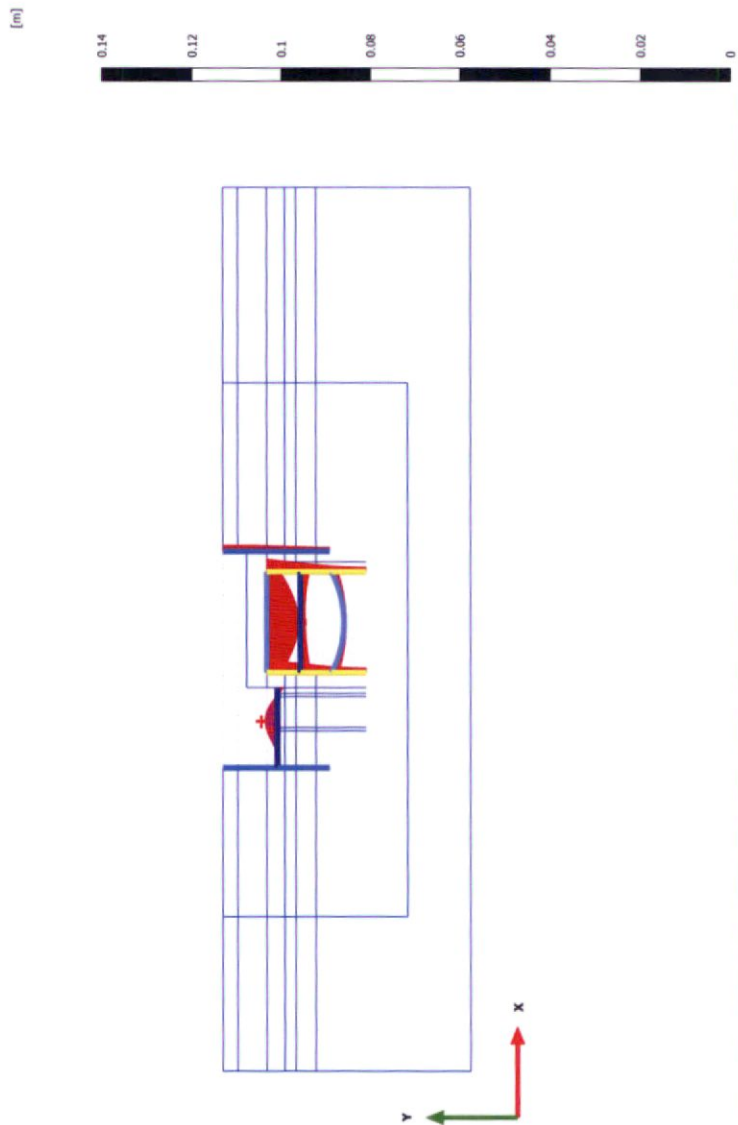


3.1.1.1.3.15 Calculation results, Plate, Phase_16 [Phase_16] (16/189), Total displacements u_y



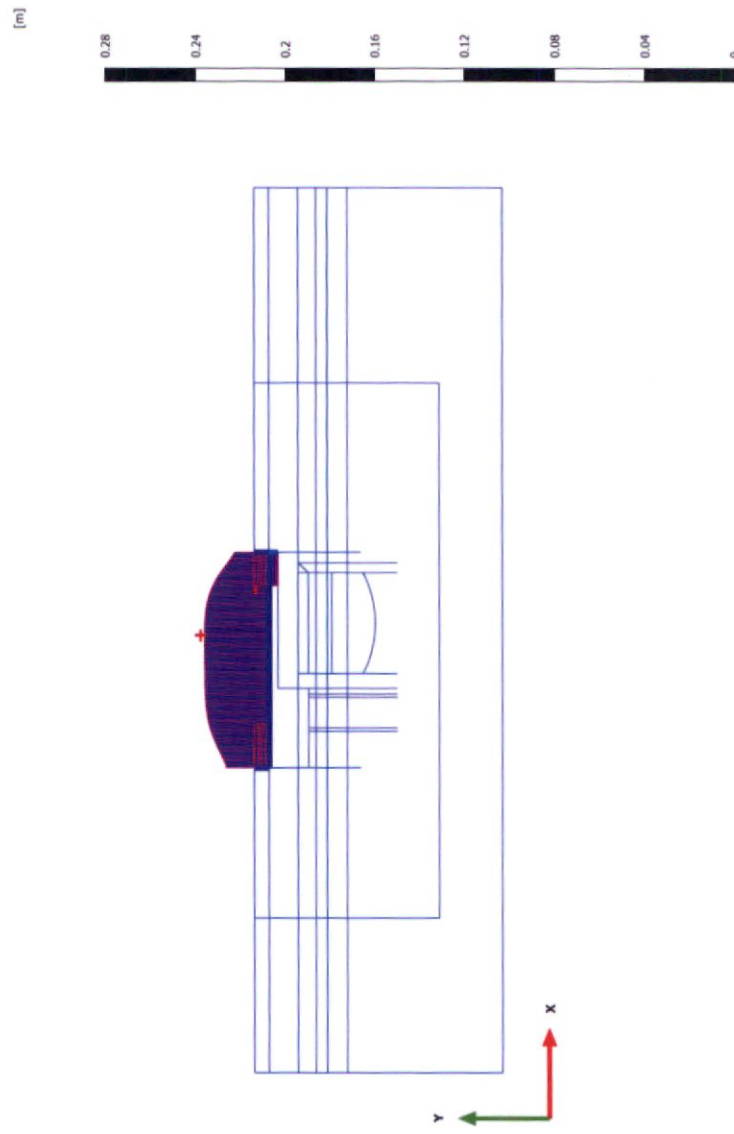
Total displacements u_y (scaled up 1.00×10^3 times)

Maximum value = 2.776×10^{-3} m (Element 42 at Node 16)

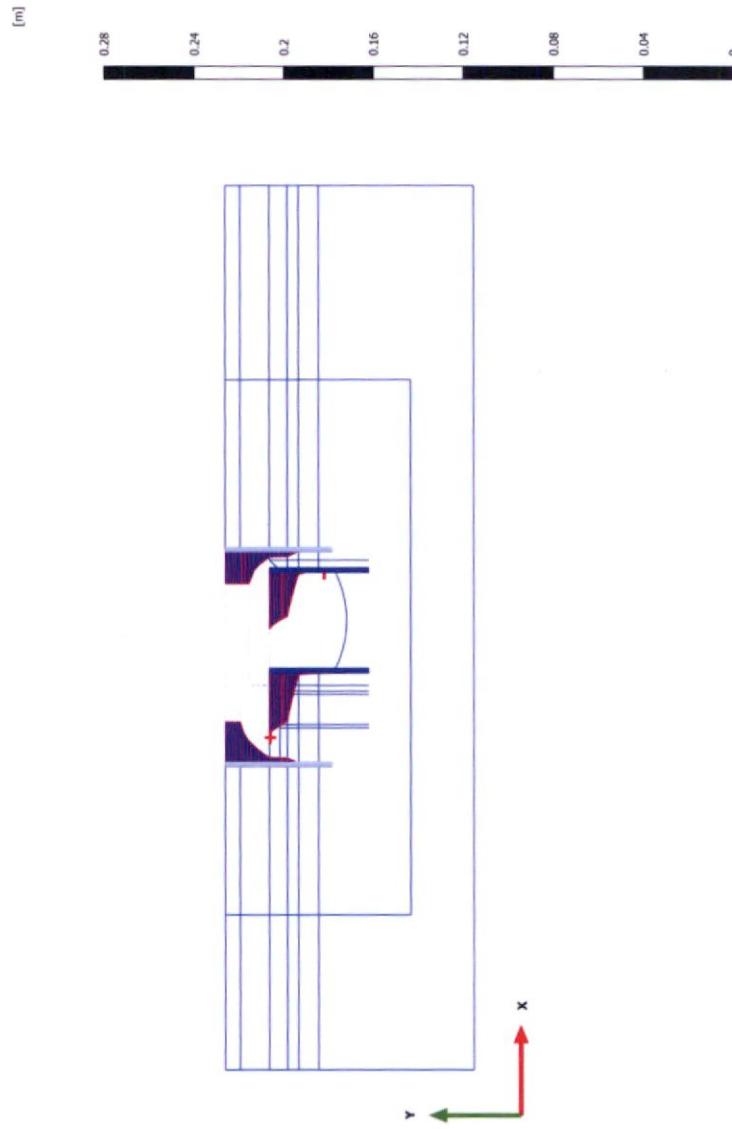
Minimum value = -7.059×10^{-3} m (Element 26 at Node 3984)

3.1.1.1.3.17 Calculation results, Plate, Phase_3 [Phase_3] (3/230), Total displacements

u_y



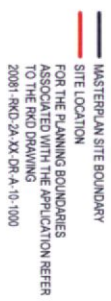
3.1.1.1.3.19 Calculation results, Plate, Phase_11 [Phase_11] (11/329), Total displacements u_y



Total displacements u_y (scaled up 500 times)
 Maximum value = 0.02835 m (Element 31 at Node 1717)
 Minimum value = 0.5700*10⁻³ m (Element 84 at Node 8182)

H. Ground Floor and Basement Plan with Survey Information

GENERAL NOTES

DUBLIN CENTRAL

DUBLIN CENTRAL GP LTD

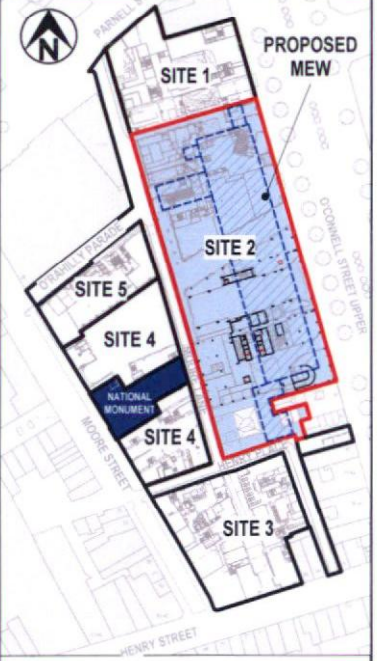


FOR INFORMATION

DC-WAT-0X-00-SK-S-010000

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



LEGEND
— MASTERPLAN SITE BOUNDARY
— SITE LOCATION
FOR THE PLANNING BOUNDARIES
ASSOCIATED WITH THE APPLICATION REFER
TO THE RKD DRAWING
20051-RKD-2A-XX-DR-A-10-1000

P02 23.05.23	ISSUED FOR INFORMATION	AS
P01 20.01.23	ISSUED FOR INFORMATION	AS
Rev	Date	Description

Project	Amendments
DUBLIN CENTRAL	

Title	SITE 2X FOUNDATION PLAN SHOWING EXISTING BASMENT SURVEY
-------	---

Client	DUBLIN CENTRAL GP LTD
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SITE 2X FOUNDATION PLAN SHOWING EXISTING BASMENT SURVEY

Project	Originator	Volume	Level	Type	Role	Number
DC-WAT-0X-00-SK-S-010001						P02

Waterman

Pickfords Wharf, Clink Street, London, SE1 9DG t: +44 20 7528 7888 m: +44 20 7528 7888 e: info@watermangroup.com, www.watermangroup.com
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FOR INFORMATION

Designed By	Checked By	Waterman Ref
AS	CB	STR15283
Drawn By	Date	Scale @ A1
AS	JAN 23	As indicated

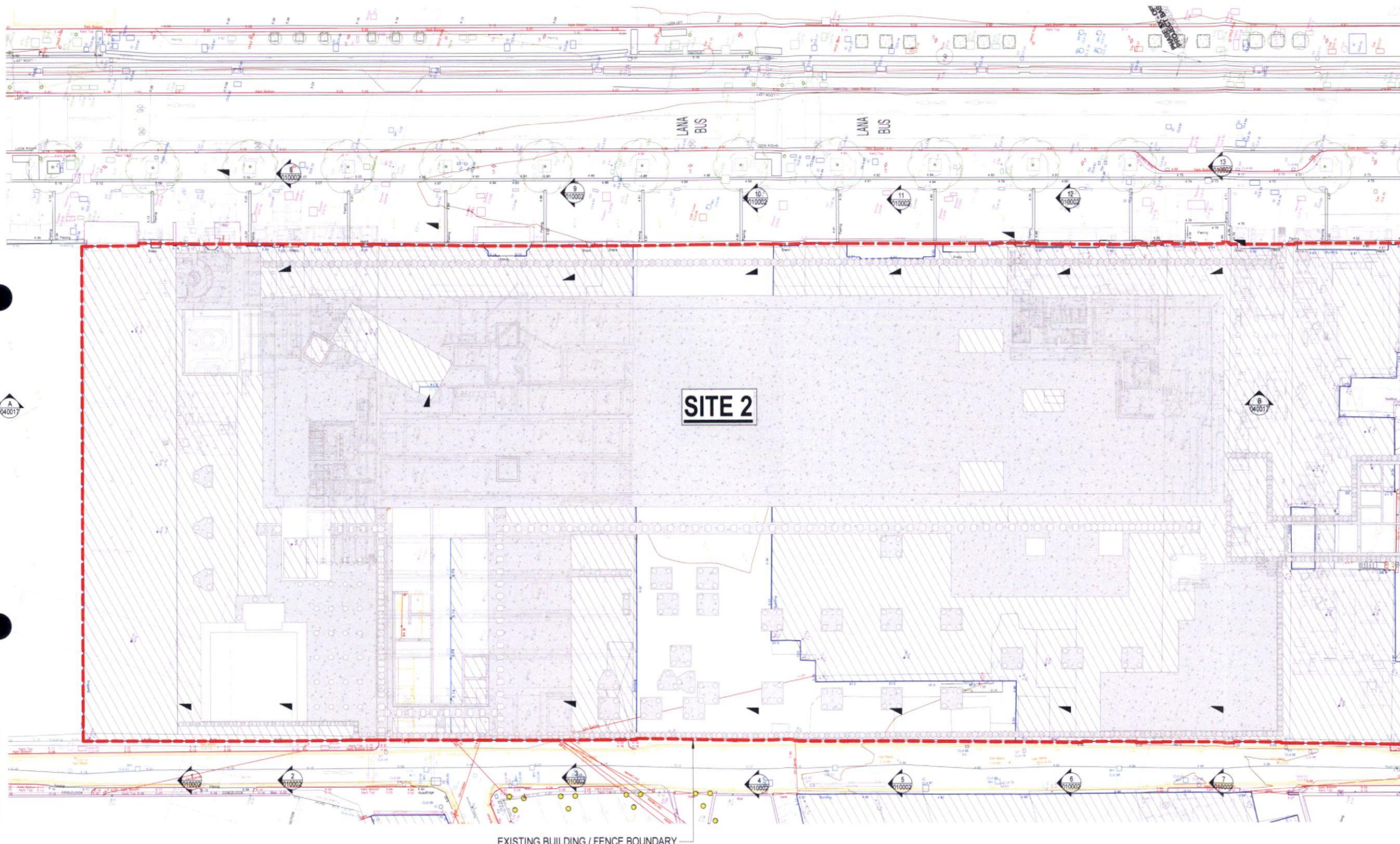
Project	Originator	Volume	Level	Type	Role	Number
DC-WAT-0X-00-SK-S-010001						P02

