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CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

GREAT CONNELL SHD

NEWBRIDGE

COUNTY KILDARE

Prepared For: -

Aston Ltd
Great Connell
Newbridge
County Kildare

Prepared By: -

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Project	Preliminary Construction Environmental Management Plan			
Client	Aston Ltd			
Report No.	Date	Status	Prepared By	Reviewed By
211550103	24/03/2022	Initial Draft	Austin Hynes BSc MSc	Jim O'Callaghan MSc
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1. INTRODUCTION

Aston Ltd appointed O'Callaghan Moran & Associates to prepare a preliminary Construction Environmental Management Plan (CEMP) for the proposed Strategic Housing Development (SHD) at Great Connell, Newbridge, County Kildare.

The preliminary CEMP defines the measures that will be implemented in the Construction Stage to:

- Effectively mitigate adverse environmental effects, and
- Manage invasive species to achieve their eradication and prevent their spread inside and outside the site boundary.

1.1 Methodology

The preliminary CEMP had regard to the following:

- Construction Industry Research and Information Association (CIRIA) guidance which include 133 Waste Minimisation in Construction (CIRIA 133), and the Control of Water Pollution from Construction Sites, Good Practice Guidelines (CIRIA C532).
- BS 5228 (2009+A1:2014) Code of practice for noise and vibration control on construction and open sites - Noise and Vibration.
- European Communities (Birds and Natural Habitats) Regulations (S.I. No. 477/2011)
- The Construction Stage Prevention & Mitigation Measures in the Environmental Impact Assessment Report.
- Preliminary Resource & Waste Management Plan.
- Provide adequate environmental training and awareness for all project personnel.

1.2 Revision

This preliminary CEMP will be revised following receipt of planning permission to incorporate any additional mitigation measures that may be imposed by the conditions of the planning permission and to update the Invasive Species Management Plan based on new surveys.

2. PROJECT DESCRIPTION

2.1 Site Location

The site is to the east of Newbridge Town Centre. It is accessed from the east off the Great Connell Road, which forms the eastern boundary. It is bounded to the north-east by a residential development (Wellesley Manor) and to the north-west by an open drain that was formerly a meander channel of the River Liffey. A hedgerow forms the southern boundary. The south-western boundary is defined by a buffer zone on the western side of the River Liffey. The western boundary is not defined on the ground.

2.2 Site Layout

The site is 27.64 hectares (ha) and the layout is shown on Drawing PA-0012 in Appendix 1. Most of the site is in agricultural use, currently tillage. An open but overgrown drainage ditch runs along the northern border and in central area of the site. There are hedgerows along the northern, southern and eastern boundaries and an area of woodland in the southwest, on the eastern bank of the River Liffey.

There is a former agricultural yard (8,920m^2) towards the centre of the site containing two single storey sheds (1,440m^2 and 595m^2), and a three-sided shed (54 m^2) and a car park to the east. There is a former residential dwelling (Valencia Lodge) to the east of the agricultural yard. This is a single storey house (136 m^2) with a single storey garage (17.8 m^2) and garden. There is a second former residence (Great Connell) in the north-east corner of the site. This is a two-storey dwelling (332 m^2) with a detached single storey garage and boiler room (48 m^2).

2.3 Services

There is an Irish Water 300mm watermain running along the Great Connell Road. This supplies the Wellesley Manor via a 100mm uPVC network. There is an existing 1000mm concrete storm water sewer serving Wellesley Manor that flows from north-east to the south-west along the north-eastern boundary and discharges into a small stream that then flows into the Liffey.

A 450mm concrete foul sewer flows north to south through the centre of the site and connects to the foul sewer network serving Wellesley Manor. A 900mm foul sewer, recently installed as part of the upgrade of the Upper Liffey Valley Sewerage Scheme, runs from north-east to south-west across the site. There is an overhead 10 kV Medium Voltage electricity line traversing the site which drops underground for a section of its run.

2.4 Environmental Setting

2.4.1 Hydrology

The site is in the catchment of the River Liffey, whose main channel runs through the site close to the south-western boundary. There are two open drainage ditches inside the site boundary that follow the original alignment of an historic meander on the Liffey.

2.5 Environmental Setting

2.5.1 Hydrology

The site is in the catchment of the River Liffey, whose main channel runs through the site close to the south-western boundary. There are two open drainage ditches inside the site boundary that follow the original alignment of an historic meander on the Liffey.

