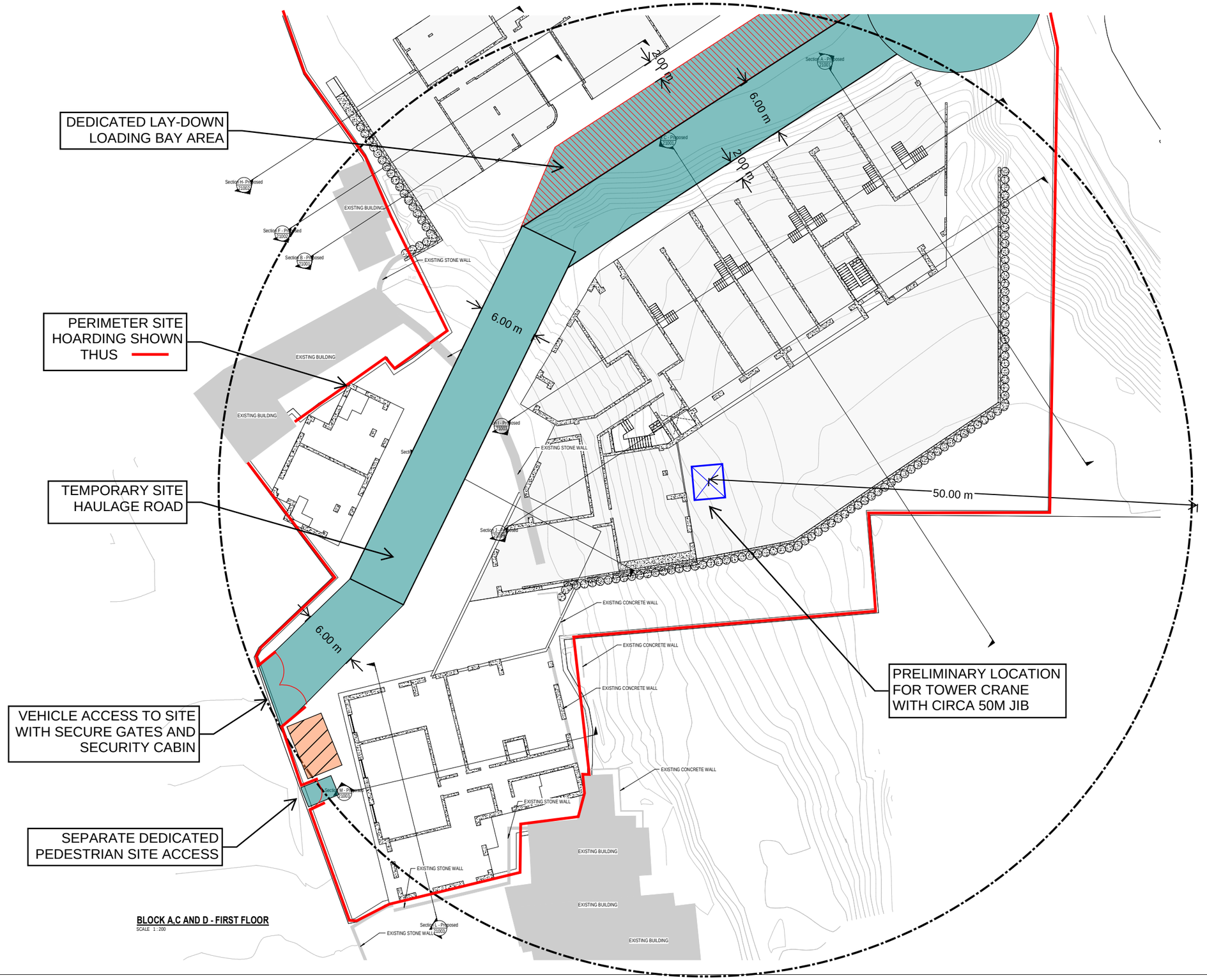

BLOCK A,C AND D - FIRST FLOOR
SCALE 1 : 200

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GENERAL NOTES

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2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.
3. ALL STRUCTURAL CONCRETE TO BE GRADE C45/55 WITH 10mm MAX. AGGREGATE SIZE. UNLESS NOTED OTHERWISE.
4. COVER TO REINFORCEMENT BELOW GROUND LEVEL TO BE 75mm WITHOUT BLINDING OR SHUTTERING.
5. REINFORCEMENT TO COMPLY WITH B.S. 8666:2005 AND TO BE FOLLOWS: H - GRADE B500A, GRADE B500B OR GRADE B500C CONFORMING TO BS 4449:2005
   A - GRADE B500A CONFORMING TO BS 4449:2005
   B - GRADE B500B CONFORMING TO BS 4449:2005
   C - GRADE B500C CONFORMING TO BS 4449:2005
6. ALL STRUCTURAL STEELWORK TO BE GRADE S355 TO B.S.EN 10025.
7. THE DETAILS OF ALL WELDING CONNECTIONS SHOULD COMPLY WITH B.S. 5135.
8. FULL WORKSHOP DETAILS FOR ALL STRUCTURAL STEEL ELEMENTS ARE TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL INCLUDING DESIGN CALCULATIONS FOR CONNECTIONS.
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    ALL WELDS TO BE 10mm F.W. UNLESS NOTED OTHERWISE.
11. ALL BLOCKWORK TO HAVE A MINIMUM COMPRESSION STRENGTH OF 7.5N/mm² (S7.5) TO IS20 U.N.O.
12. CAVITY WALL TIES TO BE S/S STRIP TYPE WALL TIES AT 750mm c/c HORIZONTALLY AND 450mm c/c VERTICALLY. AT CONTROL JOINTS AND AROUND OPES'S TIES TO BE PROVIDED AT 225mm VERTICAL CENTRES.
13. ALL STRUCTURAL TIMBER TO BE GRADE C16 TO IS444 OR BETTER.