Project	Originator	Volume	Level	Type	Role	Number
DC-WAT-0X-00-SK-S-010001						P02

Project	Originator	Volume	Level	Type	Role	Number
DC-WAT-0X-00-SK-S-010001						P02

Project	Originator	Volume	Level	Type	Role	Number
DC-WAT-0X-00-SK-S-010001						P02

Project	Originator	Volume	Level	Type	Role	Number
DC-WAT-0X-00-SK-S-010001						P02



EXISTING BUILDING / FENCE BOUNDARY

SITE 2

DUBLIN CENTRAL

SITE 2X FOUNDATION PLAN
SHOWING EXISTING BASMENT
SURVEY

DUBLIN CENTRAL GP LTD

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FOR INFORMATION

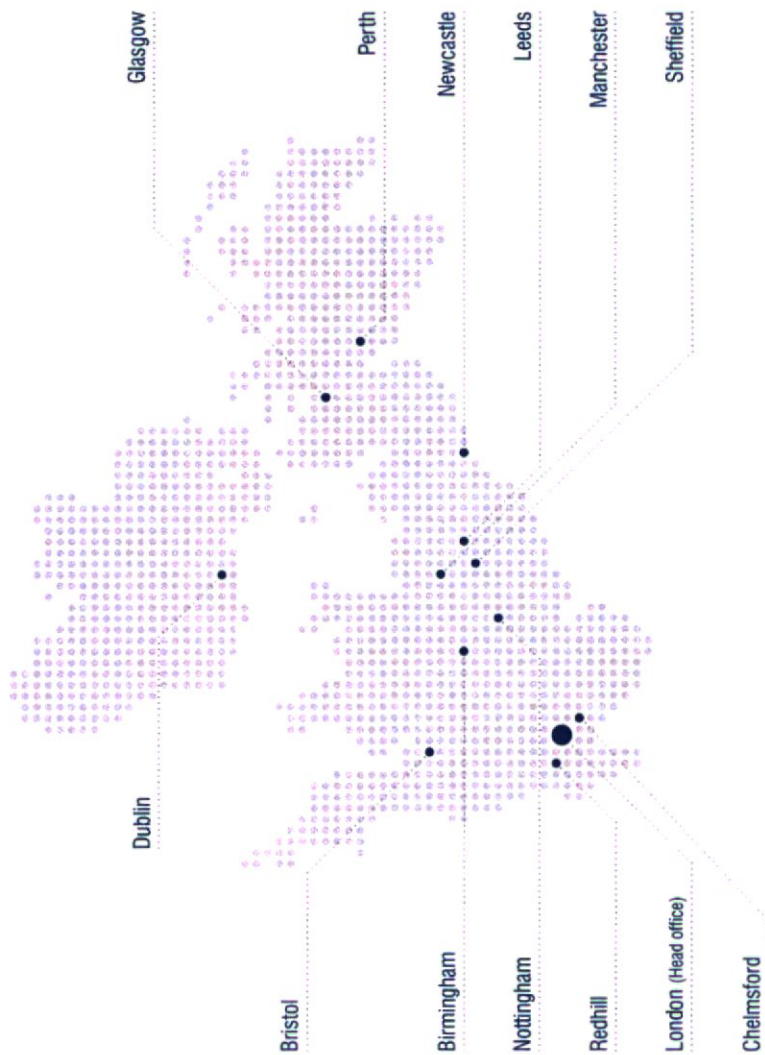
Designed By: AS, Checked By: CB, Waterman Ref: STR15283
Drawn By: AS, Date: JAN 23, Scale @ A1: As indicated

Project: DC-WAT-0X-00-SK-S-010001, Originator: , Volume: , Level: , Type: , Role: , Number: P02

Project: DC-WAT-0X-00-SK-S-010001, Originator: , Volume: , Level: , Type: , Role: , Number: P02

Project: DC-WAT-0X-00-SK-S-010001, Originator: , Volume: , Level: , Type: , Role: , Number: P02

UK and Ireland Office Locations



APPENDIX 8.3

SUBTERRANEAN CONSTRUCTION METHOD STATEMENT



Dublin Central: Site 2

Subterranean Construction Method Statement -

DC-WAT-2X-XX-RP-C-002009

September 2022

Waterman Structures Limited

Pickfords Wharf, Clink Street, London, SE1 9DG,
www.watermangroup.com

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Executive Summary

Objectives

This Subterranean Construction Method Statement is provided in support of a planning application to satisfy the requirements of the Dublin City Council 'Basement Development Policy Document' Version 1 (September 2019) and Dublin City Council Basement Development Guidance Document Version 1 (September 2019) for the redevelopment Site 3, as defined below, which is an element of the Dublin Central Masterplan development.

Approach

The basement assessment has been prepared to address Dublin City Council Principal concerns relating to basement construction which include the following:

- Groundwater flow
- Land stability and ground movement
- Surface water flow and flooding
- Cumulative effects
- Construction stage impacts (incl. temporary works)

This report should be read in conjunction with the following documents which form part of the planning application to cover all requirements of the DCC Basement Development Policy Document:

- Drainage Management Plan (Waterman)
 - Flood Risk Assessment (Waterman)
 - Geo-Environmental Risk Assessment Report (Waterman)
 - Construction Management Plan and Construction Traffic Management Plan (Waterman Moylan)
-

1. Introduction

1.1 Objectives

This Subterranean Construction Method Statement is provided in support of a planning application to satisfy the requirements of the Dublin City Council 'Basement Development Policy Document' Version 1 (September 2019) and Dublin City Council Basement Development Guidance Document Version 1 (September 2019) for the redevelopment Site 2, as defined below, which is an element of the Dublin Central Masterplan development.

1.2 The Project

The Site 2 project involves the redevelopment of the Site to create a mixed used scheme providing retail and office space. Delivery vehicle access, car parking and plant rooms are contained within single level basements.

1.3 Regulatory Context

The development of basements within Dublin is controlled via Dublin City Council Basement Development Policy Document Version 1 (September 2019), requirements and guidance being provided by the following:

- DCC Basement Development Policy Document
- DCC Basement Development Guidance Document

This Subterranean Construction Method Statement has been prepared to demonstrate the engineering approach and consideration in relation to the following: -

- Groundwater
- Cumulative effects of adjacent basement construction
- Land stability, ground movement and impact on adjacent properties
- Surface water flow and flooding
- Construction Activity and Temporary works
- Other related factors

2. Site 2 Information

The Site 2 location and context in the masterplan is shown in Figure 1 and Figure 2 below.

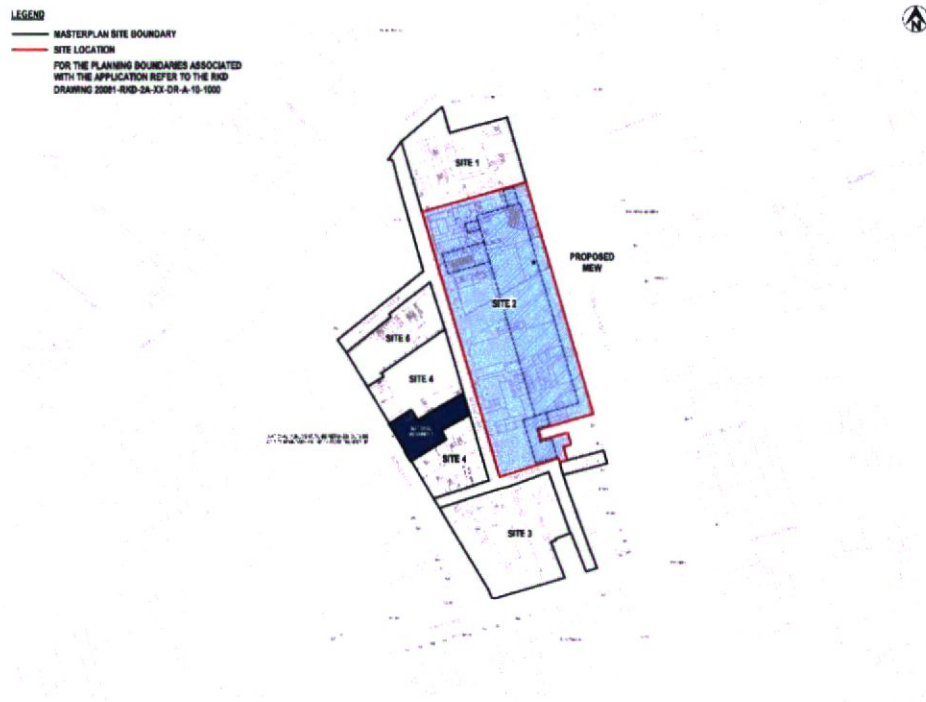


Figure 1. Site Location Plan

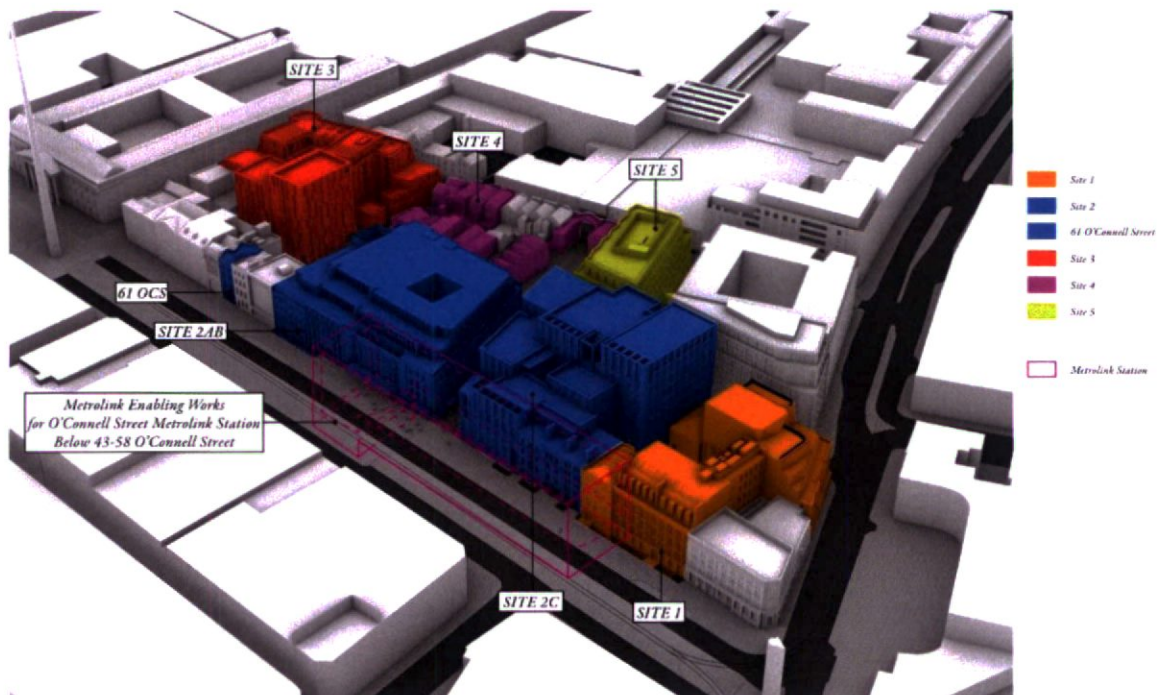


Figure 2. Masterplan

Additionally, other structures are of heritage significance and are to be retained in the proposed scheme. These include:

- No. 45 O'Connell Street Upper (façade only)
- The Reading Room at the rear of 59 O'Connell Street Upper

The retained structures within the site boundary are shown on Figure 3. Where buildings are to be retained and incorporated into the redevelopment these will be also be considered in relation to the effects the proposed works may have on their fabric.

The National Monument at Nos. 14-17 Moore Lane is not actually within Site 2 but the impact of the development is considered given the importance of this structure. The protected structures within Site 2 are assessed later in this report in terms of limiting the impact of the subterranean construction proposals.

