

13.0 TECHNICAL SUMMARY

13.1 OVERVIEW

The proposed building mainly comprises fifteen storeys over a single basement level. The basement level accommodates limited car parking (10 No. accessibility spaces), cycle parking (for 150 cycles) and plant rooms. Vehicle access is via a car lift, accessed off Poolbeg Street. There is an off-road delivery and servicing area at street-level off Poolbeg Street, which also doubles up as a waiting area for vehicles using the car lift to access the basement, so the public road and footpaths should be kept clear of waiting vehicles at all times.

At ground, first and second floor levels, the development comprises the new station concourse, office reception and fire control room. The ESB supply will be located at ground floor level. Levels 3 to 12 inclusive will be the office floors. Levels 13 and 14 are the plant room levels, with 14 being a mezzanine to Level 13. Level 15 will be the roof to the elliptical element of the office building.

The building is to be served by a single circular core, which will house the passenger and goods lifts, the access and emergency staircases, toilets and risers. Each office floor (Levels 3 to 12 inclusive) will be provided with disabled toilet and shower facilities.

Reference should be made to Planning Drawings and Architect's proposals for details of finishes to walls/elevations.

13.2 STRUCTURE

Introduction

The proposed building mainly comprises fourteen storeys over a basement levels. It is intended to accommodate offices at upper levels with some retail and station concourse space at lower levels. Basement levels accommodate parking and plant rooms. Vehicle access is via a car lift, accessed off Poolbeg Street.

Reference should be made to Architect's drawings/proposals for details of finishes to walls/elevations.

Frame and Stability

The steel frame forming the tower consists of cellular beams, standard steel sections for the columns and composite metal deck and concrete floor slabs. The offset core is to be of reinforced concrete.

Stability is achieved by transferring the wind loads to the core using the diaphragm action of the floor slabs.

The foundations are generally short bored piles or pads in the deepest areas of the basements. Differential settlement between the piles and pads would need to be designed out. The perimeter retaining walls to the basement levels are to be constructed from secant walls."

Design Standards

The building will be structurally designed to comply with the appropriate sections of the relevant Building Regulations, Standards and Codes of Practice. Relevant Standards will include:

- BS 6399 Loadings for Buildings
- Part 1 Dead and Imposed Loads
- Part 2 Wind Loads
- Part 3 Imposed Roof Loads
- BS 8110 Structural use of concrete
- BS 5950 Structural use of steelwork in building
- BS 8004 Foundations

13.3 MECHANICAL SERVICES

Carbon emissions

The performance of the current proposed building has been assessed using the Part L2A (2006) UK requirements for conservation of fuel and power. This was undertaken prior to the adoption of the EU energy performance of buildings directive, by the Irish building regulations.

In response to the European Energy Performance of Buildings Directive (EPBD), the UK Department for Communities and Local Government (CLG) commissioned the National Calculation Methodology (NCM) for determining the energy performance of buildings. The Republic of Ireland has adopted a similar methodology in the form of the Non-domestic Energy Assessment Procedure (NEAP). The key difference between the two being that the emission factors used in the UK calculation method are different to those used in the Irish calculation method (emission factors describe the CO₂ emissions released in kgCO₂ per kWh of the building's delivered energy). It should therefore be noted that, although the methodologies are similar, a direct comparison cannot be drawn between the Irish and UK regulations for EPCs.

In May 2008 a dynamic thermal modelling assessment of the proposed Tara St Redevelopment was undertaken. The assessment was performed in line with UK requirements for EPCs, using the SBEMEPC component of approved software IES V5.8.2. The assessment concluded that the building was likely to achieve an asset rating of 46, giving a B rating under UK regulations.

Heating, Ventilation and Air Conditioning

The main concourse and platform areas will be naturally ventilated, and provided with minimal heating. Supplementary ventilation via high level extract fans will be provided for use during summer months and periods of excessive heat gain. Ventilation and comfort cooling will be provided for enclosed areas such as offices, customer facilities and locations with a high heat gain.

Heating will be provided by Low temperature hot water unit heaters and door air curtains. These will be integrated into the concourse design to minimise the aesthetic impact.

The office areas shall be air conditioned by means of chilled beams located in the office areas, these will provide heating cooling and ventilation.

The heating requirements for the building shall be met by the provision of gas fired boiler plant located at level 14. Gas shall be piped to the boiler plant in a pipe-in-pipe arrangement ventilated at both ends. Gas leak detectors and shut-off valves shall be located at the meter and boiler house locations.

Chilled water for cooling will be provided for by air cooled chillers in the external space on level 14. These will be provided with appropriate sound attenuation.