14. ALL REINFORCEMENT TO BE INSPECTED BY ENGINEER PRIOR TO POURING OF CONCRETE.
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27. USE JOIST HANGERS AT ALL TIMBER TO TIMBER JOINTS.
28. BOTTOM OF TRENCHES TO BE CLEANED AND SIGNED OFF BY ENGINEER PRIOR TO THE POURING OF ANY CONCRETE.
29. CONCRETE TRENCH FILL UNDER FOUNDATION STRIPS TO BE C20/25.
30. ALL FOUNDATIONS TO BE FOUNDED ON FIRM VIRGIN GROUND.
31. ALL WALLS TO BE LOCATED CENTRALLY ON FOUNDATIONS (U.N.O.).
32. ALL ROOF BRACING TO SPECIALIST TIMBER TRUSS DESIGNERS DESIGN & SPECIFICATION.
33. ALL WORKS CARRIED OUT MUST COMPLY WITH THE RELEVANT PARTS OF THE CURRENT BUILDING REGULATIONS AND TECHNICAL GUIDANCE DOCUMENTS ENSURING THE WORKS ARE CARRIED OUT USING PROPER MATERIALS WHICH ARE FIT FOR USE FOR WHICH THEY ARE INTENDED AND FOR THE CONDITIONS IN WHICH THEY ARE TO BE USED.
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35. REFER TO PILING SPECIFICATION FOR TESTING REQUIREMENTS
36. 'DRY-TECH' SPECIALIST WHITE TANKING SYSTEM TO BE USED TO WATERPROOF ALL CONCRETE SUB STRUCTURES.
37. EXISTING BASEMENT WALL CONSTRUCTION TO BE CONFIRMED ON SITE.
38. ROCK LEVELS VARY BETWEEN 8-12m BEGL (TBC PENDING FULL SITE INVESTIGATION).
39. INTUMESCENT PAINT TO STEELWORK TO BE IN ACCORDANCE WITH SECTION M60 OF THE ARCHITECTS SPECIFICATION.
39. INTUMESCENT PAINT TO STEELWORK TO BE IN ACCORDANCE WITH SECTION M60 OF THE ARCHITECTS SPECIFICATION.
40. REFER TO ARUP DRAWINGS FOR RECORDS OF EXISTING STRUCTURE.
41. ALL SLAB THICKNESSES TO BE CONFIRMED SUBJECT TO PLANT LAYOUT.