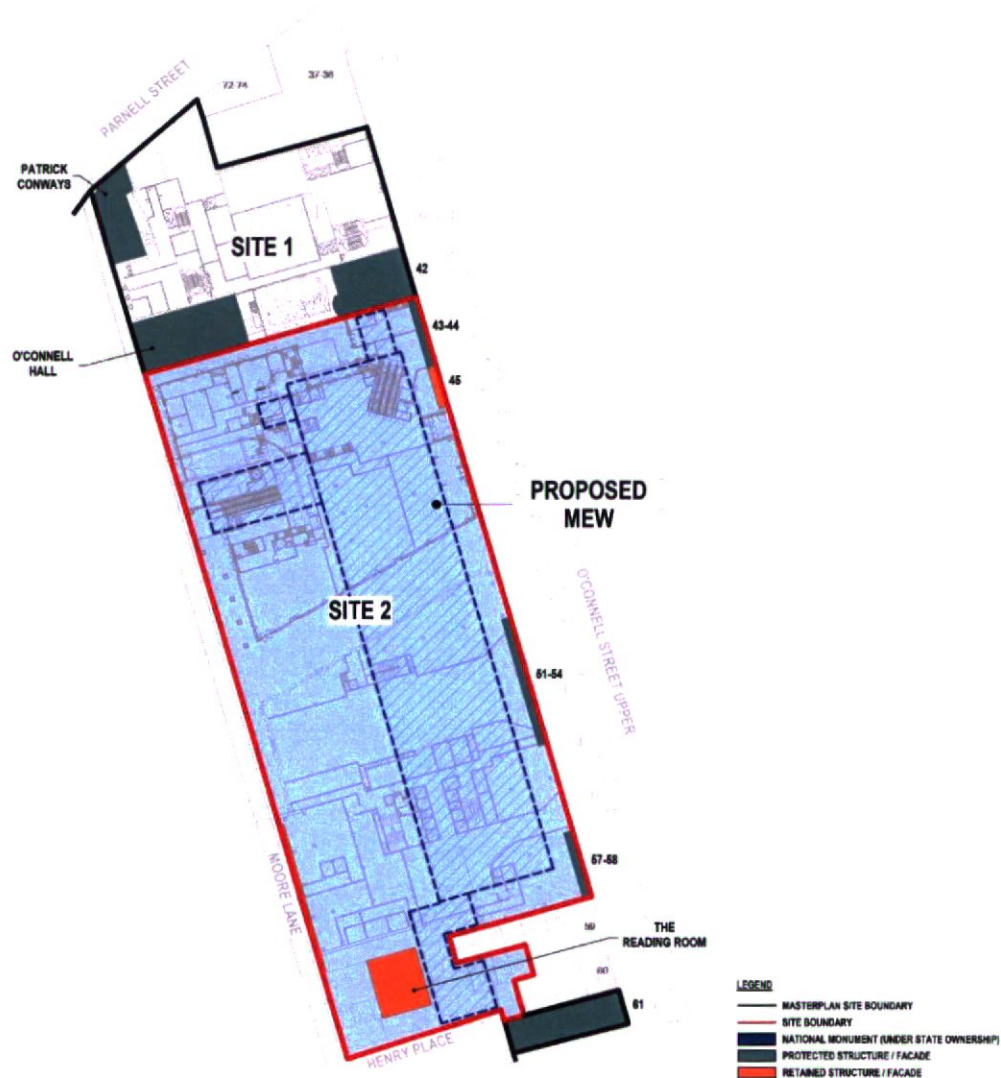


Figure 3. Site 3 Protected Structures

2.3.1 Public Sewers and Utilities

Utility services including gas, water, electricity, and telecoms (Fibre Optical Cables) exist in the footpaths all around the masterplan as would be expected in a city centre location.



Figure 5. Existing Utilities Map. – Site 2

The earthworks, piling and construction works will take the location of utilities and sewers into account and method statements will be prepared for activities taking due cognisance of the utility infrastructure where in close proximity to the site boundary. Existing services crossing the site will be isolated and removed.

Table 3: Summary of Ground Conditions

Stratum	Area covered	Estimated Thickness (m)	Typical Description
Superficial deposits			
Made Ground	Entire Site	2 – 5.2	Brown clayey with cinders and fragments of rubble and brick, increasing in thickness towards the eastern Site boundary.
Alluvium	Entire Site	5 – 20	Medium dense to dense sandy GRAVEL with occasional sand and silt layers. The gravel directly underlies the Made Ground and decreases in thickness towards the east/southeast Site corner
Till	Entire Site	5 – 10	Stiff to very stiff fine-grained CLAY with varying amounts of gravel, cobbles, and boulders.
Bedrock Deposit			
Lucan Formation	Entire Site	300 – 800	Dark grey to black, fine-grained, occasionally cherty, micritic Lucan Formation that weathers paler, usually to pale grey. There are rare dark coarser grained calcarenite limestone sometimes graded, and interbedded dark-grey calcar. The top of the Lucan Formation is encountered between 17mbgl and 27mbgl. A 1.0m thick weathered layer is present at the top of the deposit.

A section of the geology on-site as identified during previous ground investigations is included in Figure 6.

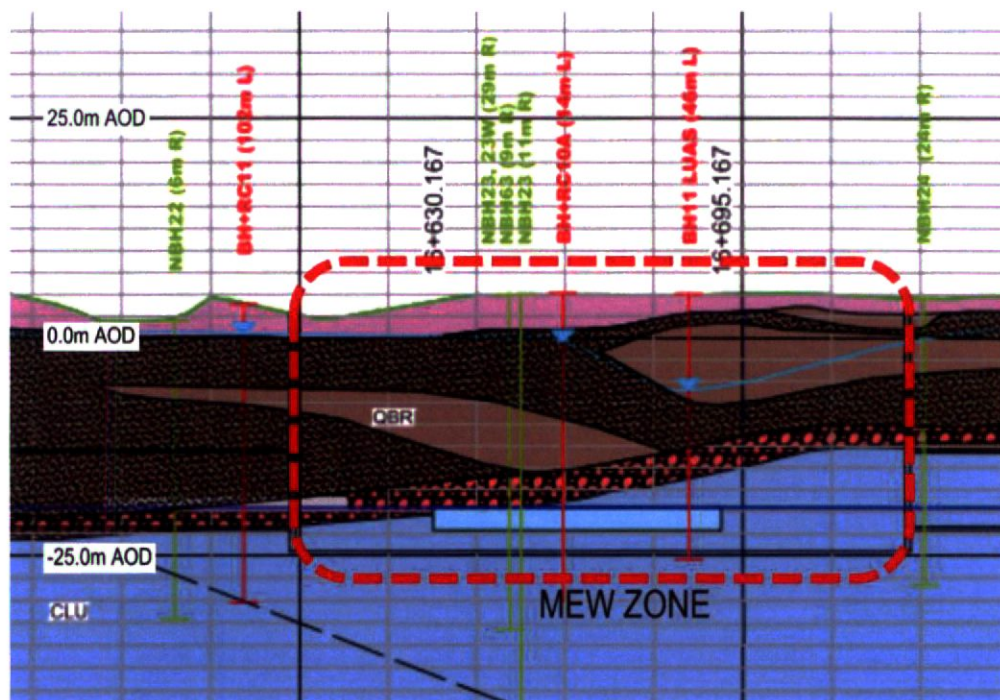


Figure 6. Ground Investigation Long Section - West to East Extracted from Jacobs/Idom Drawing ML1-JAI-GEO-ROUT_XX-DR-Y-00021 P01.4 22/08/2019

Liffey has not classified the Ecological Potential of this surface water body under the Water Framework Directive.

River Liffey is designated as a nutrient sensitive area according to the EPA.

2.7 Contamination

Ground conditions are typical of an inner-city location. Significant historical or current sources of contamination were not identified, and significant gross contamination is not expected. Current basements exist in large areas of the site meaning the bulk of made ground in these areas will already have been removed.

Contamination testing completed as part of previous ground investigations identified low levels of contaminants within soils. Marginal exceedances of hydrocarbon (TPH), cadmium, and mercury were recorded. This is not unexpected given the city centre location.

Groundwater samples collected from four monitoring wells indicated and hydrocarbons (TPH and PAH) and metals (iron, manganese, potassium, barium, sodium, and copper) in exceedance of assessment criteria. This confirms localised contamination exists on-site however evidence of a significant plume of contamination was not encountered. Groundwater quality is considered representative of the surrounding area.

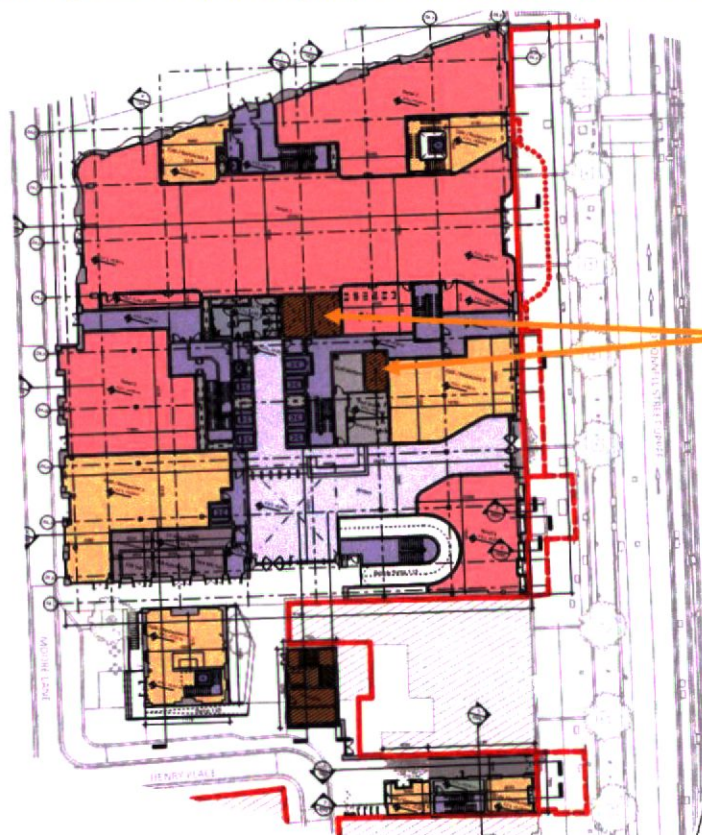
The absence of gross contamination onsite is supported by the fact that the previous ground investigation established the fill material and underlying subsoils were generally categorised as inert and suitable for disposal at inert landfill or for use in land reclamation projects. There were localised areas where the materials are categorised as non-hazardous waste category.

Construction of basements as part of the development will remove a considerable amount of made ground from site therefore improving its contamination status. A watching brief will be carried out as part of proposed geotechnical and waste classification ground investigation for the presence of contaminated soil or groundwater. If encountered additional investigation and assessment may be required. A watching brief will also be carried out during the basement excavations for the presence of unexpected contamination, should this be encountered additional assessment and mitigation measures may also be required.



4 areas identified are void spaces reserved for future MetroLink Station (e.g Future entrances).

Figure 9. Site 2C Proposed Ground floor layout (Grafton Drawing DC-GRA-2C-00-DR-A-20-0000)



3 areas identified are void spaces reserved for future MetroLink Station (e.g Future vent shafts).

Figure 10. Site 2AB Proposed Ground Floor (RKD Drawing 20081-RKD-2A-00-DR-A-20-1100)

3.2 Typical Superstructure

3.2.1 Block 2AB

The proposed structural solution for Site 2 Block 2AB is a flat slab reinforced in situ concrete frame.

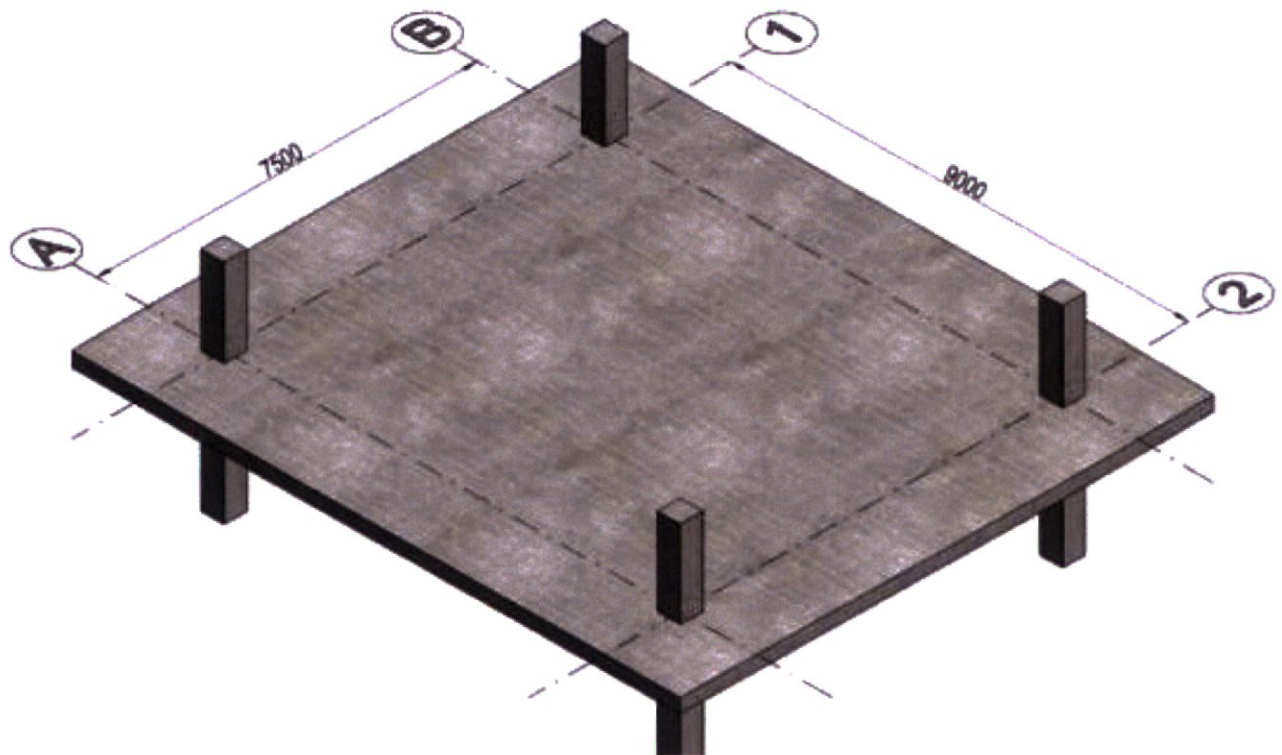


Figure 11. Typical RC Flat slab construction

The structural solution provides a flat soffit to maximise horizontal services distribution while minimising floor to floor heights and the overall building height. The slab thickness will typically be 250mm thick but will vary according to the structural span.