The basement car park areas shall be provided with a mechanical extract system that will provide 6 air changes per hour in normal conditions and 10 air changes per hour in a fire situation.

Public Health Systems

The public health installation shall comprise the following systems:

- 1) Above ground soils and wastes drainage from toilets and common areas.
- 2) Water services including incoming water mains, cold water storage, domestic hot, cold and drinking systems.

Fire Fighting Systems

The entire building shall be protected by means of a sprinkler system. Wet risers shall be located at each level to provide water for fire fighting means. Fire extinguishers shall be provided to provide first aid fire fighting to all areas.

13.4 ELECTRICAL SERVICES

The electrical engineering systems shall comprise of the following:

1. 11,000 volt ESB supply
2. Provision of HV switch room at concourse level
3. provision of Concourse Substation
4. Provision of tenants substation at roof
5. Provision of a standby generator on roof for Essential systems.
6. Electrical distribution
7. General purpose power installation.
8. Lighting installation.
9. Emergency lighting installation.
10. Fire detection and alarm system.
11. Lightning protection, earthing and bonding.
12. Power supplies to tenant areas.
13. Exterior lighting.

ESB Supply

A new ESB HV switch room shall be created on the concourse level to provide the building with an 11,000V 3 phase supply. From the HV switch room the 11KV supplies shall be distributed to the substations located on concourse level and on the roof.

A 1000kVA transformer shall be provided, located within the concourse substation to supply the concourse area.

A 1000kVA transformer shall also be provided, located within the roof level substation to supply the Tennant area's.

A 1500kVA transformer shall be provided, located within the roof level substation to supply the Plant and essential services

Standby Generator Provision

A generator shall be provided to supply the essential mechanical services in the building. It is intended to install a 200 kVA generator set located at roof level.

Electrical Distribution

A system of electrical sub-main distribution cables and rising Bus-bar systems shall be provided to feed electrical distribution panels and distribution boards located around the Building. Rising busbar systems shall generally be utilised within the main risers. Sub mains distribution cables shall generally be run on cable trays from the electrical risers through ceiling voids on each floor.

General Purpose Power Installation

A complete general-purpose installation shall be provided throughout the landlord areas of the building. Each tenant area shall also be provided with general power to suit the fit-out of the area. All areas shall be provided with twin 13A socket outlets fused connection units and isolation devices, located in accordance with Clients requirements.

Lighting

A complete lighting installation shall be provided throughout the landlord areas of the building, including the reception area and all circulation areas. In general recessed downlights, incorporating compact fluorescent energy saving lamps, shall be installed throughout the landlords areas.

Each tenant area shall also be provided with general lighting to suit the fit-out of the area.

The lighting installation shall be controlled to minimise energy usage

Emergency Lighting Installation

The emergency lighting system shall comprise stand-alone self-contained fittings and emergency inverter packs installed in general lighting fittings. Design of the emergency lighting system shall be in accordance with IS 3217.

Fire Detection & Alarm Systems

A detection and alarm system to an L1 standard of I.S. 3218 is provided. To avoid unwanted alarms and unnecessary disruption to a building of this nature, an investigation time could be incorporated into the system.

Lighting Protection Earthing & Bonding

A lighting protection system complying with BS 6651 shall be provided for the building. The system shall consist of the building structure bonding and a bare copper tape network at roof level.

Power Supplies to Tenant Areas

A power supply shall be provided to each tenant area. A sub-main distribution cable shall be run from a separate ESB meter and terminated in a three phase and neutral isolator in each tenant unit. From this point the tenant can fit-out the unit.

Exterior Lighting

Exterior lighting shall be provided from off building luminaires located between window mullions and other available locations to achieve maximum illuminance of the exterior of the building. Time clock and photo-cell shall control the system to achieve maximum efficiency.

Aviation Warning Lights

An aviation warning light shall be installed on the roof area of the office building in accordance with current recommendation and standards.

Lift and Escalator Installation

The office areas shall be serviced by means of an arrangement of 6 No lifts. Two of these lifts shall be for fire fighting purposes. One lift shall be used as a designated goods lift to service the restaurant and plant room areas only.

The mechanical, electrical, lift and fire protection services shall be designed and installed in accordance with all relevant building regulations and technical guidelines. Fire protection services shall be designed in consultation with Fire Officer Requirements.

Water services, soils and waste systems, and rainwater collection systems shall be designed in consultation with local authority requirements.

13.5 DRAINAGE

Drainage from the proposed office/commercial development and the redevelopment of the Dart Station will be drained on a completely separate system, with separate foul and surface water drainage systems and outfall manholes before connection to Dublin City Councils sewerage system.