Rev	Date	Description	Drawn By	Checked By
		Amendmeres		

Project
BALSCADDEN, HOWTH

Title
SITE SETUP
SOUTHERN BOUNDARY

Client
MARLET PROPERTY GROUP

Architect
PLUS ARCHITECTURE

Waterman Moylan
Engineering Consultants

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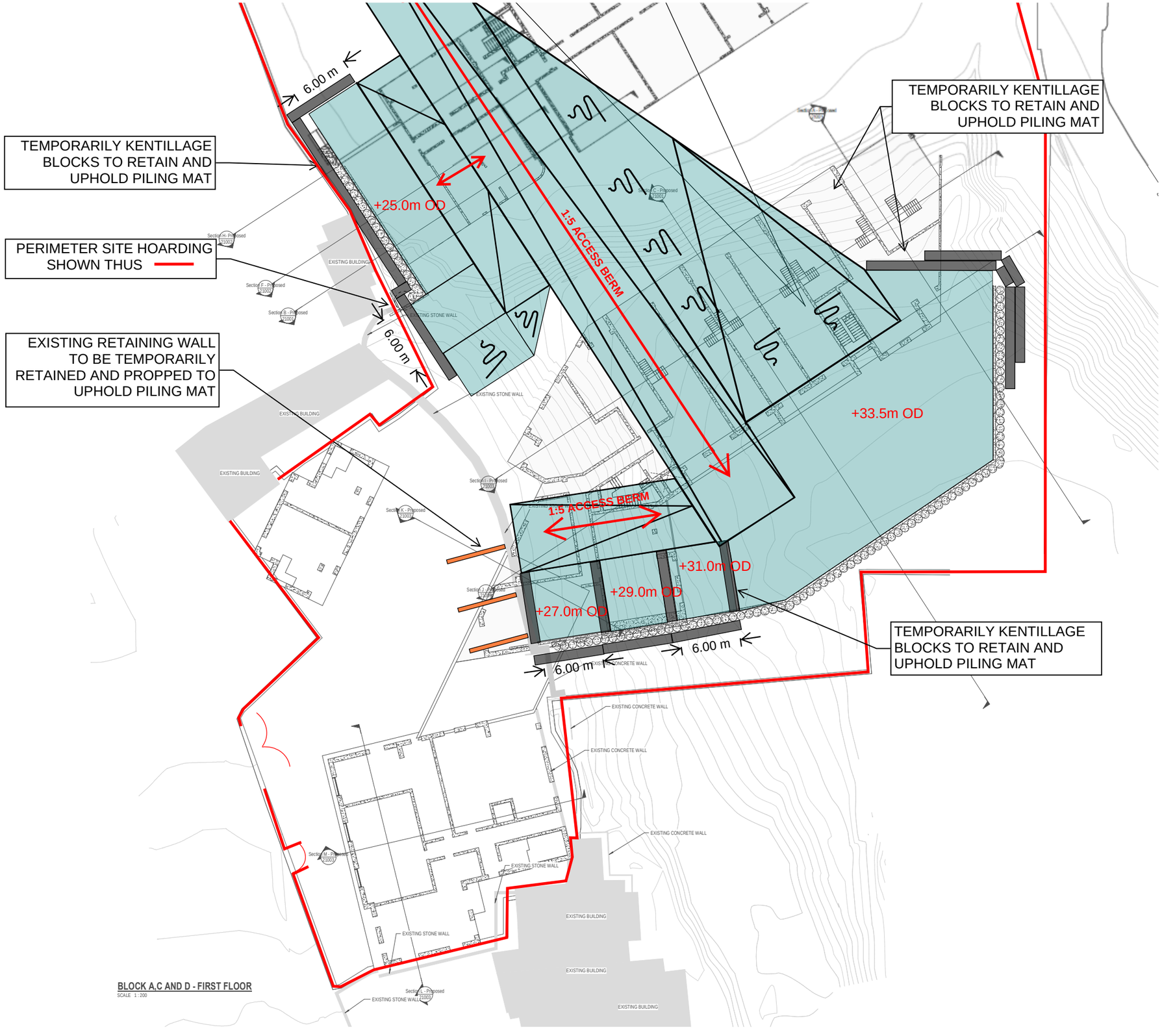
Status
PLANNING