The columns and slabs have been sized to support the applied loads for the proposed structural grid and to achieve a fire resistance period of 90 minutes.

Concrete column sizes are 450x450mm or 400x400mm at basement and ground floor within the plant and retail areas.

250mm thick in situ concrete core walls extend from the basement slab up to roof level enclosing the lifts and stairs and are the structural lateral stability system.

3.3 Substructure, Foundations and Excavation

As part of the Dublin Central development there is a requirement to incorporate Metrolink Enabling Works (MEW) within the design and construction of Site 2. Through consultation with Transport Infrastructure Ireland (TII) and based upon the current TII preliminary design carried out by Jacobs Idom, a structural “box” beneath the ground floor level has been incorporated to accommodate the independent construction and operation of the planned O’Connell Street Metrolink Station which is being designed by Transport Infrastructure Ireland. This includes provision of co-ordinated voids to accommodate station entrances, ventilation, and fire escape shafts through this part of the Dublin Central proposed development. These ensure that the proposed Dublin Central development is structurally independent of, and not prejudicial to, the Metrolink project. The Metrolink project will be the subject of a separate application for approval to be made by Transport Infrastructure Ireland in Q3 2022. MetroLink Enabling Works (MEW) are however proposed within the Site 2 application, to be undertaken by the Applicant, with the actual station and railway works to be undertaken separately by TII at a later date.

The MEW works will be formed with diaphragm walls and in situ concrete base slab and top slab. The foundations for the oversite development will be supported on piled walls adjacent to the MEW and on groups of piles beneath the single level building basement.

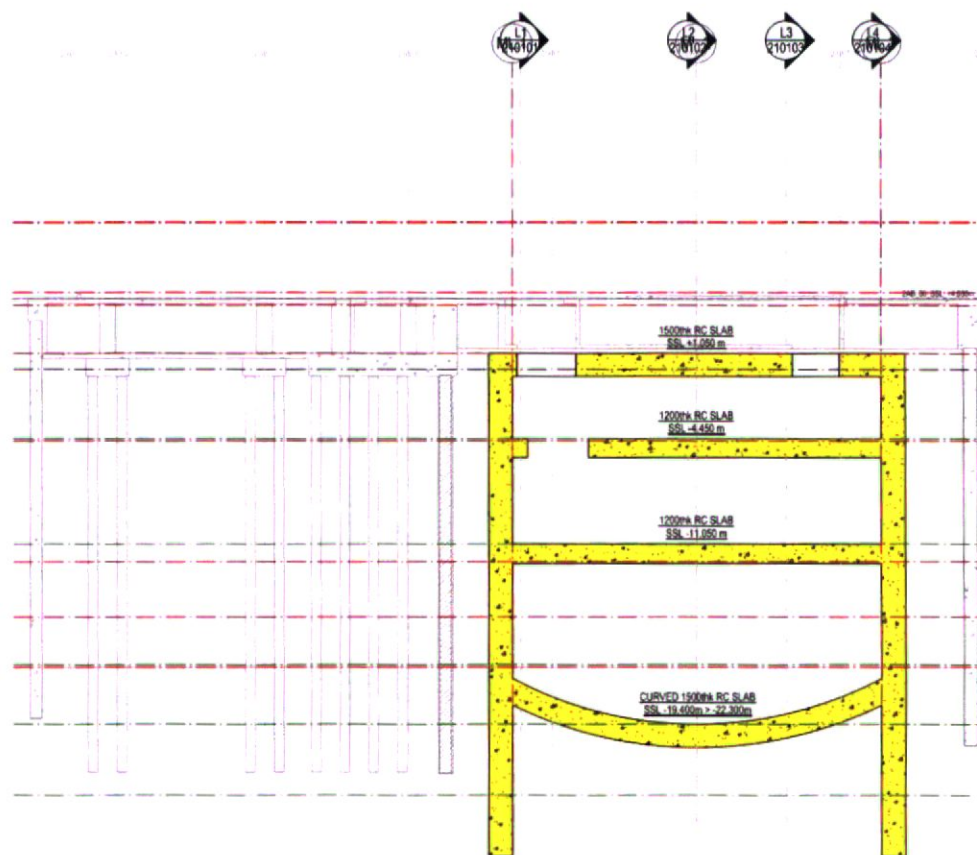


Figure 13. Section showing independent MEW works and oversite development basement and foundation

The oversite development requires a single storey basement. In order to minimise the excavation to form the basement level it is proposed to construct the basement using secant piled walls alongside the diaphragm walls of the MEW box. The same approach will be adopted along Moore Lane. The scale of the excavation required for the oversite development basement @5m deep and the depth and scale of the MEW excavation @28.5m deep requires a stiff earthwork support solution which is provided by this form of construction. The excavation material will generally be through made ground down to circa 5m below ground level then Alluvium (Sandy Gravel) and into the Calp Limestone.

The secant walls will be designed by the piling specialist for the lateral pressures due to earth, water, and surcharge plus vertical loads both in the temporary and permanent conditions.

The BIA including a Ground Movement Analysis and Hydrological Impact Assessment undertaken by Waterman, is included in Appendix B. The Ground Movement Analysis considered each stage of the development including demolition, piling, bulk excavation, and construction of each Site of the development. Predicted ground movements resulting from the works shall be monitored against baseline readings prior to commencing the works. Monitoring of noise and vibration shall be undertaken to all protected structures during the works.

Particular consideration has been given to the retained and/or protected structures on or adjacent to the site, including the National Monument located at Nos.14-17 Moore Street.

The sequence of works described and the method and approach for the temporary works to verify, support and safeguard the existing structures will enable the work to proceed, mitigating the risks to the historical buildings.

The technical work attached in the appendices, including the construction management plan and the ground movement analysis, confirm that proposed design and construction approach will achieve the level of surety required when working around and against existing buildings, highways, and utilities.

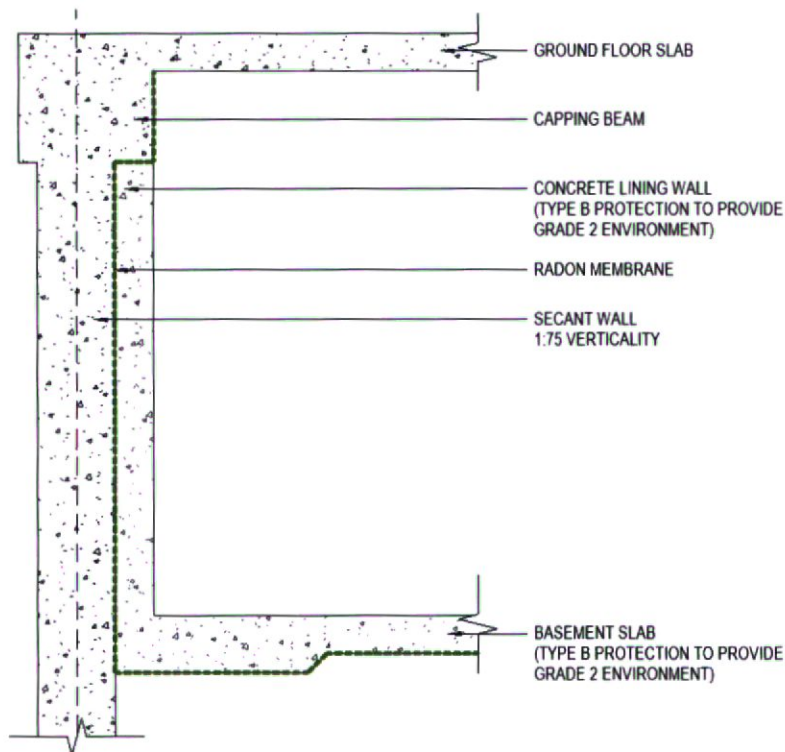


Figure 15. Typical detail of Grade 2 construction

A Grade 3 construction can be achieved by enhancing the architectural detailing on the inside of the structure. This is a matter for the architect to consider in relation to the proposed uses.

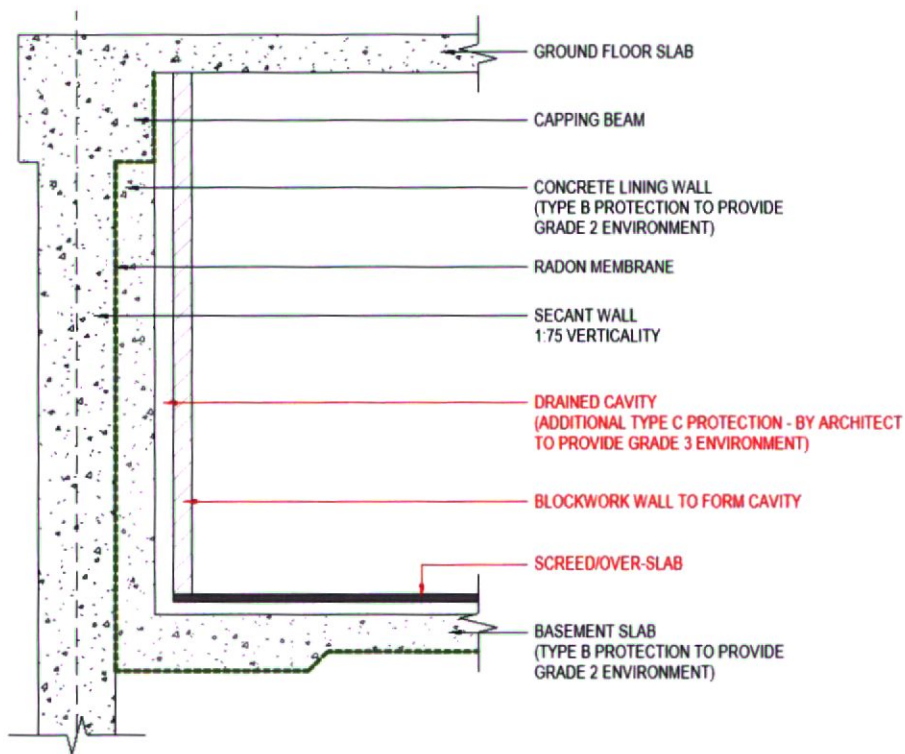


Figure 16. Additional Detail to Figure 15 for Grade 3 Basement Waterproofing (Architect to Specify)

For Block 2AB, attenuation is to be provided in two adjacent tanks at the basement level. These will be on-line attenuation tanks, with all surface water discharging to the tanks before out falling by gravity to the existing combined network in O'Connell Street Upper. The shared outfall from the tanks will be fitted with a Hydrobrake or similar approved flow control device limited to 2l/s.