2.5.2 Geology & Hydrogeology

The subsoils in the western half of the site are Alluvium, with the eastern half underlain Gravels derived from Limestone. The subsoils are between 16.5m and 18m thick and overly limestone bedrock. The sands and gravels are classified as a locally important aquifer. The underlying bedrock is a regionally important karstified (Rkd) aquifer. The water table ranges from 1m to 2.9m below ground level.

2.5.3 Biodiversity

The site is dominated by large fields of arable crops, with two former residences and three former agricultural buildings at the centre of the site towards the eastern boundary. The northern, southern and eastern boundaries include hedgerows with small areas of scrub and treelines. There is an area of mixed broadleaved woodland in the south-west corner of the site and this is the most valuable habitat within the site and will be retained intact. There is an 80m riparian zone either side of the River Liffey. The closest Natura 2000 Site is Pollardstown Fen Special Protection Area, which is 2.6km to the west.

2.5.4 Archaeology

Archaeological field surveys did not identify any significant archaeological features within the site boundary. A number of minor features were identified in Test Trench T12 in the south east of the site that need to be assessed at the site clearance stage (Figure 2.1).

2.6 Surrounding Land Use

To the south and south-east are agricultural lands primarily used for tillage. To the east, across the Great Connell Road, are the Murphy Ireland Ltd offices and compound. To the north-east is Wellesley Manor, which has the closest residential dwellings to the development, with the houses in the south of the estate being approximately 10m from the north-eastern development site boundary. A large-scale residential development is currently under construction to south-west of the site.

2.7 Road Network

The R416 Athgravan Road to the west is a Regional Road linking Newbridge and Athgarvan. It is a single lane two-way carriageway. The Great Connell Road is a Local Primary Road linking the R445 with the L2032 via Buckley's Cross at the northern end. It is a single lane two-way carriageway.

The Great Connell roundabout provides access to the residential development on the western side of the Great Connell Road, the Murphy International offices and compounds and the Dr. Pepper beverage manufacturing plant.

The completed section of the N445 'Ballyfarm Road' is expected to be taken in charge by Kildare County Council by Q2 2022. This section of road will then be open to the public.

2.8 Invasive Species

Himalayan Balsam *Impatiens glandulifera,* which is listed in the Third Schedule of SI 477 of 2011 was recorded along the banks of the River Liffey within the proposed development site (Figure 2.4). The locations are in the riparian zone.