Designed By	Checked By	Waterman Ref.
PFG	RO	21-032
Drawn By	**Date**	**Scales @ A1**
PFG	JUNE 2021	1 : 200

Project - Originator - Volume - Level - Type - Role - Number	Revision
21-032-WMS-C-01-SK-S-002	P01



BLOCK A,C AND D - FIRST FLOOR
SCALE 1 : 200

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GENERAL NOTES

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2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.
3. ALL STRUCTURAL CONCRETE TO BE GRADE C45/55 WITH 10mm MAX. AGGREGATE SIZE. UNLESS NOTED OTHERWISE.
4. COVER TO REINFORCEMENT BELOW GROUND LEVEL TO BE 75mm WITHOUT BLINDING OR SHUTTERING.
5. REINFORCEMENT TO COMPLY WITH B.S. 8666:2005 AND TO BE FOLLOWS: H - GRADE B500A, GRADE B500B OR GRADE B500C CONFORMING TO BS 4449:2005
   A - GRADE B500A CONFORMING TO BS 4449:2005
   B - GRADE B500B CONFORMING TO BS 4449:2005
   C - GRADE B500C CONFORMING TO BS 4449:2005
6. ALL STRUCTURAL STEELWORK TO BE GRADE S355 TO B.S.EN 10025.
7. THE DETAILS OF ALL WELDING CONNECTIONS SHOULD COMPLY WITH B.S. 5135.
8. FULL WORKSHOP DETAILS FOR ALL STRUCTURAL STEEL ELEMENTS ARE TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL INCLUDING DESIGN CALCULATIONS FOR CONNECTIONS.
9. ALL BOLTED JOINT CONNECTIONS TO BE BY MEANS OF GRADE 8.8 BOLTS TO B.S. 3692.
10. THE CONTRACTOR IS TO INCLUDE FOR TESTING OF WORKSHOP WELDS AND SITE WELDS IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIFICATION.
    ALL WELDS TO BE 10mm F.W. UNLESS NOTED OTHERWISE.
11. ALL BLOCKWORK TO HAVE A MINIMUM COMPRESSION STRENGTH OF 7.5N/mm² (S7.5) TO I.S20 U.N.O.
12. CAVITY WALL TIES TO BE S/S STRIP TYPE WALL TIES AT 750mm c/c HORIZONTALLY AND 450mm c/c VERTICALLY. AT CONTROL JOINTS AND AROUND OPES'S TIES TO BE PROVIDED AT 225mm VERTICAL CENTRES.
13. ALL STRUCTURAL TIMBER TO BE GRADE C16 TO IS444 OR BETTER.
14. ALL REINFORCEMENT TO BE INSPECTED BY ENGINEER PRIOR TO POURING OF CONCRETE.
15. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY OR DETERMINE ALL DIMENSIONS AND LEVELS REQUIRED PRIOR TO COMMENCEMENT OF CONSTRUCTION OR PRODUCTION OF FABRICATION DRAWINGS.
16. FOR ALL SETTING OUT, REFER TO ARCHITECTS DETAILS.
17. PERISHABLE COMPRESSIBLE FILLER BOARD IS NOT TO BE USED.
18. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY WORKS REQUIRED IN ORDER TO CONSTRUCT THE BUILDING, WHILST MAINTAINING OVERALL STABILITY.
19. ALL PRECAST CONCRETE ELEMENTS TO BE CONSTRUCTED IN ACCORDANCE WITH SPECIALIST SUB-CONTRACTOR'S DETAILS AND SPECIFICATIONS.
20. THE FORMATION FOR ALL FOUNDATIONS IS TO BE INSPECTED BY THE ENGINEER PRIOR TO THE POURING OF ANY CONCRETE. THE CONTRACTOR SHALL NOT EXCAVATE BELOW FORMATION LEVEL WITHOUT PRIOR WRITTEN INSTRUCTION FROM THE ENGINEER.