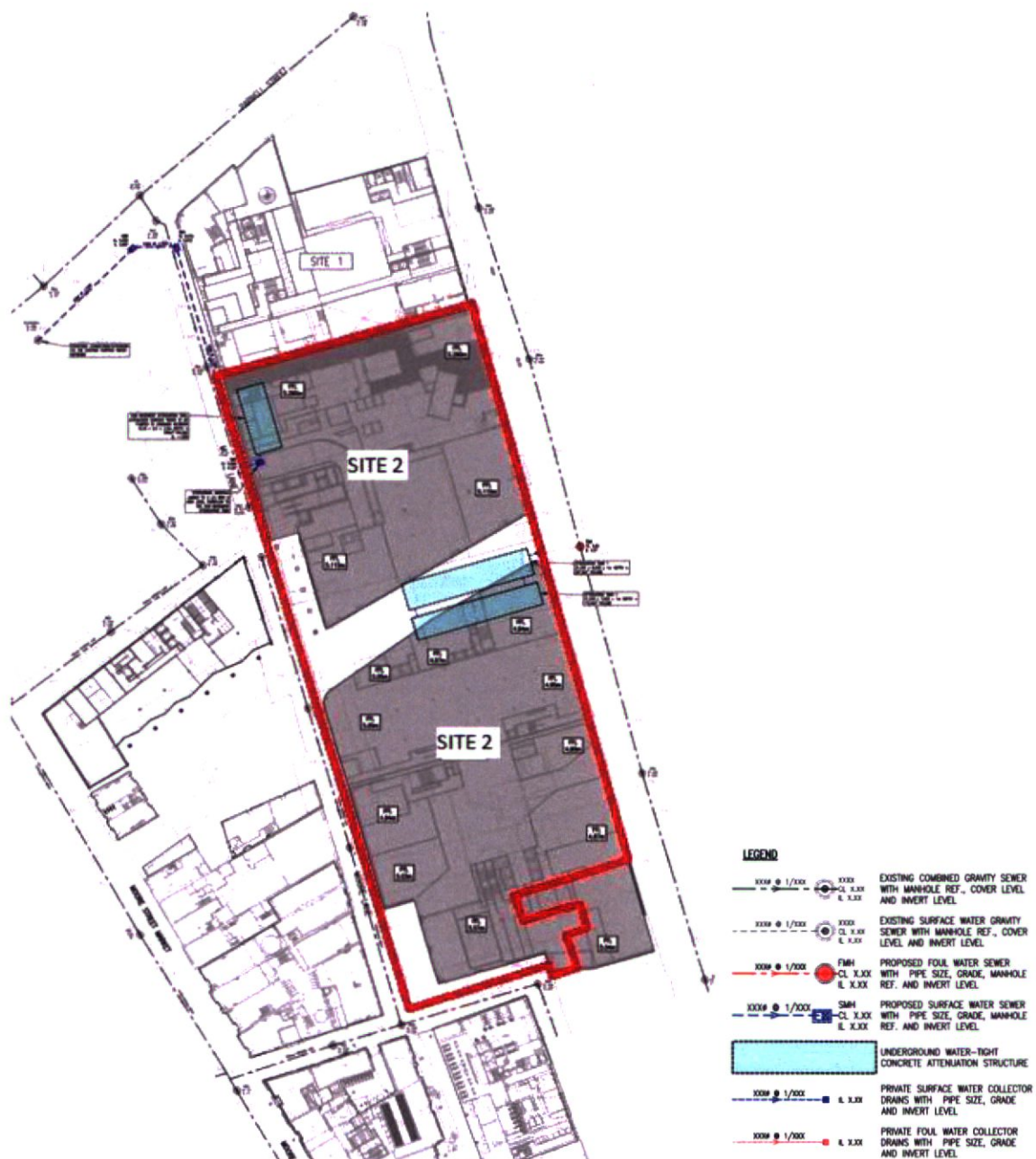


Figure 17. Site 2 Drainage Layout.

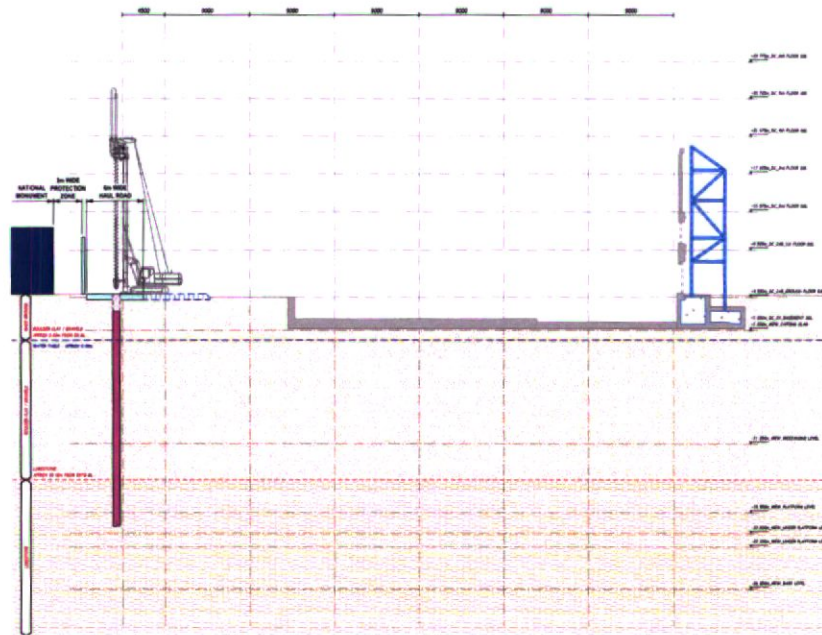


Figure 19 Phase 2- Place piling mat to enable access for perimeter secant piling.

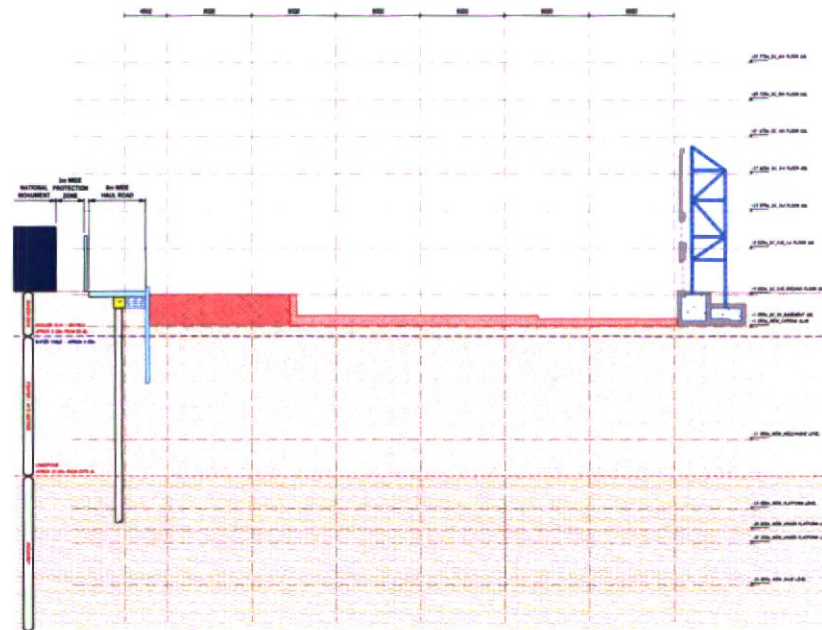


Figure 20 Phase 3- Continue to place pile mat and grub up old basements and foundations

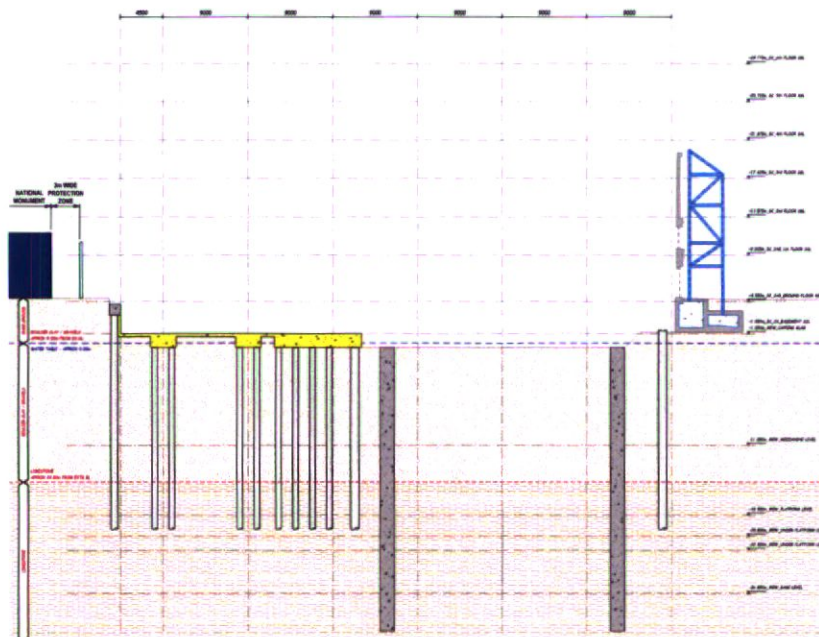


Figure 23 Phase 6 – Construct pile caps and crane bases

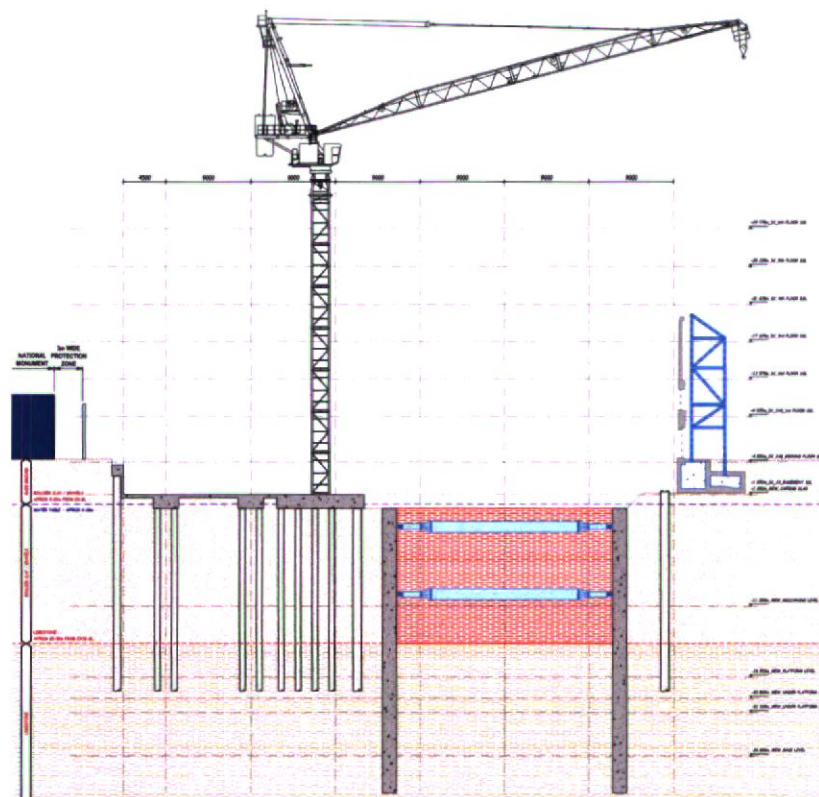


Figure 24 Phase 7 - Erect Tower cranes and commence excavation for MEW introducing back propping as required.

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Dublin Central: Site 2
Dublin Central Subterranean Construction Method Statement
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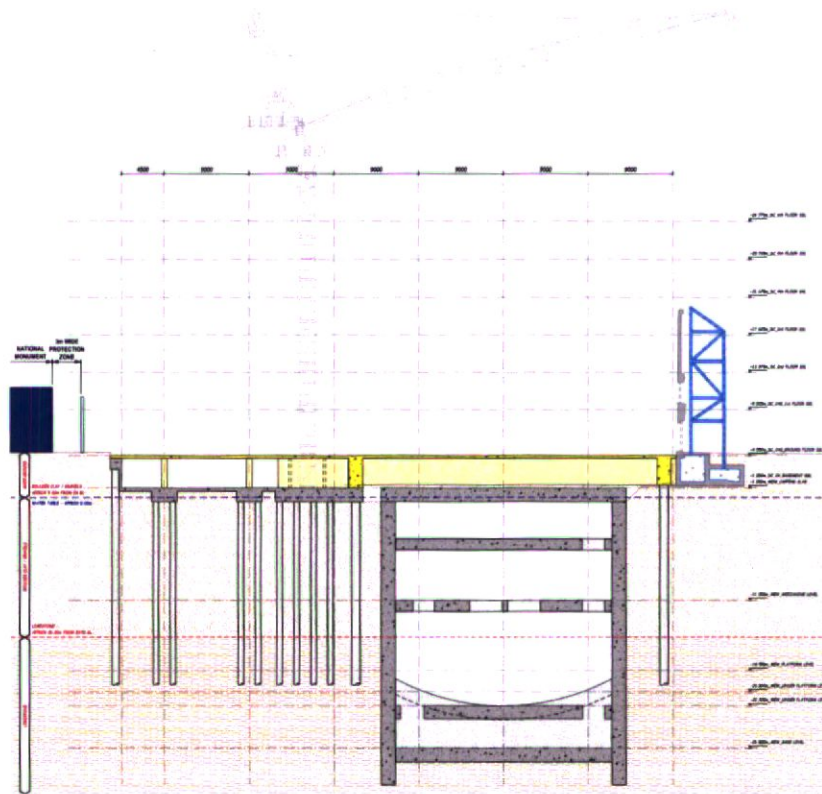


Figure 31 Phase 14 - Construct independent transfer structure above MEW box

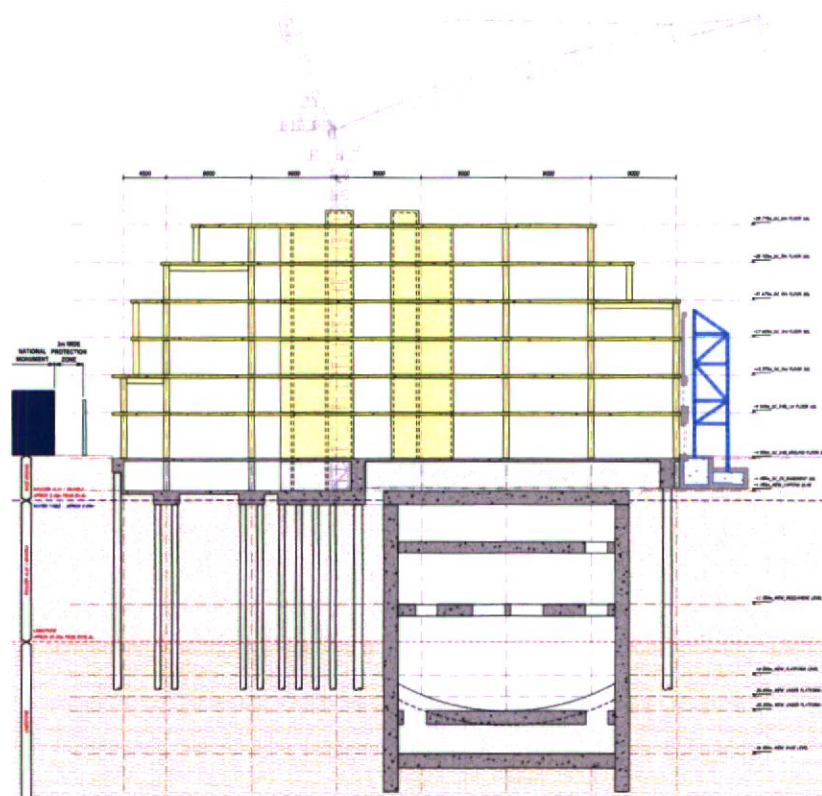


Figure 32 Phase 15 - Proceed with oversite development

5. Basement Impact Assessment

This section provides an engineering interpretation of the impact of the site development on the surrounding buildings and infrastructure. A copy of the Basement Impact Assessment is included in Appendix B.