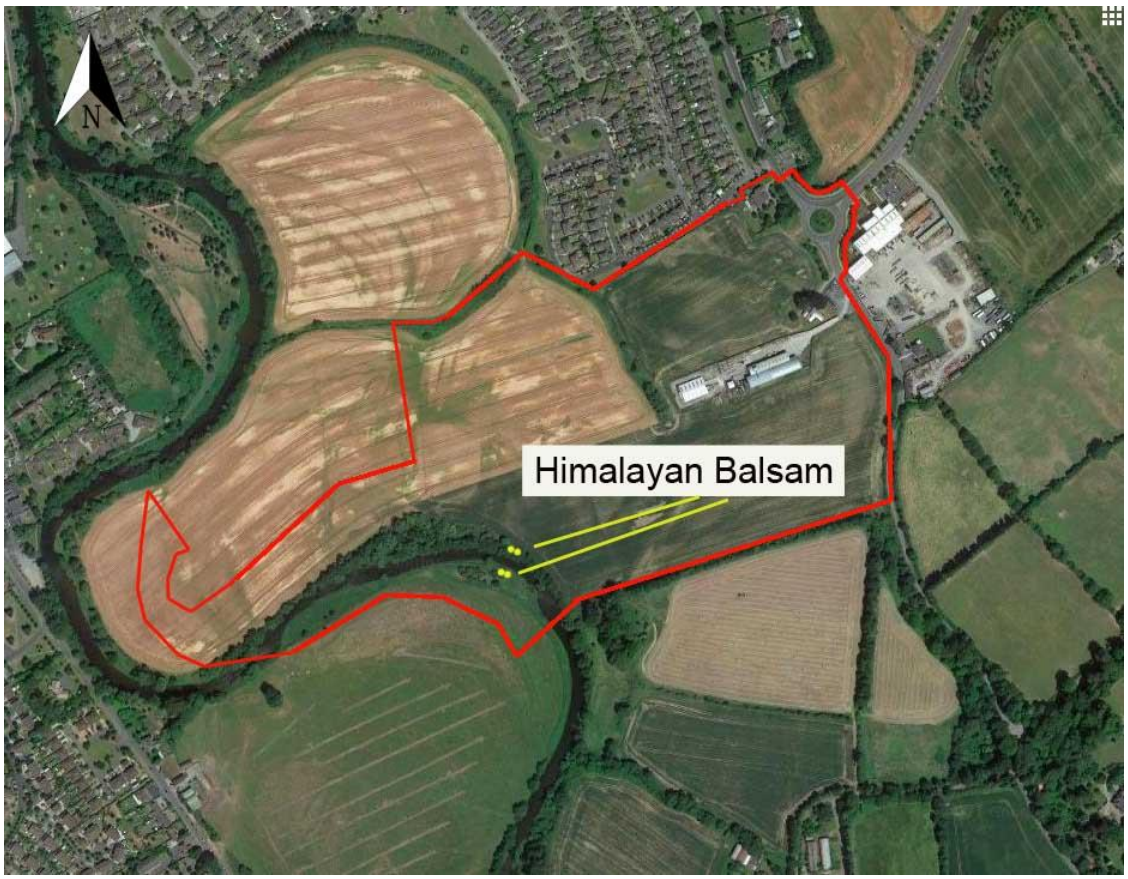

Figure 2.4 Invasive Species

3. DEVELOPMENT DESCRIPTION

The proposed layout is shown on Drawing PR-002 in Appendix 1. The development involves the demolition of two unoccupied private residences and three sheds and the phased construction of 569 residential units comprising a mix of house and apartments with associated car parking (1,008) and bicycle (734) spaces; the construction of a neighbourhood centre and a crèche and the provision of a series of parks (2.6 ha) and open amenity area (8.31 ha) along the River Liffey. Access will be off the Great Connell Road and the development will include the delivery of a 350m section of the Newbridge Southern Outer Orbital Relief Road (NSOORR).

3.1 Services

The development will connect to the mains water supply via a 200mm diameter connection from the existing watermain on the Great Connell Road. The surface water drainage system will discharge to the existing drainage ditch and the River Liffey via nine below ground flow attenuation tanks.

The existing 450mm foul sewer that runs across the site from south to north will be diverted and connected to the new 900mm diameter sewer. There will be a pumped foul water connection to the Upper Liffey Valley Sewerage Scheme

The existing overhead electrical power lines running from the north-east to south-west through the site and along the southern site boundary will be diverted underground.

3.2 Roads/Junctions

The development will deliver a 350m section of the NSOORR and the Great Connell Roundabout will be replaced by a signalised junction

4. PRELIMINARY CONSTRUCTION PROGRAMME

4.1 Development Phases

The proposed phasing of the works is shown on Drawing No PA-008 in Appendix 1

Phase 1: Northern Area of Site

- Construction of 169 residential units and the neighbourhood centre including the crèche
- Construction of the signalised junction and Great Connell Roundabout
- Demolition of private residences and removal of trees as per the Arborist requirement
- Diversion of Athgarvan foul sewer to connected to Upper Liffey Valley Sewerage Scheme
- Undergrounding of overhead power lines.
- Construction of relevant infrastructural works including new foul sewer and pumping station, surface water drainage including SuDs measures, water mains connections, roads and footpaths and utilities.
- Completion of flood compensation storage works within the riparian/zoned amenity lands
- Open Spaces landscaping in Zones 9,10,11,13, A & B.

Phase 2: **South of Phase 2**

- Construction of 103 residential units.
- Construction of relevant infrastructural works including new gravity foul sewer, surface water drainage including SuDs measures, water mains connections, roads and footpaths and utilities.
- Provision of Open Space 2, along with relevant landscape works within the riparian zone.

Phase 3: **South of Phase 3**

- Construction of 99 residential units.
- Construction of relevant infrastructural works including new gravity foul sewer, surface water drainage including SuDs measures, water mains connections, roads and footpaths and utilities.
- Open space landscaping to Areas 3 & F, including treatment works to this section of the Great Connell Road.

Phase 4: **West of Phases 4**

- Construction of 198 residential units.
- Construction of relevant infrastructural works including new gravity foul sewer, surface water drainage including SuDs measures, water mains connections, roads and footpaths and utilities.
- Open space landscaping to areas 1, 4, 5, 6, 7, 8, D & E, including treatment works to the section of the Great Connell Road.