21. ALL MATERIAL & WORKMANSHIP TO BE IN ACCORDANCE WITH ENGINEER'S SPECIFICATIONS.
22. ALL BACKFILL MATERIAL SHALL COMPLY WITH THE PROVISIONS OF SR21 AND I.S. E.N. 13242-2002. TESTING SHALL BE BE CARRIED OUT BY THE CONTRACTOR AT THE SOURCE OF ANY MATERIAL PROPOSED AS FILL TO VERIFY THE MATERIAL COMPLIES WITH THE GUIDANCE GIVEN IN SR21. WRITTEN CONFIRMATION ON COMPLIANCE MUST BE ISSUED BY THE CONTRACTOR PRIOR TO ARRIVAL OF MATERIAL ON SITE.
23. ALL BLOCKWORK / CONCRETE INTERFACES TO BE TIED USING STAINLESS STEEL WALL TIES AT 225mm SPACING (VERT.)
24. ALL INSULATION, DPC & RADON DETAILS TO ARCHITECT'S SPECIFICATIONS.
25. REFER TO PRECAST SUPPLIER FOR PRECAST FLOOR PROPPING REQUIREMENTS.
26. ALL PRECAST CONCRETE UNITS TO HAVE 100mm MIN. BEARING ONTO MASONRY WALLS/CONCRETE BEAMS/CONCRETE WALLS.
27. USE JOIST HANGERS AT ALL TIMBER TO TIMBER JOINTS.
28. BOTTOM OF TRENCHES TO BE CLEANED AND SIGNED OFF BY ENGINEER PRIOR TO THE POURING OF ANY CONCRETE.
29. CONCRETE TRENCH FILL UNDER FOUNDATION STRIPS TO BE C20/25.
30. ALL FOUNDATIONS TO BE FOUNDED ON FIRM VIRGIN GROUND.
31. ALL WALLS TO BE LOCATED CENTRALLY ON FOUNDATIONS (U.N.O.).
32. ALL ROOF BRACING TO SPECIALIST TIMBER TRUSS DESIGNERS DESIGN & SPECIFICATION.
33. ALL WORKS CARRIED OUT MUST COMPLY WITH THE RELEVANT PARTS OF THE CURRENT BUILDING REGULATIONS AND TECHNICAL GUIDANCE DOCUMENTS ENSURING THE WORKS ARE CARRIED OUT USING PROPER MATERIALS WHICH ARE FIT FOR USE FOR WHICH THEY ARE INTENDED AND FOR THE CONDITIONS IN WHICH THEY ARE TO BE USED.
34. ALL MATERIALS USED SHALL BE (CE) MARKED IN ACCORDANCE WITH THE EU CONSTRUCTION PRODUCT REGULATIONS (CPR) (No.305/2011). REFER TO ANNEX IV OF THE REGULATIONS FOR THE LIST OF APPLICABLE PRODUCTS. ALL MATERIALS USED SHALL BE (CE) MARKED IN ACCORDANCE WITH THE EU CONSTRUCTION PRODUCT REGULATIONS (CPR) (No.305/2011). REFER TO ANNEX IV OF THE REGULATIONS FOR THE LIST OF APPLICABLE PRODUCTS.
35. REFER TO PILING SPECIFICATION FOR TESTING REQUIREMENTS
36. 'DRY-TECH' SPECIALIST WHITE TANKING SYSTEM TO BE USED TO WATERPROOF ALL CONCRETE SUB STRUCTURES.
37. EXISTING BASEMENT WALL CONSTRUCTRUCTION TO BE CONFIRMED ON SITE.
38. ROCK LEVELS VARY BETWEEN 9-12m BEGL (TBC PENDING FULL SITE INVESTIGATION).
39. INTUMESCENT PAINT TO STEELWORK TO BE IN ACCORDANCE WITH SECTION M60 OF THE ARCHITECTS SPECIFICATION.
39. INTUMESCENT PAINT TO STEELWORK TO BE IN ACCORDANCE WITH SECTION M60 OF THE ARCHITECTS SPECIFICATION.
40. REFER TO ARUP DRAWINGS FOR RECORDS OF EXISTING STRUCTURE.
41. ALL SLAB THICKNESSES TO BE CONFIRMED. SUBJECT TO PLANT LAYOUT.