5.1 Flooding

A copy of the flood risk assessment has been included in Appendix D.

The subject lands have been analysed for risks from tidal flooding from the Irish Sea at Dublin Bay, fluvial flooding from the River Liffey, pluvial flooding, ground water and failures of mechanical systems. 5, below, presents the various residual flood risks involved.

Table 5. Summary of Flood Risks from Various Components.

Source	Pathway	Receptor	Likelihood	Consequence	Risk	Mitigation Measure	Residual Risk
Tidal	Dublin Bay or tidally influenced River Liffey	Proposed development	Extremely low	None	Negligible	None	Extremely low
Fluvial	River Liffey	Proposed development	Extremely Low	None	Negligible	None	Extremely low
Pluvial	Private & Public Drainage Network	Proposed development, downstream properties and roads	Ranges from low to high	High	Ranges from moderate to extremely high	Appropriate drainage, SuDS and attenuation design, setting of floor levels, overland flood routing	Low
Ground Water	Ground	Underground services, ground and basement levels of buildings	Low	Moderate	Low	Appropriate setting of floor levels, flood routing, damp proof membranes	Low
Human/Mechanical Error	Drainage network	Proposed development	High	Moderate	High	Setting of floor levels, overland flood routing, regular inspection of SW network	Low

As indicated in the above table, the various sources of flooding have been reviewed, and the risk of flooding from each source has been assessed. Where necessary, mitigation measures have been proposed. As a result of the proposed mitigation measures, the residual risk of flooding from any source is low

gravels. The findings of the assessment will be used to tailor the dewatering and recharge strategy accordingly and to prepare a detailed dewatering method statement.

The ground investigation will also be used to assess the potential impact the basement structures and MEW may have on groundwater levels due to flow path interference. Although considered unlikely to be significant this will assess the potential for groundwater level rise and will inform mitigation that may be required.

The proposed basements will incorporate suitable waterproofing to prevent and manage any ingress of groundwater into the structure therefore the risk of groundwater flooding to the Development is considered low.

5.3.3 Damage Criteria Assessment

The building damage assessment is based on the Burland et al damage classification method, in accordance with CIRIA report C760 recommended by the SPD (Table 10 reproduced below):

Category of damage	Description of typical damage (ease of repair is underlined>	Approximate crack width (mm)	Limiting tensile strain, ϵ_{sm} (%)
0 Negligible	Hairline cracks of less than about 0.1 mm are classed as negligible	<0.1	0.0 to 0.05
1 Very slight	<u>Fine cracks that can easily be treated during normal decoration.</u> Perhaps isolated slight fracture in building. Cracks in external brickwork visible on inspection	<1	0.05 to 0.075
2 Slight	<u>Cracks easily filled. Redecoration probably required.</u> Several slight fractures showing inside of building. Cracks are visible externally and <u>some repointing may be required externally</u> to ensure weathertightness. Doors and windows may stick slightly.	<5	0.075 to 0.15
3 Moderate	<u>The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable lining. Repointing of external brickwork and possibly a small amount of brickwork to be replaced.</u> Doors and windows sticking. Service pipes may fracture. Weathertightness often impaired.	5 to 15 or a number of cracks >3	0.15 to 0.3
4 Severe	<u>Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows.</u> Windows and frames distorted, floor sloping noticeably. Walls leaning or bulging noticeably, some loss of bearing in beams. Services pipes disrupted.	15 to 25, but also depends on number of cracks	>0.3
5 Very severe	<u>This requires a major repair, involving partial or complete rebuilding.</u> Beams lose bearings, walls lean badly and require shoring. Windows broken with distortion. Danger of instability.	Usually >25, but depends on numbers of cracks	

Notes

- 1 In assessing the degree of damage, account must be taken of its location in the building or structure.
- 2 Crack width is only one aspect of damage and should not be used on its own as a direct measure of it.

Figure 34 Damage category classification- CIRIA C760 Table 6.4 - Classification of visible damage to walls (after Burland et al., 1977, Boscardin and Cording, 1989 and Burland, 2001)

The above categories of damage are generally classified as follows:

- Categories 0, 1 and 2 - Visual appearance or aesthetic damage
- Categories 3 and 4 - Serviceability or functional damage
- Category 5 - Stability damage

In accordance with the DCC guidance, damage to existing buildings should not exceed Category 2 generally and Category 1 for a listed building.

5.3.7 Future Works

The following works will be carried out in future design and construction stages:

- Visual inspections and condition surveys of the adjacent buildings within the zone of influence of the basement construction. These will be carried out prior to demolition and after completion. The ground movement analysis will be available to party wall surveyors as part of the party wall awards process. Dimensional reference surveys to be carried out and monitored as required and agreed with party wall surveyors.
- Intrusive investigations and condition survey of the listed buildings. Develop a monitoring strategy against the detailed assessment levels of movement to restrict tensile strains and hence damage levels to Category 1. Develop an action plan and mitigation measures against target trigger levels of movement.
- Visual inspections and condition surveys of Third-Party assets. Monitoring regime to be established and agreed plus trigger levels and Monitoring Action Plan detailing agreed actions to be taken for each trigger level. Actual movements to be reviewed at key stages against predicted movements.
- Utilities – all services within the adjacent footpaths will be identified prior to starting on site and the statutory authorities consulted regarding the proposals and any necessary temporary or permanent diversions or protection.

6. Conclusions

The Subterranean Construction Method Statement identifies the approach taken to manage the potential impacts identified in the DCC Basement Development Policy Document. The design concepts described in the design team reports provided by the DCGP Ltd consultant team demonstrate that the impacts related to the proposed development are understood. Where the development has a potential impact on the underlying aquifer, groundwater flows, Protected Structures and other adjacent properties, public highways, and local infrastructure, the design and preliminary construction methodology has been properly considered and show that the design and construction strategies proposed will mitigate and minimise the potential impacts. As the design and construction of the works proceed post planning, the concepts set out at the planning stage will be followed and developed further to deliver a well designed and engineered outcome in accordance with the conceptual design reports.



APPENDICES

Appendix B

Basement Impact Assessment - DC-WAT 2X-XX-RP-C-002017

Refer to separate report with reference as above.

Appendix D Flood Risk Assessment - DC-WAT-XX-XX-RP-C-001006

Refer to separate report with reference as above.

Appendix F**Engineering Assessment Report - DC-WAT-2X-XX-RP-C-001013**

Refer to separate report with reference as above

APPENDIX 14.1 RESOURCE & WASTE MANAGEMENT PLAN

**RESOURCE & WASTE
MANAGEMENT PLAN FOR
A PROPOSED RESIDENTIAL
DEVELOPMENT**

**MASTERPLAN, SITE 2AB,
SITE 2C AND 61 O'CONNELL
STREET.**

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APPENDIX 14.1

Report Prepared For

Dublin Central GP Limited or
shortened to DCGP Ltd.

Report Prepared By

Chonaill Bradley, Principal Environmental
Consultant

Our Reference

CB/20/11784WMR03a

Date of Issue

19 July 2023

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1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) has prepared this Resource and Waste Management Plan (RWMP) on behalf of Dublin Central GP Limited or shortened to DCGP Ltd. The Dublin Central project is an expansive (c.2.2 Ha) and complex regeneration project. It needs to be delivered in stages to overcome site and project constraints. A site wide cumulative masterplan has been prepared by 'the Applicant' to set out the overall development vision for the Dublin Central project. 'The Masterplan' area encompasses almost entirely three urban blocks. The area is bounded generally by O'Connell Street Upper and Henry Place to the east, Henry Street to the south, Moore Street to the west, and O'Rahilly Parade and Parnell Street to the north. Moore Lane extends south from Parnell Street through the centre of the masterplan area, as far as its junction with Henry Place.

The phrase 'Proposed Development' is used to describe the entire of the proposed development within 2no. separate and concurrent planning applications for Site 2 and No. 61 O'Connell Street. Site 2 is subdivided into Site 2AB and Site 2C with ACME / RKD Architects the lead Architect for Site 2AB and Grafton Architects the lead Architect for Site 2C and for the avoidance of doubt is 1no. planning application. This use of the phrase 'Proposed Development' within the EIAR should not be confused with the separate proposed development that is the subject of each of the 2no. separate and concurrent planning applications.

This plan will provide information necessary to ensure that the management of Construction and Demolition (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 Regulations¹, *Protection of the Environment Act 2003* as amended², *Litter Pollution Act 1997* as amended³, the *Eastern-Midlands Region Waste Management Plan 2015 – 2021*⁴ and the Draft National Waste Management Plan for a Circular Economy (NWMPCE) (2023)⁵.

In particular, this Plan aims 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).

This RWMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of waste to be generated by the proposed development and makes recommendations for management of different waste streams.

2.0 C&D RESOURCE AND WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Irish Government issued a policy statement in September 1998 known as '*Changing Our Ways*'⁶, which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2018).

guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Design teams roles and approach;
- Relevant EU, national and local waste policy, legislation and guidelines;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for Resource Waste Manager (RM) and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of consultation with relevant bodies i.e. waste recycling companies, Local Authority, etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a bespoke RWMP for developments. The new guidance classifies developments on a two-tiered system. Developments which do not exceed any of the following thresholds may be classed as Tier 1 development, which require a simplified RWMP:

- New residential development of less than 10 dwellings.
- Retrofit of 20 dwellings or less.
- New commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 1,250m².
- Retrofit of commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 2,000m²; and
- Demolition projects generating in total less than 100m³ in volume of C&D waste.

A development which exceeds one or more of these thresholds is classed as Tier-2 projects.

This development requires a RWMP as a Tier 2 development as it is above following criterion:

- New commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 1,250m².
- Retrofit of commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 2,000m²;
- Demolition projects generating in total less than 100m³ in volume of C&D waste.

Other guidelines followed in the preparation of this report include '*Construction and Demolition Waste Management – a handbook for Contractors and Site Managers*'¹³, published by FÁS and the Construction Industry Federation in 2002 and the previous guidelines, 'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects' (2006).

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are

relation to waste management in order for Dublin City and the Region to become self-sufficient in terms of resource and waste management and to provide a waste management infrastructure that supports this objective.

- *SI28: To prevent and minimise waste generation and disposal, and to prioritise prevention, recycling, preparation for reuse and recovery in order to develop Dublin as a circular city and safeguard against environmental pollution.*
- *SI29: Segregated Storage and Collection of Waste Streams: To require new commercial and residential developments, to include adequate and easily accessible storage space that supports the separate collection of as many waste and recycling streams as possible, but at a minimum general domestic waste, dry recyclables and food waste as appropriate.*
- *SI30: To require that the storage and collection of mixed dry recyclables, organic and residual waste materials within proposed apartment schemes have regard to the Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities 2018 (or and any future updated versions of these guidelines produced during the lifetime of this plan).*

Objectives:

- *SIO14 Local Recycling Infrastructure: To provide for a citywide network of municipal civic amenity facilities/ multi-material public recycling and reuse facilities in accessible locations throughout the city in line with the objectives of the circular economy and 15 minute city.*
- *SIO16 Eastern-Midlands Region Waste Management Plan: To support the implementation of the Eastern-Midlands Regional Waste Management Plan 2015–2021 and any subsequent plans in order to facilitate the transition from a waste management economy towards a circular economy.*

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the project are:

- Waste Management Act 1996 (No. 10 of 1996) as amended. Environmental Protection Act 1992 (No. 7 of 1992) as amended.
- Litter Pollution Act 1997 (No. 12 of 1997) as amended.
- Planning and Development Act 2000 (No. 30 of 2000) as amended ¹⁵.
- Circular Economy and Miscellaneous Provisions Act 2022.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2001* and subsequent Irish legislation, is the principle of “*Duty of Care*”. This implies that the waste producer is responsible for waste from the time it is generated through until its legal recycling, recovery or disposal (including its method of disposal). As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final destination, waste contractors will be employed to physically transport waste to the final destination. Following on from this is the concept of “*Polluter Pays*” whereby the waste producer is liable to be prosecuted for pollution incidents, which may arise from the incorrect management of waste produced, including the actions of any contractors engaged (e.g. for transportation and disposal/recovery/recycling of waste).

- Assessing any existing buildings on the site that can be refurbished either in part or wholly to meet the Client requirements; and
- Enabling the optimum recovery of assets on site.

3.2 Designing for Green Procurement

Waste prevention and minimisation pre-procurement have been discussed and will be further discussed in this section. The Design Team will discuss proposed design solutions, encourage innovation in tenders and incentivise competitions to recognise sustainable approaches. They should also discuss options for packaging reduction with the main Contractor and subcontractors/suppliers using measures such as 'Just-in-Time' delivery and use ordering procedures that avoid excessive waste. The Green procurement extends from the planning stage into the detailed design and tender stage and will be an ongoing part of the long-term design and selection process for this development.