5. METHOD STATEMENT FOR CONSTRUCTION

5.1 Working Hours

The normal working hours shall be 08:00 to 18:00 Monday to Friday (excluding bank holidays) and 08:00 to 16:00 Saturdays, subject to restrictions that may be imposed by the planning permission. Works will not be carried out on Sundays and Public Holidays. Subject to the agreement of the Kildare County Council out of hours activities may be required for certain elements e.g. connections to water mains and municipal foul sewer.

5.2 Site Preparatory Works

Preparatory works involves Site Set Up by the Contractor which will include the following:

- Setting of access control to the development area and the erection of directional signage as specified in the Construction Stage Traffic Management Plan.
- All construction related traffic will access the site via N445 (Ballyfarm Road) only with no construction traffic on the Great Connell Road at any time.
- Provision of secure compound for the storage of all on-site machinery and materials.
- Confirming the buffer distances between site boundaries and sensitive locations.
- Construction of internal site roads.
- Provision of services and utilities, and
- Provision of security fencing and perimeter hoarding.

Prior to the commencement of construction, the Contractor will contact the relevant bodies (e.g. ESB, Gas Networks, Irish Water) check records and drawings to establish the location of existing buried services/utilities. Where it is necessary to disconnect services/utilities during the construction works for a notable period, temporary provisions will be provided.

5.3 Construction Compound

The exact location of the compound will be confirmed in advance of commencement of the works (and agreed with Kildare County Council). The compound may be relocated during the construction phases. All construction traffic and deliveries to the site will be directed to only use the extended section of the N445 (Ballyfarm RD) no other public rad access will be permitted.

The compound will include a site office and welfare facilities, hardstanding for plant and machinery and a designated waste storage area. It will initially be serviced with electrical power from an on-site generator and will include Portaloo toilet facilities until a connection to the municipal foul sewer has been established. The generator will contain a built-in double contained fuel storage tank. All liquid chemicals will be stored in the construction compound in bunded storage areas.

5.4 Excavation Works

Topsoils and subsoils will only be excavated to establish formation level for the buildings, roads and underground services, including the surface water attenuation tanks. A tracked 360-degree excavator will be used to strip the topsoil, and a dumper will be used to move the excavated materials to temporary stockpile locations.

5.5 Construction of the NSOORR

The construction methodology is as follows:

- Soils will be excavated until a competent stratum is reached.
- A layer of geogrid/geotextile may be required at the surface of the competent stratum.
- The competent stratum will be overlain with up to 500mm of granular fill.
- A final hard surface layer will be placed to provide a road profile to accommodate construction traffic.
- Prior to completion of the Phase 1 the finished road surface will be applied.

5.6 Concrete Works

Concrete batching will not be carried out on-site. Excess concrete will be removed from the site and concrete washout will not be permitted on the site. Concrete pouring will be monitored to ensure there is no accidental discharge. Accidental spills will not be hosed down.

5.7 Surface Water/Drainage System

A 5-meter buffer will be maintained along the banks for the drains in the north of the site. The only works carried out inside the 80m strip of riparian area along the Liffey will be the provision of bound gravel bitmac paths. A minimum 10m buffer will be maintained between the riverbank and the operational area when the paths are being laid.

A stretch of the drainage ditch in the north of the site will be infilled. A storm water attenuation system will be installed comprising a range of SuDs measures including underground attenuation. The attenuation system will discharge to the drainage ditch in the north of the site and to the River Liffey via silt traps and oil interceptors. The outfalls will be constructed in accordance with Inland Fisheries Ireland “Guidelines on the Protection of Fisheries during Construction Works In and Adjacent to Waters 2016” .

5.8 Groundwater

The excavation works will not extend to below the water table and dewatering will not be required.

5.9 Materials – Source and Transportation

The selection and specification of construction materials will be informed by the local availability of these materials. Subject to the necessary constraints of performance, durability and cost, construction materials will be sourced from local suppliers and manufacturers, where possible.

5.10 Oils and Chemical Storage

All oils, fuels, paints and other chemicals will be stored in a secure, bunded, hardstand area. The bund capacity of the bulk oil storage tanks will at a minimum be 110% of the tank. For drum storage, a bund capacity of 25% of the maximum volume of material stored is required. The refuelling and servicing of mobile plant and equipment will only be carried out in a designated hardstand area which is at least 50m from any drains.