Rev	Date	Description	Drawn By	Checked By
		Amendmens		

Project
BALSCADDEN, HOWTH

Title
TEMPORARY PILING PLATFORM LEVELS FOR THE INSTALLATION OF PILES

Client
MARLET PROPERTY GROUP

Architect
PLUS ARCHITECTURE

Waterman Moylan
Engineering Consultants

Block S East Point Business Park Dublin D03 H3F4
t +353 1 664 8900
info@moylan.ie www.waterman-moylan.ie

Status
PLANNING

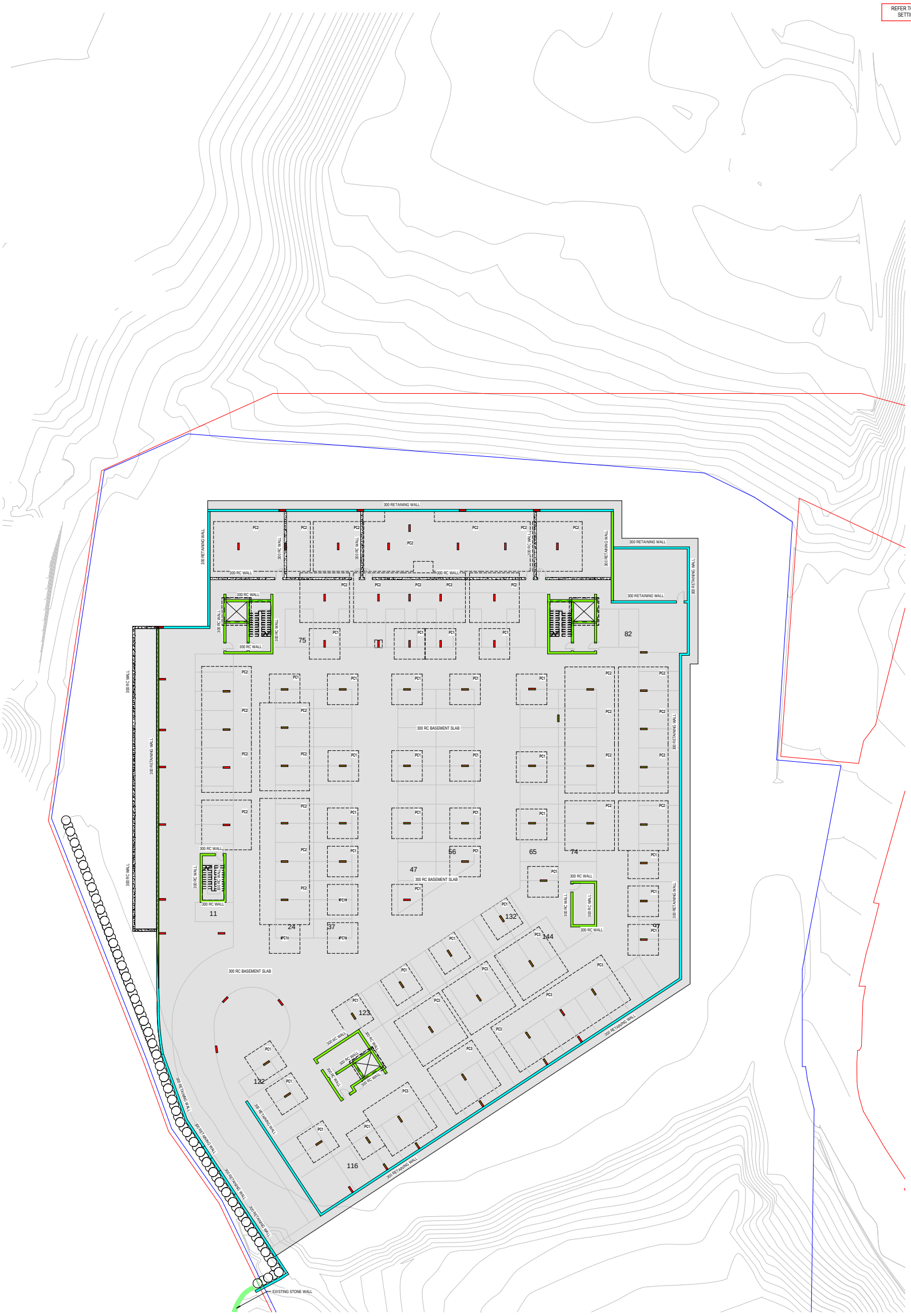
Designed By	Checked By	Waterman Ref.
PFG	RO	21-032
Drawn By	**Date**	**Scales @ A1**
PFG	JUNE 2021	1 : 200