3.3 Designing for Off-Site Construction

Use of off-site manufacturing has been shown to reduce residual wastes by up to 90% (volumetric building versus traditional). The decision to use offsite construction is typically cost led but there are significant benefits for resource management. Some further considerations for procurement which are being investigated as part of the planning stage design process are listed as follows:

- Modular buildings as these can displace the use of concrete and the resource losses associated with concrete blocks such as broken blocks, mortars, etc.;
 - Modular buildings are typically pre-fitted with fixed plasterboard and installed insulation, eliminating these residual streams from site.
- Use of pre-cast structural concrete panels which can reduce the residual volumes of concrete blocks, mortars, plasters, etc.;
- The use of prefabricated composite panels for walls and roofing to reduce residual volumes of insulation and plasterboards;
- Using pre-cast hollow-core flooring instead of in-situ ready mix flooring or timber flooring to reduce the residual volumes of concrete/formwork and wood/packaging, respectively; and
- Designing for the preferential use of offsite modular units.

3.4 Designing for Materials Optimisation During Construction

To ensure manufacturers and construction companies adopt lean production models, including maximising the reuse of materials onsite.. This helps to reduce the environmental impacts associated with transportation of materials and from waste management activities. This includes investigating the use of standardised sizes for certain materials to help reduce the amount of offcuts produced on site, focusing on promotion and development of off-site manufacture.

3.5 Designing for Flexibility and Deconstruction

Design flexibility has and will be investigated throughout the design process to ensure that where possible products (including buildings) only contain materials that can be recycled and are designed to be easily disassembled. Material efficiency is being considered for the duration and end of life of a building project to produce; flexible, adaptable spaces that enable a resource-efficient, low-waste future change of use; durability of materials and



Figure 4.1 Extract from Google Earth showing the Proposed Development location in red.

Master Plan

As noted above, the Proposed Development sits within the context of the Dublin Central Masterplan which extends to c. 2.2 ha.

The Dublin Central project is an expansive (c. 2.2 Ha) and complex urban regeneration project. It needs to be delivered in multiple separate projects to overcome site and project constraints.

A site wide cumulative Masterplan has been prepared by the Applicant to set out the overall development vision for the Dublin Central project.

ACME Architects are the Masterplan Architect for the Dublin Central regeneration project. ACME has prepared a detail Masterplan Design Statement, which set out the design framework for the wider envisaged redevelopment at this significant, strategic location



Figure 4.1 The Proposed Development (Site 2AB, 2 C, 61 O'Connell Street) shown within the context of the Dublin Central Masterplan.

Broadly each site is described as follows: -

Site 1: Located in the north east of the Masterplan. Site 1 is bounded generally by O'Connell Street to the east, Parnell Street to the north, Moore Lane to the west and Site 2C to the south. It includes Nos. 40 – 42 O'Connell Street Upper (including O'Connell Hall) and Nos. 70 – 71 Parnell Street (including Conway's pub).

Site 1 contains the following protected structures No. 42 O'Connell Street (including O'Connell Hall) and No.70 Parnell Street, and lies within the O'Connell Street ACA and partially within the Conservation Area.

Site 2: Located in the east of the Masterplan. Site 2 is subdivided into Site 2AB and Site 2C. It is bounded generally by O'Connell Street to the east (the front portion of No. 59 & 60 O'Connell Street Upper is excluded), No. 62 O'Connell Street Upper and Henry Place to the south, Moore Lane to the west and Site 1 to the north. It includes Nos. 43 – 59 O'Connell Street Upper (including the Carlton Cinema site), the rear of No. 59 & 60 O'Connell Street Upper and No. 61 O'Connell Street Upper.

No. 61 O'Connell Street

The proposed development consists of the refurbishment of No. 61 O'Connell Street Upper as residential use (comprising 3no. 2-bed apartment units) from 1st to 3rd floor including the creation of a new covered pedestrian link through part of the ground floor connecting O'Connell Street Upper and Henry Place. 2no. café / restaurant (52 sq. m in total) units are proposed at ground floor onto O'Connell Street and Henry Place. A leisure studio / gym (c. 206 sq. m in total) is proposed at basement including the provision of 2no. changing rooms.

4.2 Details of the Non-Hazardous Wastes to be Produced

There will be waste materials generated from the demolition and renovation of the existing buildings, hardstanding areas on site, as well as from the further excavation of the building foundations. 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 soil, stones, clay and made ground excavated to facilitate construction of new foundations, underground services, and the installation of the proposed basements. The project engineers (Waterman Group) have estimated that 163,490 m³ will need to be excavated for the Dublin Central Masterplan (i.e. all Sites) and 133,565m³ of material will need to be excavated to accommodate Site 2 (including MEW). There is limited chance for reuse of material onsite and it is envisaged that all material, will need to be removed offsite due to the limited opportunities for reuse on site. 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.

4.3 Potential Hazardous Wastes Arising

4.3.1 Contaminated Soil

In 2008 an initial joint geotechnical and environmental site investigation was undertaken (by O' Callaghan Moran & Associates) comprising the excavation of trial pits, the installation of boreholes in the subsoils and bedrock and the collection and testing of soil and groundwater samples. The intrusive investigations were confined to open areas in the middle of the site and around the site parameter. It is envisaged that further site

Japanese Knotweed (*Fallopia japonica*) is an alien invasive species listed under *schedule 3 of Regulations SI No. 355/2015*. SCE's report concludes that it is not present on this site and there was no indication that it is growing in the immediate vicinity.

4.3.4 Asbestos

Multiple asbestos refurbishment/demolition survey were undertaken by About Safety Ltd in September and October 2020 and are submitted as part of the application. The scope of the survey's were confined to all accessible areas of the existing buildings which are due for demolition and/or refurbishment in the future.

Asbestos Containing Materials (ACM) were detected in several locations within some of the buildings including but not limited to floor tiling, roof slates, roof felt, rope seals, bitumen and woven rope.

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.

4.3.5 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.

5.0 ROLES AND RESPONSIBILITIES

The *Best Practice Guidelines on the Preparation of Resource Waste Management Plans for Construction and Demolition Projects* promotes that a RM should be appointed. The RM may be performed by number of different individuals over the life-cycle of the Project, however it is intended to be a reliable person chosen from within the Planning/Design/Contracting Team, who is technically competent and appropriately trained, who takes the responsibility to ensure that the objectives and measures within the Project RWMP are complied with. The RM is assigned the requisite authority to meet the objective and obligations of the RWMP. The role will include the important activities of conducting waste checks/audits and adopting construction and demolition methodology that is designed to facilitate maximum reuse and/or recycling of waste.

5.1 Role of the Client

The Client are the body establishing the aims and the performance targets for the project.

- Identifying all destinations for resources taken off-site. As above, any resource that is legally classified as a 'waste' must only be transported to an authorised waste facility;
- End-of-waste and by-product notifications addressed with the EPA where required;
- Clarification of any other statutory waste management obligations, which could include on-site processing;
- Full records of all resources (both wastes and other resources) should be maintained for the duration of the project; and
- Preparing a RWMP Implementation Review Report at project handover.

6.0 KEY MATERIALS & QUANTITIES

6.1 Project Resource Targets

Project specific resource and waste management targets for the site have not yet been set and this information will be updated for these targets once these targets have been confirmed by the client. However, it is expected for projects of this nature that a minimum of 70% of waste is fully re-used, recycled or recovered. Target setting will inform the setting of project-specific benchmarks to track target progress. Typical Key Performance Indicators (KPIs) that will be used to set targets include (as per guidelines):

- Weight (tonnes) or Volume (m^3) of waste generated per construction value;
- Weight (tonnes) or Volume (m^3) of waste generated per construction floor area (m^2);
- Fraction of resource reused on site;
- Fraction of resource notified as by-product;
- Fraction of waste segregated at source before being sent off-site for recycling/recovery; and
- Fraction of waste recovered, fraction of waste recycled, or fraction of waste disposed.

6.2 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 shown in Table 6.1. The List of Waste (LoW) code (2018) for each waste stream is also shown.

Masterplan**Table 7.1** *Estimated off-site reuse, recycle and disposal rates for demolition waste from the Masterplan*

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	2027.9	0	0.0	85	1723.7	15	304.2
Concrete, Bricks, Tiles, Ceramics	11491.4	30	3447.4	65	7469.4	5	574.6
Plasterboard	901.3	30	270.4	60	540.8	10	90.1
Asphalts	225.3	0	0.0	25	56.3	75	169.0
Metals	3379.8	5	169.0	80	2703.9	15	507.0
Slate	1802.6	0	0.0	85	1532.2	15	270.4
Timber	2703.9	10	270.4	60	1622.3	30	811.2
Asbestos	7.0	0	0.0	0	0.0	100	7.0
Total	22539.2		4157.2		15648.6		2733.4

Site 2**Table 7.2** *Estimated off-site reuse, recycle and disposal rates for demolition waste from Site 2.*

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	1216.2	0	0.0	85	1033.7	15	182.4
Concrete, Bricks, Tiles, Ceramics	6891.5	30	2067.5	65	4479.5	5	344.6
Plasterboard	540.5	30	162.2	60	324.3	10	54.1
Asphalts	135.1	0	0.0	25	33.8	75	101.3
Metals	2026.9	5	101.3	80	1621.5	15	304.0
Slate	1081.0	0	0.0	85	918.9	15	162.2
Timber	1621.5	10	162.2	60	972.9	30	486.5
Asbestos	2.0	0	0.0	0	0.0	100	2.0
Total	13514.7		2493.1		9384.6		1637.0

61 O'Connell Street**Table 4.3** *Estimated off-site reuse, recycle and disposal rates for demolition waste from 61 O'Connell Street.*

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	3.7	0	0.0	85	3.2	15	0.6
Concrete, Bricks, Tiles, Ceramics	21.1	30	6.3	65	13.7	5	1.1
Plasterboard	1.7	30	0.5	60	1.0	10	0.2
Asphalts	0.4	0	0.0	25	0.1	75	0.3
Metals	6.2	5	0.3	80	5.0	15	0.9
Slate	3.3	0	0.0	85	2.8	15	0.5
Timber	5.0	10	0.5	60	3.0	30	1.5

Site 2

Table 7.6: Predicted on and off-site reuse, recycle and disposal rates for construction waste

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	871.1	10	87.1	80	696.9	10	87.1
Timber	739.1	40	295.6	55	406.5	5	37.0
Plasterboard	264.0	30	79.2	60	158.4	10	26.4
Metals	211.2	5	10.6	90	190.1	5	10.6
Concrete	158.4	30	47.5	65	102.9	5	7.9
Other	396.0	20	79.2	60	237.6	20	79.2
Total	2639.7		599.2		1792.3		248.1

In addition to the information in Table 4.5, there will be c.133,565m³ of soil, stones, clay and made ground excavated to facilitate construction of new foundations, underground services, and the installation of the proposed basement. Any suitable excavated material will be temporarily stockpiled for reuse as fill, where possible, but reuse on site is expected to be limited and all of the excavated material is expected to be removed offsite for appropriate reuse, recovery and/or disposal.

61 O'Connell Street

Table 7.6: Predicted on and off-site reuse, recycle and disposal rates for construction waste

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	2.7	10	0.3	80	2.2	10	0.3
Timber	2.3	40	0.9	55	1.3	5	0.1
Plasterboard	0.8	30	0.2	60	0.5	10	0.1
Metals	0.7	5	0.0	90	0.6	5	0.0
Concrete	0.5	30	0.1	65	0.3	5	0.0
Other	1.2	20	0.2	60	0.7	20	0.2
Total	8.2		1.9		5.6		0.8

In addition to the information in Table 4.5, there will be a very limited quantity of soil, stones, clay and made ground excavated to facilitate construction of new foundations, underground services. Any suitable excavated material will be temporarily stockpiled for reuse as fill, where possible, but reuse on site is expected to be limited and all of the excavated material is expected to be removed offsite for appropriate reuse, recovery and/or disposal.

7.3 Proposed Resource & Waste Management Options

Waste materials generated will be segregated on site, where it is practical. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source where feasible. All waste receptacles leaving site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the Dublin Region that provide this service.

Any nearby sites requiring clean fill/capping material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Regulation 27. Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will also be done in accordance with Regulation 27. Regulation 27 will be investigated to see if the material can be imported onto this site for beneficial reuse instead of using virgin materials.

If the material is deemed to be a waste, then removal and reuse / recovery / disposal of the material will be carried out in accordance with the *Waste Management Act 1996* as amended, the *Waste Management (Collection Permit) Regulations 2007* as amended and the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered.

In the event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS).

Bedrock

While it is not envisaged that bedrock will be encountered, if bedrock is encountered, it is anticipated that it will not be crushed on site. Any excavated rock is expected to be removed offsite for appropriate reuse, recovery and/or disposal. If bedrock is to be crushed onsite the appropriate mobile waste facility permit will be obtained from DCC.

Silt & Sludge

During the demolition and construction phase, silt and petrochemical interception should be carried out on runoff and pumped water from site works, where required. Sludge and silt will then be collected by a suitably licensed contractor and removed offsite.

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete blocks, bricks, tiles and ceramics generated as part of the demolition and construction works are expected to be clean, inert material and should be recycled, where possible. If concrete is to be crushed onsite the appropriate mobile waste facility permit will be obtained from DCC.

Hard Plastic

As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc., will be disposed of in a separate skip and recycled off-site.