5.11 Traffic Management

A Traffic Management Plan (TMP) will be prepared prior to the start of the Advance Works. The Plan will take into consideration:

- Department of Transport Traffic Signs Manual 2021
- Department of Transport Guidance for the Control and Management of Traffic at Road Works (2010)
- Relevant conditions of the planning permission, and the
- Site Access

There will be a single entrance to Phases 1 to 4 off the Great Connell Roundabout. All construction and delivery traffic will access the site via the extended section of the R445 “Ballyfarm Rd” which is due to open in Q2 2022. Construction traffic will not access the site from the Great Connell Road.

The traffic will include:

- Private vehicles use by construction site staff
- Construction vehicles (excavators and dump trucks)
- Materials delivery vehicles, typically heavy goods vehicles (HGV)

Many staff members will share transport and will generally arrive before 08:00 and leave after 18.00 thereby avoiding morning and evening peak hour traffic. There will, on average, be 5 HGV movement hourly at the busiest times.

The Plan will address the following

- Provision of Warning/Advanced Warning Signs at appropriate locations.
- Speed limits.
- Designated parking areas.

- Maintaining cleanliness of the public roads on the approaches to the site.
- Maintaining safe pedestrian access on the public roads in the vicinity of the site.

5.12 Health and Safety

As required by the Safety, Health and Welfare at Work (Construction) Regulations 2013, the Contractor appointed to complete the development will prepare a Health and Safety Plan that address site specific health and safety issues from the start to the completion of the construction.

The Contractor will provide 'Site Induction' training for all construction staff and ensure all site staff have current 'Safe Pass' cards. All construction staff will receive a full safety briefing and will be provided with all of the safety equipment required by their assigned tasks.

5.13 Site Security

The Contractor will be responsible for site security, including erecting and maintaining adequate fencing.

6. ENVIRONMENTAL MITIGATION MEASURES

The Construction Stage involves site clearance, building demolition, excavation, the construction of the residential units, neighbourhood centre, crèche and roadways and the provision of the associated wastewater and surface water drainage systems. Heavy goods vehicles will deliver construction materials and the mobile plant will include excavators, lifting equipment, dumper trucks, compressors, and generators.

The construction works have the potential to impact on the environment through the generation of noise and dust and impacts on air quality, surface water, groundwater, and ecology. The Main Contractor shall appoint an experienced Environmental Clerk of Works who will be responsible for ensuring the mitigation measures specified in this Plan are effectively implemented throughout the Construction Stage. This includes the provision of staff induction training and regular 'toolbox' talks.

6.1 Noise & Vibration

The Main Contractor shall be responsible for compliance with the requirements of BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014 (Code of Practice for Noise and Vibration Control on Construction and Open Sites) and the Safety, Health and Welfare at Work (General Application) Regulations 2007, Part 5 Noise and Vibration.

The noise and vibration assessment carried out as part of the EIA process concluded that the construction phase LAeq 1 h levels at all receptors will be lower than the 65 dB criterion recommended by BS 5228-1:2009. Cumulative levels associated with simultaneous building construction and NSOORR construction will also be lower than the 65 dB criterion, and considerably lower than the 70 dB NRA road construction criterion in the National Roads Authority (NRA) Guidelines for Treatment of Noise and Vibration in National Roads Schemes. No vibration impacts will arise.

Although construction phase noise emissions will be short term, and will not exceed construction phase criteria, the applicant nonetheless proposes to apply the following mitigation measures throughout the construction phase:

- Works will in general be confined to the period Monday-Friday 0800-1800, and Saturday 0800-1600.

- Where it is proposed to operate plant during the period 0700-0800 at locations within 100m of offsite receptors, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.

- Provision of a barrier along site boundary (e.g. standard 2.4m high construction hoarding) to when construction works are being carried out in proximity to noise sensitive receptors i.e. private residences.

- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.

- Plant used on-site will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers shall be immediately replaced.

- Queuing of trucks near offsite receptors will be prohibited.

- Plant will only be left running during works and will be switched off at all other times. Plant will not be left idling.

- Where it is proposed to introduce potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.

- Where generators or compressors are operated within 100 m of offsite receptors, or previously completed receptors onsite, these will be fitted with manufacturers' acoustic enclosures, or alternatively will be screened by a local acoustic screen or soil stockpile.

- Provision of a barrier along site boundary (e.g. standard 2.4m high construction hoarding) to when construction works are being carried out in proximity to noise sensitive receptors i.e. private residences.