Project - Originator - Volume - Level - Type - Role - Number	Revision
21-032-WMS-C-01-SK-S-003	P01

B. Structural Drawings

REFER TO GEOTECHNICAL ENGINEER'S (BYRNE LOOBY) DRAWINGS & DETAILS FOR SETTING-OUT OF THE EMBEDDED PILED WALL

REFER TO ARCHITECT'S DRAWINGS FOR SETTING-OUT OF THE STRUCTURE



BLOCK B - BASEMENT
SCALE 1 : 200

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13. ALL STRUCTURAL TIMBER TO BE GRADE C16 TO IS444 OR BETTER.
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35. REFER TO PILING SPECIFICATION FOR TESTING REQUIREMENTS

LEGEND

- DENOTES 350mm THICK RC BASEMENT SLAB (C32/40) ALLOW 150kg/m3 REINFORCEMENT WITH DRYTECH WHITETANKING SYSTEM (OR SIMILAR APPROVED)
- **PC1** DENOTES 4000x4000x600mm THICK RC PAD FOOTING ALLOW 150kg/m3 REINFORCEMENT WITH DRYTECH WHITETANKING SYSTEM (OR SIMILAR APPROVED)
- **PC2** DENOTES 6500x6500x950mm THICK RC PAD FOOTING ALLOW 200kg/m3 REINFORCEMENT WITH DRYTECH WHITETANKING SYSTEM (OR SIMILAR APPROVED)
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- DENOTES 300mm THICK RC RETAINING WALLS (C32/40) ALLOW 180kg/m3 REINFORCEMENT

Rev	Date	Description	Drawn By	Checked By

Amendments

Project: BALSCADDEN, HOWTH

Title: BLOCK B GA PLANS BASEMENT

Client: MARLET PROPERTY GROUP

Architect: PLUS ARCHITECTURE

Waterman Moylan
Engineering Consultants

Block S East Point Business Park Dublin D03 H3F4
t +353 1 664 8900
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Status: PLANNING

Drawn By	Designed By	Checked By	Approved By
PFG	PFG	RN	RO

Waterman-Moylan Ref.	Date	Scales @ A1
21-032	JUNE 2021	As indicated

File Path: C:\Users\a.mylan\Documents\21-032-WMS-ZZ-ZZ-M3-S-00001_21-07-01_a.mylan.rvt

Project - Originator - Volume - Level - Type - Role - Number	Revision
21-032-WMS-B-B-DR-S-20001	P01

REFER TO GEOTECHNICAL ENGINEER'S (BYRNE LOOBY) DRAWINGS & DETAILS FOR SETTING-OUT OF THE EMBEDDED PILED WALL

REFER TO ARCHITECT'S DRAWINGS FOR SETTING-OUT OF THE STRUCTURE

BLOCK B - GROUND FLOOR
SCALE 1 : 200

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Rev	Date	Description	Drawn By	Checked By

Amendments

Project: BALSCADDEN, HOWTH

Title: BLOCK B GA PLANS GROUND FLOOR

Client: MARLET PROPERTY GROUP

Architect: PLUS ARCHITECTURE

Waterman Moylan
Engineering Consultants

Block S East Point Business Park Dublin D03 H3F4
t +353 1 664 8900
info@moylan.ie www.waterman-moylan.ie

Status: PLANNING

Drawn By	Designed By	Checked By	Approved By
PFG	PFG	RN	RO

Waterman-Moylan Ref.	Date	Scales @ A1
21-032	JUNE 2021	As indicated

File Path

Project - Originator - Volume - Level - Type - Role - Number	Revision
21-032-WMS-B-GF-DR-S-20002	P01

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REFER TO GEOTECHNICAL ENGINEER'S (BYRNE LOOBY) DRAWINGS & DETAILS FOR SETTING-OUT OF THE EMBEDDED PILED WALL