Foul Drainage

Foul drainage from the proposed development will drain by gravity and discharge to Dublin City Councils sewer on Poolbeg Street. This sewer is a 990 x 590 mm brick sewer and runs westwards to a 600 diameter sewer on Tara Street eventually out falling northwards to a 1100 x 720 mm brick sewer on George's Quay.

The foul outfall manhole from the development will be fitted with an interceptor trap to prevent noxious gases and odours entering the drainage system from the Corporation sewer.

Basement Drainage

Incidental run-off in the Basement Level due to wind blown rain, fire suppression or wet cars will drain by gravity through drainage channels or drainage gullies through a Class II full retention petrol interceptor before discharge to the central pumping station.

The rising main from this pump station will discharge to the foul outfall manhole within the development before discharge by gravity to the Corporation sewer on Poolbeg Street.

Surface Water Drainage

Surface water run-off from the development will drain by gravity and discharge to a new 300 diameter surface water sewer draining eastwards along Poolbeg Street. This sewer will link in with the future 675 diameter surface sewer on Luke Street, which is to be constructed, as part of Dublin City Council Drainage Division's upgrading of the areas drainage system. This 675 diameter surface water sewer will outfall at the River Liffey on Georges Quay. However, as an interim measure the proposed 300 diameter sewer on Poolbeg Street may have to discharge to the 2020 810 mm combined sewer on Luke Street. As part of the Dublin City Councils Drainage Divisions Stormwater Management Policy, storm water retention facilities may be required on the site before discharge to this Corporation sewer. If storm attenuation is conditioned by the Corporation, the size of the facility will be dependent on the criteria that Dublin City Council decides to adopt for the design.

If storm water attenuation is required a surface water discharge flow restriction will be imposed by Dublin City Council and any flow in excess of this will be attenuated.

An option at this stage, if attenuation is required, would be to provide a storage tank on the Upper Basement Level. A flow-restricting device would be installed in the surface water outfall manhole within the development. Positioning the storage tank at the Upper Basement Level would allow the tank to discharge by gravity to the sewer after the storm has subsided.

The surface water outfall manhole within the development will be fitted with a non-return valve to prevent surcharge from the surface water sewer backing up into the developments drainage system during high tides in the River Liffey.

Watermains

There is an existing water supply network in the area of the development. The site has a 6" diameter watermain on 3 sides and a 24" diameter trunk main on Tara Street.

Tests will have to be carried out to confirm the flows and pressures in the existing mains to ascertain an accurate assessment of the supply characteristics. Supply will only be provided from the existing 6" mains.

There are two hydrants adjacent to the site on Georges Quay, one on Tara Street and one on Poolbeg Street.

It is unlikely that the flow and pressure characteristics of the water supply in the area will be adequate to meet the requirements of the local Fire Prevention Officer.

It is anticipated that the proposed development would be Class I for the purposes of fire fighting requirements, and this necessitates a supply of 9,000 litres per minute of water for a 6 hour duration. If in the event of an inadequate supply a suitable arrangement of on-site storage tanks can be incorporated into the proposals. Again a more detailed investigation into the exact supply characteristics would be required.

14.0 FIRE STRATEGY

14.1 BACKGROUND

This section outlines the fire safety strategy for the building and is designed to be a summary of provisions to be discussed with the approving authority.

The base document for the design of the fire precautions is the Building Regulations using the guidance in the Technical Guidance Document B, Fire Safety (TGDB).

Other documents referred to are BS5588: Pts 5, 6, 8 and 12 addressing fire-fighting, places of assembly, managing the disabled and building management respectively.

14.2 BASIS OF FIRE STRATEGY

The Fire Strategy is based upon a fire engineering approach, which achieves the functional objectives of Building Regulations.

The fire strategy is explained fully in Section 3 of the Fire Strategy Report.

14.3 MEANS OF ESCAPE

OFFICE LEVELS

A phased evacuation regime is proposed for the building. The evacuation will commence with those on the floor of fire origin, and the floor above. The rest of the storeys in the building will be alerted to an incident. Mobility impaired occupants of the building and occupants may also be evacuated as part of the first stage. After the initial storeys are evacuated, at a time of 3 minutes, the rest of the building will be evacuated two storeys at a time, starting with the floors above those initially evacuated.

STATION CONCOURSE AND RETAIL LEVELS

The evacuation strategy is based on conventional escape route design with reliance on the use of voice evacuation system, with facility for pre-recorded messages and directive voice messaging. To facilitate deaf passengers, it is proposed to utilise the passenger information dot matrix signs to alert in case of fire.

STAIR WIDTH AND OCCUPANCY

The stair capacity is based on the assumption of 1200mm wide stairs. The assumptions result in the following floor space factors: -