- Selection of quiet plant/location of plant; plant which will have the least impact in term of noise will be selected and will be positioned as far away as practical from noise sensitive receptors.

- All vehicles and mobile plant will have effective exhaust silencers, and these will be subject to regular maintenance to ensure they remain fit for purpose. All diesel fuelled plant will have effective air intake silencers.

- Pneumatic percussive tools (air drills, hammers, rammers etc) will be fitted with the manufacturer's recommended mufflers or silencers.

- Hours of work - all construction related works, other than emergency works and security will be carried out during normal construction working hours.

- The Ecological Clerk of Works will be appointed as a liaison officer with the local community. Where evening or night-time operations are required, local residents will be notified through the liaison officer.

- All noise complaints will be logged in a register and investigated immediately. Details of follow-up action will be included in the register.

6.2 Air

6.2.1 Dust

Dust emissions are likely to arise from earthworks, wind blow from temporary soil stockpiles; construction traffic movements; handling of construction materials and landscaping. The following control measures will be implemented at a minimum:

- The Main Contractor shall prepare a site-specific Dust Management Plan prior to the start of the works.

- Spraying of exposed earthworks, soil stockpiles and site haul roads during dry weather using mobile bowser units.

- Provision of a power wash at the site entrance road to remove dirt from vehicles before they leave the site.

- Paved roads will be regularly swept to remove mud and debris and traffic movements on non-paved areas will be restricted to essential site traffic

- Control of vehicle speeds.

- Material drop heights from plant to plant or from plant to stockpile will be minimised.

- The approach road to the Great Connell Roundabout and the junction itself will be inspected daily for cleanliness and cleaned as required using a mechanical road sweeper.

6.2.2 Engine Exhaust Emissions

The following mitigation measures will be implemented to minimise emissions:

- Construction materials will where possible be sourced locally so as to minimise transport distances.

- Engines will be turned off when machinery is not in use, and

- Regular maintenance of vehicles, plant and equipment.

6.3 Land & Soil

The following management practices will be implemented to minimise the risk of soil contamination:

- Excavation and the stripping of topsoil etc. will only be undertaken when absolutely necessary as this can lead to sediment run off and leaching of nutrients from soils into the groundwater.

- Excavated soils not immediately reused will be stockpiled to minimise the effects of weathering.

- Good housekeeping (daily site clean-ups, use of disposal bins, etc.) on site during construction, and the proper use, storage and disposal of substances and their containers will prevent soil contamination.

- Regular plant maintenance to minimise oil leaks.

- Refuelling of the diesel fuelled plant will only be undertaken by trained personnel in areas where appropriate spill control materials are to hand (spill mats, oil dry). Any spillages will be immediately contained, and the contaminated soil excavated and sent to an appropriately licensed waste management facility.

6.4 Water

The mitigation measures described in Section 6.4 are equally relevant to the protection of surface waters. The following additional measures will be implemented:

- A 10m buffer will be maintained between the existing ditch that will be retained and the construction area.

- The only works carried out inside the 80 m riparian strip along the Liffey will be the provision of bound gravel bitmac paths. A minimum 10 m buffer will be maintained between the riverbank and the operational area when the paths are being laid.

- Pouring of cementitious materials will be carried out where possible in dry periods based on weather forecasts. Plastic covers will be available in case of a sudden rainfall event.

- The concrete pumping will be monitored to ensure no accidental discharge.

- Excess concrete will be removed from the site and concrete washout, with the exception of chute cleaning, will not be permitted on the site

- There will be no hosing into surface water drains of spills of concrete, cement, grout or similar materials

6.5 Archaeology

- Prior to the start of the construction works a suitably qualified and experienced, Archaeologist shall be appointed to undertake all mitigation measures. The Archaeologist shall obtain an Archaeological Excavation Licence from the Department of Housing, Local Government and Housing.

- The Archaeologist shall monitor all topsoil stripping/general ground reduction works onto the surface of the underlying subsoils.

- As part of the initial phase of topsoil stripping, the overall extents of Features F12-1, F12-2 and F12-3, together with the brick-making feature uncovered in T21, identified in the Archaeological Assessment completed as part of the EIA, will be determined (Figure 2.4). These features will be subject to a process of archaeological excavation (preservation by record).