REFER TO ARCHITECT'S DRAWINGS FOR SETTING-OUT OF THE STRUCTURE

BLOCK C - GF
SCALE 1 : 200

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20. THE FORMATION FOR ALL FOUNDATIONS IS TO BE INSPECTED BY THE ENGINEER PRIOR TO THE POURING OF ANY CONCRETE. THE CONTRACTOR SHALL NOT EXCAVATE BELOW FORMATION LEVELWITHOUT PRIOR WRITTEN INSTRUCTION FROM THE ENGINEER.
21. ALL MATERIAL & WORKMANSHIP TO BE IN ACCORDANCE WITH ENGINEER'S SPECIFICATIONS.
22. ALL BACKFILL MATERIAL SHALL COMPLY WITH THE PROVISIONS OF SR21 AND I.S. E.N. 13242:2002. TESTING SHALL BE BE CARRIED OUT BY THE CONTRACTOR AT THE SOURCE OF ANY MATERIAL PROPOSED AS FILL TO VERIFY THE MATERIAL COMPLIES WITH THE GUIDANCE GIVEN IN SR21. WRITTEN CONFIRMATION ON COMPLIANCE MUST BE ISSUED BY THE CONTRACTOR PRIOR TO ARRIVAL OF MATERIAL ON SITE.
23. ALL BLOCKWORK / CONCRETE INTERFACES TO BE TIED USING STAINLESS STEEL WALL TIES AT 225mm SPACING (VERT.)
24. ALL INSULATION, DPC & RADON DETAILS TO ARCHITECT'S SPECIFICATIONS.
25. REFER TO PRECAST SUPPLIER FOR PRECAST FLOOR PROPPING REQUIREMENTS.
26. ALL PRECAST CONCRETE UNITS TO HAVE 100mm MIN. BEARING ONTO MASONRY WALLS/CONCRETE BEAMS/CONCRETE WALLS.
27. USE JOIST HANGERS AT ALL TIMBER TO TIMBER JOINTS.
28. BOTTOM OF TRENCHES TO BE CLEANED AND SIGNED OFF BY ENGINEER PRIOR TO THE POURING OF ANY CONCRETE.
29. CONCRETE TRENCH FILL UNDER FOUNDATION STRIPS TO BE C20/25.
30. ALL FOUNDATIONS TO BE FOUNDED ON FIRM VIRGIN GROUND.
31. ALL WALLS TO BE LOCATED CENTRALLY ON FOUNDATIONS (U.N.O.).
32. ALL ROOF BRACING TO SPECIALIST TIMBER TRUSS DESIGNERS DESIGN & SPECIFICATION.
33. ALL WORKS CARRIED OUT MUST COMPLY WITH THE RELEVANT PARTS OF THE CURRENT BUILDING REGULATIONS AND TECHNICAL GUIDANCE DOCUMENTS ENSURING THE WORKS ARE CARRIED OUT USING PROPER MATERIALS WHICH ARE FIT FOR USE FOR WHICH THEY ARE INTENDED AND FOR THE CONDITIONS IN WHICH THEY ARE TO BE USED'.
34. ALL MATERIALS USED SHALL BE (CE) MARKED IN ACCORDANCE WITH THE EU CONSTRUCTION PRODUCT REGULATIONS (CPR) (No.305/2011). REFER TO ANNEX IV OF THE REGULATIONS FOR THE LIST OF APPLICABLE PRODUCTS. ALL MATERIALS USED SHALL BE (CE) MARKED IN ACCORDANCE WITH THE EU CONSTRUCTION PRODUCT REGULATIONS (CPR) (No.305/2011). REFER TO ANNEX IV OF THE REGULATIONS FOR THE LIST OF APPLICABLE PRODUCTS.
35. REFER TO PILING SPECIFICATION FOR TESTING REQUIREMENTS

Rev	Date	Description	Drawn By	Checked By
		Amendments		

Project
BALSCADDEN, HOWTH

Title
BLOCK A,C AND D GA PLANS GROUND FLOOR

Client
MARLET PROPERTY GROUP

Architect
PLUS ARCHITECTURE

Waterman Moylan
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Status
PLANNING

Drawn By	Designed By	Checked By	Approved By
PFG	PFG	RN	RO

Waterman-Moylan Ref.	Date	Scales @ A1
21-032	JUNE 2021	1 : 200

File Path:

Project - Originator - Volume - Level - Type - Role - Number	Revision
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