Onsite Crushing

It is currently not envisaged that the crushing of waste materials will occur onsite, however if the crushing of material is to be undertaken a mobile waste facility permit will first be obtained from DCC and the destination of the excepting waste facility will be supplied to the DCC waste unit.

7.4 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the nominated project RM (see Section 10.0).

All movement of waste and the use of waste contractors will be undertaken in accordance with the *Waste Management Acts 1996 - 2011*, *Waste Management (Collection Permit) Regulations 2007* as amended and *Waste Management (Facility Permit & Registration) Regulations 2007* and amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project RM (see Section 10.0) will maintain a copy of all waste collection permits on-site.

If the waste is being transported to another site, a copy of the Local Authority waste COR/permit or EPA Waste/IE Licence for that site will be provided to the nominated project RM (see Section 10.0). If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) notification document will be obtained from DCC (as the relevant authority on behalf of all local authorities in Ireland) and kept on-site along with details of the final destination (COR, permits, licences etc.). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

All information will be entered in a waste management recording system to be maintained on site.

8.0 ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is outlined below. The total cost of C&D waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

8.1 Reuse

By reusing materials on site, there will be a reduction in the transport and recycle/recovery/disposal costs associated with the requirement for a waste contractor to take the material off-site.

Clean and inert soils, gravel, stones etc. which cannot be reused on site may be used as access roads or capping material for landfill sites etc. This material is often taken free of charge or a reduced fee for such purposes, reducing final waste disposal costs.

8.2 Recycling

Salvageable metals will earn a rebate which can be offset against the costs of collection and transportation of the skips.

10.0 TRAINING PROVISIONS

A member of the construction team will be appointed as the project RM to ensure commitment, operational efficiency and accountability during the C&D phases of the project.

10.1 Resource Manager Training and Responsibilities

The nominated RM will be given responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid them in the organisation, operation and recording of the waste management system implemented on site. The RM will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the RM to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and material salvage.

The RM will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The RM will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this RWMP.

10.2 Site Crew Training

Training of site crew is the responsibility of the RM and, as such, a waste training program should be organised. A basic awareness course will be held for all site crew to outline the RWMP and to detail the segregation of waste materials at source. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the Waste Storage Areas (WSAs). A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

11.0 TRACKING AND TRACING / RECORD KEEPING

Records should be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the waste arising's on site.

A waste tracking log should be used to track each waste movement from the site. On exit from the site the waste collection vehicle driver should stop at the site office and sign out as a visitor and provide the security personnel or RM with a waste docket (or WTF for hazardous waste) for the waste load collected. At this time, the security personnel should complete and sign the Waste Tracking Register with the following information:

- Date
- Time
- Waste Contractor
- Company waste contractor appointed by e.g. Contractor or subcontractor name

Upon completion of the C&D phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling/reuse/recovery figures for the development.

12.3 Pest Management

A pest control operator will be appointed as required to manage pest onsite during the construction phase of the project. Organic and food wastes generated by staff will not be stored in open skips, but in closed waste receptacles. Any waste receptacles will be carefully managed to prevent leaks, odours and pest problems.

13.0 C&D ENVIRONMENTAL MITIGATION MEASURES

During the Demolition and Construction phase the project Construction Environmental Management Plan (CEMP) will be followed in regard to implementing and managing all environmental management requirements.

This CEMP explains the construction techniques and methodologies which will be implemented during demolition and construction of the proposed development.

The CEMP mitigation measures will be implemented to ensure that pollution and nuisances arising from site clearance and construction activities is prevented where possible and managed in accordance with best practice environmental protection.

The CEMP will be implemented and adhered to by the demolition and construction contractors and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, RM and Ecological Clerk of Works where relevant. All personnel working on the site will be trained in the implementation of the procedures.

14.0 CONSULTATION WITH RELEVANT BODIES

14.1 Local Authority

Once construction contractors have been appointed, have appointed waste contractors and prior to removal of any C&D waste materials offsite, details of the proposed destination of each waste stream will be provided to the DCC Waste Regulation Unit.

DCC will also be consulted, as required, throughout the demolition, excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

14.2 Recycling/Salvage Companies

The appointed waste contractor for the main waste streams managed by the demolition and construction contractors will be audited in order to ensure that relevant and up-to-date waste collection permits and facility registrations/permits/licences are held. In addition, information will be obtained regarding the feasibility of recycling each material, the costs

15.0 REFERENCES

1. Waste Management Act 1996 as amended,
2. Environmental Protection Agency Act 1992 as amended.
3. Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended
4. Eastern-Midlands Region Waste Management Plan 2015 – 2021 (2015).
5. Regional Waste Management Planning Offices, *Draft The National Waste Management Plan for a Circular Economy (June 2023)*.
6. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998).
7. Forum for the Construction Industry – *Recycling of Construction and Demolition Waste*.
8. Department of Communications, Climate Action and Environment (DCCAE), *Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025* (Sept 2020).
9. DCCAE, *Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less'* (2021)
10. Circular Economy and Miscellaneous Provisions Act 2022.
11. Environmental Protection Agency (EPA) '*Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects*' (2021)
12. Department of Environment, Heritage and Local Government, *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* (2006).
13. FÁS and the Construction Industry Federation (CIF), *Construction and Demolition Waste Management – a handbook for Contractors and site Managers* (2002).
14. Dublin City Council (DCC), *Dublin City Council Development Plan 2022-2028* (2021)
15. Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended
16. EPA, *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2018)
17. Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.
18. Environmental Protection Agency (EPA), *National Waste Database Reports 1998 – 2022*.
19. EPA and Galway-Mayo Institute of Technology (GMIT), *EPA Research Report 146 – A Review of Design and Construction Waste Management Practices in Selected Case Studies – Lessons Learned* (2015).



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Refurbishment & Demolition Asbestos Survey

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Ref:	Presumed/Strongly Presumed Asbestos & Non-Accessed Areas [Requires investigation by a competent contractor prior to works likely to cause disturbance]
4	The boiler room generator flange gaskets are presumed to contain asbestos.
7	Integral areas of the Hoval boilers are strongly presumed to contain asbestos.
8	Asbestos containing gaskets are strongly presumed in the pipework flanges throughout the boiler room.
10	External window sealants and mastics are presumed to contain asbestos.
14	Lift cores and doors were not accessible and are therefore presumed to contain asbestos.
33	The dry riser hydrants are presumed to contain asbestos.
General	Fire doors throughout the building are presumed to contain asbestos unless material was identified through keyholes or damaged areas of doors.
78	The Chinese restaurant (fronting O'Connell St.) and first and second floors were not accessible during the inspection.
75	The ESB sub-station was not accessed during the inspection.
77	Occupied offices in the car park were not inspected.
78	Retail outlets on O'Connell Street were not accessible during the inspection.
89, 94	The stairway to the 1 st floor and lift lobbies are presumed to contain asbestos vinyl floor tiles.
122	The lead sealed cast-iron collars are presumed to contain asbestos woven rope packing. Network of pipework in basement and in building.
123	Construction and demolition waste piles are extensive throughout the basement and is presumed to contain asbestos materials.

Introduction

About Safety Ltd. was instructed to carry out a Refurbishment and Demolition Asbestos Survey of the above property. The survey and sampling was carried out taking cognizance of the requirements of the Health and Safety Executive (UK) document, *HSG 264, Asbestos: The Survey Guide*.

Objectives

The objectives of this survey were to:

To carry out a survey to ascertain the presence of asbestos based materials.

To carry out a survey to locate and describe, as far as reasonably practicable, all asbestos containing materials prior to refurbishment/demolition.

To gain access to all areas, as necessary, to determine the extent of any asbestos that may be present.

To sample and estimate the extent and volume of any asbestos materials that may be present.

To generate asbestos material assessments where the period between the survey and event is significant i.e. more than 3 months.

To produce a report identifying areas containing asbestos to be used as a basis for tendering their removal.

To instigate asbestos removal works prior to refurbishment/demolition.

NB: The extent of asbestos containing materials if identified in this report are only approximate and should not be relied upon as a basis for tendering removal works. Contractors tendering works are expected to satisfy themselves by site visit and measurement the exact nature and extent of any works they are tendering.

Survey Limitations

All areas accessed for proposed refurbishment works were subjected to a survey taking cognisance of the requirements of HSG 264, Asbestos: The Survey Guide. The investigation consisted of an inspection of each room and area to be impacted by the works.

No report has been made on any concealed spaces, which may exist within the fabric of the building where the extent and presence of these is not evident due to inaccessibility, lack of building drawings or insufficient knowledge of the structure of the building at the time of the survey.

Inaccessible Areas: Electrical equipment such as, boiler units, water heaters, storage heaters, fuse or switch boards. Within floor or wall structures, behind wall or ceiling cladding or within blocked up chimneys. Within internal areas of fire doors unless asbestos observed from keyhole or other damaged areas. Care should always be exercised when working on any electrical equipment in particular the older styles as asbestos-containing materials may be present.

Asbestos Refurbishment & Demolition Survey: Definition

A refurbishment and demolition survey is needed before any refurbishment or demolition works is carried out. This type of survey is used to locate and describe, as far as reasonably practicable, all ACM's in the area where the refurbishment works will take place or in the whole building if demolition is planned. The survey will be fully intrusive and involve destructive inspection, as necessary, to gain access to all areas, including those that may be difficult to reach. A refurbishment and demolition survey may also be required in other circumstances, e.g. when more intrusive and maintenance and repair work will be carried out or for plant removal and dismantling.

Where the refurbishment or demolition works may not take place for a significant period after the survey (e.g. three months), then the information required for a management survey should be obtained.

Asbestos Contaminated Soils (ACS)

The first point of contact with soil or ground contaminated with asbestos will be during site investigations and exploratory ground works. This may be defined as asbestos operative related work and applies where there is a potential for sporadic or low intensity exposure. People directly involved in these preliminary works, geotechnical engineers and ground workers, should receive formal training enabling them to work safely where asbestos could be present in the ground as a consequence of legacy use issues with the land. In principle, the general tiered approach to the assessment and management of potential risks posed by ACS is the same as that for any other contaminant. However, the unique nature of asbestos means that different methods of analysis, exposure estimation and risk estimation are required. Importantly, soil and air analysis methods need to be more detailed than those currently and commonly used to demonstrate compliance with the Asbestos Regulations.

Material Assessment

No condition assessment is normally necessary for refurbishment and demolition surveys but, where the period between survey and the event is significant, e.g. more than 3 months, then a material assessment should be conducted and interim management arrangements put in place.

Material Assessment Algorithm

In the material assessment process, the main factors influencing fibre release are given a score which can then be added together to obtain a material assessment rating. The four main parameters which determine the amount of fibre released from an ACM when subject to disturbance are:

- Product Type

employer working with or removing asbestos.

In addition, Safety, Health and Welfare at Work (Construction) Regulations 2013 (SI 291 of 2013) also apply to any building, installation, repair, demolition and asbestos removal work.





Information about working with material containing asbestos cement is contained in Health and Safety Authority's document "Guidelines on Working with Materials Containing Asbestos Cement".

Provision of information

It is recommended that this report is brought to the attention of any person likely to be involved in refurbishment/demolition works.

Once asbestos materials have been identified it is essential that appropriate remedial measures be introduced prior to any structural alterations, refurbishment or demolition works commencing. All the asbestos removal works should be carried out by a competent asbestos removal contractor in accordance with Asbestos at Work Regulations 2006 to 2010. Statutory notification requirements of 14 days are required under the provisions of the Asbestos Regulations for certain works involving asbestos. The contractor appointed for removal works is responsible for deciding if a 14-day notification is required and for drawing up a plan of work for any removal works.

Appendix B – Schedule of Survey Sheets

Ref No.	Building	Location or Functional Space	Sample No.	Material Description, surface treatment and condition	Extent	Asbestos identified (presumed, strongly presumed or identified)	Product type	Condition	Surface treatment	Asbestos type	Material assessment score	Recommendations	Photo
5	Fingal Co. Co. Office and Carpark Moore Lane	6 th floor boiler room	2027306	Asbestos cement flue pipes from boilers and exiting through roof.	6 LM approx.	Chrysotile	1	0	1	1	3	Removal and disposal as asbestos waste by a competent contractor prior to work likely to cause disturbance.	
6	Fingal Co. Co. Office and Carpark Moore Lane	6 th floor boiler room	2027303	Woven rope seals to Hoval boiler burner unit and door.	2 LM approx.	Chrysotile	2	1	1	1	5	Removal and disposal as asbestos waste by a competent contractor prior to work likely to cause disturbance.	
7	Fingal Co. Co. Office and Carpark Moore Lane	6 th floor boiler room		Integral areas of boilers		Strongly presumed to contain asbestos						Removal and disposal by a competent contractor prior to any works likely to cause disturbance.	
8	Fingal Co. Co. Office and Carpark Moore Lane	6 th floor boiler room		Pipework flange gaskets		Strongly presumed to contain asbestos						Dismantling and investigation by a competent contractor prior to work likely to cause disturbance.	

Key NAD = No asbestos detected NAA = Non-Accessed Area AIB = Asbestos insulation board AC = Asbestos cement VFT = vinyl floor tile NQ = Not Quantified/Quantifiable SM = Square Meters LM = Linear Meters	Confirmed Asbestos	Material Assessment Score		Risk		
		≤ 4		Very Low		
		5 - 6		Low		
	Presumed/Strongly presumed ACM Or Non-Accessed Area	7 - 9		Medium		
		≥ 10		High		
		No condition assessment is normally necessary for refurbishment and demolition surveys but, where the period between survey and the event is significant, e.g. more than 3 months, <u>then a material assessment should be conducted and interim management arrangements put in place.</u>				