- In the event of additional subsurface features of archaeological interest being uncovered during the monitoring, works in the immediate area of such features shall cease and the Archaeologist will seek the advice of the National Monuments Service, Department of Housing, Local Government and Heritage to determine what additional action should be implemented.

- Should additional archaeological/historical artefactual material be recovered during such works, then the Archaeologist will ensure that the requirements of the National Museum of Ireland with regard to such items should be implemented. This may include specialist archaeological identification and reporting and conservation, if required.

- Following completion of the combined programmes of archaeological excavation and monitoring, and any other possible archaeological interventions/investigations, the Archaeologist shall prepare a full and final report for submission to the Planning Authority and the Department of Housing, Local Government and Housing and National Museum of Ireland.

6.6 Biodiversity

Given the site location there is particular emphasis on the need to protect the valuable habitats adjoining the site i.e. River Liffey and treeline/woodland habitats. To achieve this, it is essential that all construction staff, including all sub-contractors, are fully informed of these habitats and of the control measures that must be implemented to prevent adverse impacts. The Ecological Clerk of Works will be responsible for informing all relevant staff.

6.6.1 Lighting

- Site lighting will be provided with the minimum luminosity necessary for safety and security purposes. Where possible, lighting will be restricted to the working area and using the cowl and angling noted above, will minimise overspill and shadows on sensitive habitats outside the construction area and

- Site lighting will be positioned and directed so that it does not unnecessarily intrude on adjacent ecological receptors. The primary area of concern is the potential impact at the woodland and treelines along the River Liffey. There will be no directional lighting focused towards these areas and cowling and focusing lights downwards will minimise light spillage.

6.6.2 Habitats

- Trees will be protected in accordance with BS: 5837:2012 Trees in relation to design, demolition and construction.

- Where possible trees will be removed outside the period 1st March to 31st August.

- The mitigation measures to protect the trees that will be retained shall comply with Arboriculture Method Statement for works within the root protection area of the tree

- Reinstatement of trees and vegetation will be undertaken by a suitably qualified landscape contractor.

6.6.3 Bats

- Where possible the demolition of buildings will take place between and October March when bats will be hibernating, as they have negligible potential as winter hibernation sites.

- In all cases immediately in advance of demolition a bat specialist will undertake an examination of the building. Emergence surveys will be carried out if buildings are affected during the April to September period. If bats are present at the time of examination it is essential to determine the nature of the roost (i.e. number, species, whether it is a breeding population) as well as its exact location.

- If bats are recorded in the buildings earmarked for demolition, special mitigation measures to will be put in place and a license to derogate from the conservation legislation will be sought from the NPWS.

- The Main Contractor will take all required measures to ensure works do not harm individual bats by altering working methods or timing to avoid bats, if necessary.

- If roosting habitat for bats is removed, replacement habitat will be provided.

- A number of trees will be removed prior to/during construction. The bat specialist will work with the Ecological Clerk of Works to ensure that the loss of trees is minimised, and those trees earmarked for retention are adequately protected.

- Tree-felling will be undertaken in the period September to late October/early November. During this period bats are capable of flight and may avoid the risks of tree-felling if proper measures are undertaken.

- Felled trees will not be mulched immediately. Such trees will be left lying several hours and preferably overnight before any further sawing or mulching. This will allow any bats within the tree to emerge and avoid accidental death. The bat specialist will be on-hand during felling operations to inspect felled trees for bats. If bats are seen or heard in a tree that has been felled, work will cease and the local NPWS Conservation Ranger will be contacted.

- Trees will be retained where possible and no 'tidying up' of dead wood and spilt limbs on tree specimens will be undertaken unless necessary for health and safety.

- Treelines outside the proposed development area but adjacent to it and thus at risk, will be clearly marked by a bat specialist to avoid any inadvertent damage.

- During construction directional lighting will be employed to minimise light spill onto adjacent areas. Where practicable during night-time works, there will be no directional lighting focused towards the River Liffey or boundary habitats and focusing lights downwards will be utilised to minimise light spillage.

- If bats are recorded by the bat specialist within any trees or buildings, no works will proceed without a relevant derogation licence from the NPWS.

- As a biodiversity enhancement measure it is proposed that bat boxes will be put up within the study area. It is proposed that 10 bat boxes will be located within the site (https://www.wildcare.co.uk/vincent-pro-bat-box-10651.html for box proposed or similar). The boxes will be erected by the Ecological Clerk of Works taking into account landscape plans, vehicle movements and lighting.

- As noted above, lighting mitigation measures will follow *Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers* (Bat Conservation Ireland, 2010) and *Guidance note 08/18. Bats and artificial lighting in the UK. Bats and the built environment series* (Bat Conservation Trust 2018).

- All mitigation measures including detailed method statements will be agreed with the NPWS prior to commencement of works, which could affect any bat populations on site.

6.7 Landscape

The mitigation measures will include.

- Erection of 2.4m high construction hoarding around relevant sections of the site boundary e.g. Great Connell Road and the north-eastern boundary with Wellesley Manor.

- Implementing tree protection measures as required (no-dig zones, tree protection fencing and existing hedgerow retention). All trees that will not be removed will remain undisturbed and undamaged

- Tree protection zones will not be used for car parking and the storage of construction materials.

7. INVASIVE SPECIES MANAGEMENT PLAN

7.1 Introduction

This Plan is based on the mitigation measures recommended in the Biodiversity Chapter in the EIAR prepared by Dixon Brosnan Ecologists.

7.2 Himalayan Balsam

Himalayan Balsam is a member of the busy Lizzie family (Balsaminacea) and, as its name suggests, is native to the Himalaya region of Asia. It was introduced as a garden plant in the mid-1800's and rapidly became established along waterways and in other damp places as a result of it prolific seed production.

It is an annual plant forming dense upright stands approximately 1m tall where it effectively out-competes surrounding herbs and grasses. It is tolerant of shade and does very well in the canopy of riparian woodland. In the autumn it dies back leaving the ground bare and vulnerable to erosion.

7.3 Survey

Prior to the commencement of construction works an invasive species survey will be undertaken by an experienced within the proposed development boundary by a competent ecologist to determine if invasive species listed under Part 1 of the Third Schedule of S.I No. 477 of 2011 have established in other areas of the development area in the period between pre-planning and post consent.

7.4 Proposed Management Programme

Given the location and extent of the plants the recommended control measure is hand pulling. The plants will be hand-pulled and bagged prior to the commencement of site works. They will be then placed in a designated area of the site to decay.

The seeds are not particularly robust but may survive for 18 months so a two-year programme of control, which will be within the phased development schedule, will be required. As development works will not be carried out within 50m of the plant stand it is not necessary to wash down machinery leaving the site to prevent seeds from being spread outside the site boundary; however this may change depending on the outcome of the pre-construction survey.

The Contractor will appoint an experienced invasive treatment specialist, who in conjunction with the supervising ecologist, will prepare a detailed management plan prior to the commencement of the works based on up-to-date surveys.

8. MONITORING

An Environmental Monitoring Programme will be implemented for the duration of the works. The scope will be based on the conditions of the planning permission and will be confirmed with Kildare County Council in advance of the works. The preliminary scope is below.

8.1 Archaeology

An experienced Archaeologist will attend on site during the stripping of the topsoil to monitor for archaeological features as specified in Section 6.6.

8.2 Dust Deposition

Dust deposition monitoring will be carried out at locations and frequencies agreed with Kildare County Council. The monitoring will be carried out using Bergerhoff gauges specified in the German Engineering Institute VDI 2119 document entitled 'Measurement of Dustfall Using the Bergerhoff Instrument' (Standard Method).

The gauges will be set up such that the containers were approximately 2m above the ground surface. To inhibit the growth of algae, 10ml of copper sulphate will be added to each jar. The monitoring period shall be between 28 and 32 days. The proposed deposition limit is 350 mg/m2/day

8.3 Noise Monitoring

Noise monitoring will be carried out at noise sensitive locations and frequency agreed with Kildare County Council. The monitoring will be in accordance with International Standard ISO 1996-2:2017 Acoustics – Description, measurement and assessment of environmental noise, Part 2: Determination of environmental noise levels (2017). The noise limits will be as conditioned in the planning permission.

8.4 Works Area

The site will be inspected daily to ensure that buffer zones between the working areas and the water courses are maintained and that oil and chemical storage and handling areas are appropriately managed.

8.5 Biodiversity

A bat specialist will examine the buildings prior to demolition and the mature trees prior to removal to determine the presence/absence of bats.

8.6 Landscape Works

Regular inspections will be carried out to ensure that the landscaping is carried out in accordance with the landscape plans and the tree protection measures are correctly implemented.

8.7 Reporting

The results of the monitoring will be submitted to Kildare County Council.

APPENDIX 1