INFRASTRUCTURE

Project

Residential Development at Hacketstown, Skerries, Co. Dublin

Report Title

Construction and Environmental Management Plan

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Contents

1 Introduction

This Construction and Environmental Management Plan (CEMP) is for the works associated with the construction of the proposed residential development at Hacketstown, Skerries, Co. Dublin.[1]

This CEMP was prepared by Ben Mong CEng, MEI, Associate civils with DBFL Consulting Engineers and was reviewed by Laura McLoughlin BEng(Hons), CEng, MEI, Associate Civils with DBFL Consulting Engineers. Ben has over 10 years' experience in large scale civils engineering design projects with extensive experience in Roads & Drainage, Water & Wastewater and Bulk Earthworks for Commercial, Industrial and Residential developments. Laura has over 10 years' experience working in civil engineering consultancies managing projects from inception to handover under the NI Framework for Small Sewerage Schemes, infrastructure design and drainage sustainability in residential and commercial developments.

The SHD application site comprises approximately 6.7 hectares – see Figure 1 below. The site is bound to the north by a riparian strip which traverses the lands west to east along a hedgerow. The lands slope downward towards the water course. The site is bound to the north by a newly constructed housing known as Ballygossan Park Phase 1, to the west by the Dublin–Belfast railway line, to the east by Golf Links Road and to the south by agricultural lands and individual houses.

The residential area immediately North of the site was recently completed under Reg Ref: F11A/0309/E1, for 103 no. dwellings plus a crèche in Ballygossan Park Phase 1. It is understood that proposals for Ballygossan Park Phase 2 will be subject of a separate planning application. The site slopes at an approximate gradient of 1:20 from south to north.

[1] This plan may have to be adapted to deal with planning conditions imposed and / or unforeseen conditions but any significant departure from it will be by agreement with the local authority and will only be to improve the efficient and environmental management of the site.

Figure 1: Site Location, Hacketstown, Skerries, Co. Dublin (Site Boundary Indicative Only)

The subject site and the lands to the north comprise the now expired Hacketstown Local Area Plan (LAP), which encompasses approximately 16.6 hectares in total. While the LAP is not relied upon given that it has expired, the original design strategies pertaining to infrastructure and surface water management are still relevant.

The proposed development entails 345 no. residential units comprising of 84 no. 1-bed units, 93 no. 2-bed units (66 no. 2-bed apartments and 27 no. 2-bed duplexes), 167 no. 3-bed units (128 no. 3-bed duplexes and 39 no. 3 - bed houses) ranging in height from 2 no. – 4 no. storeys on a site of 6.7 ha. located at Hacketstown in the townlands of Milverton, Townparks and Hacketstown, Skerries, Co. Dublin. As well as:

- Public Open Space of c.16,670 sqm (25% of net developable area) is proposed including the parkland and main public square, in addition to the linear park of c.2,427 sqm;
- c.2,272 sqm communal open space is proposed to serve the apartments;
- 414 car parking spaces in total are proposed including 70 visitor spaces, creche set down and 3 for creche staff parking within undercroft and at surface level.
- 802 No. bicycle parking spaces comprising including 128 No. visitor spaces and 10 No. to serve the creche;
- Childcare and community facility of c.377 sqm. located in Block C;
- Upgrades to the Golf Links Road including new pedestrian and cycle infrastructure with frontage on Golf Links Road;

- Vehicular access off the Golf Links Road is to be provided to the southeast of the subject site;

In addition the proposal will provide a new internal link road which will connect to the adjacent lands to the north, for which a separate planning application has been made to Fingal County Council under Reg. Ref. F21A/0287 (ABP Reg. Ref. 312189-21).

All associated site development and infrastructural works including amenity spaces, landscaping, open space, boundary treatments, vehicular parking, bicycle parking, utilities, internal roads, footpaths and shared surfaces, playground, site clearance and temporary construction development.

This CEMP addresses noise and vibration, traffic management, working hours, pollution control, dust control, road cleaning, compound/public health facilities and staff parking, all associated with the construction works.

The site development and construction phase for the Project will take place over a 5 year period.

The final CEMP, to be submitted and approved by the local authority prior to the commencement of construction, will include any requirements arising from the conditions attached to any permission granted and will make provision for and ensure adherence to any and all Covid regulations and guidelines as is relevant at the time of submission.

2 Compound Facilities/Parking

The compound shall be entirely within the site boundaries. Site accommodation to be provided will include suitable washing / dry room facilities for construction staff, canteen, sanitary facilities, first aid room, office accommodation etc. Access to the compound will be security controlled and all site visitors will be required to sign in on arrival and sign out on departure.

The compound shall be constructed using a clean permeable stone finish and will be enclosed with security fencing. A permeable hardstand area will be provided for staff parking and these areas will be separate from designated machinery / plant parking.

A material storage zone will also be provided in the compound area. This storage zone will include material recycling areas and facilities.

A series of 'way finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas.

On completion of the works all construction materials, debris, temporary hardstands etc. from the site compound will be removed off site and sent for reuse as by-products or recovery at authorised facilities and the site compound area reinstated in full on completion of the works.

3 Traffic Management

As part of Construction Stage Safety Plan for the works a Traffic Management Plan (TMP) will be prepared in accordance with the principles outlined below and shall comply at all times with the requirements of:

- Chapter 8 of the Department of the Environment Traffic Signs Manual, current edition, published by The Stationery Office, and available from the Government Publications Office, Sun Alliance House, Molesworth Street, Dublin 2;
- Guidance for the Control and Management of Traffic at Road Works (June 2010) prepared by the Local Government Management Services Board;
- Any additional requirements detailed in the Design Manual for Roads and Bridges & Design Manual for Urban Roads & Streets (DMURS)

The site will be accessed from the existing site entrance from Golf Links Road. Traffic volumes are not anticipated to be significant and turning movements into the site shall be accommodated without delay. Warning signage will be provided for pedestrians and other road users on all approaches in accordance with Chapter 8 of the Traffic Signs Manual and the Contractor's Traffic Management Plan. See EIAR Chapter 11 Material Assets: Road Network & Traffic for further details.

All construction activities will be governed by a Construction Traffic Management Plan (CTMP), the final details of which will be agreed with Fingal County Council prior to the commencement of construction activities on site. This document will be produced by the contractor upon appointment prior to construction. The principal objective of the CTMP is to ensure that the impacts of all building activities generated during the construction phase upon the public (off-site), visitors to the subject site (on-site) and internal (on-site) workers environments, are fully considered and proactively managed/programmed thereby ensuring that safety is maintained at all times, disruption is minimised and undertaken within a controlled hazard free/minimised environment.

During the general excavation of the foundations there will be additional HGV movements from the site. See EIAR Chapter 11 for further details. All suitable material will be used for construction and fill activities where possible and appropriate. All waste material will be removed to an authorised waste management facility. .

In addition to the traffic generated by the disposal of surplus subsoil from the site, there will be traffic generated from deliveries of construction materials and equipment. It should be pointed out that construction traffic generated during the development works tends to be off-peak hour. Such trips would generally be spread out over the full working day and are unlikely to be higher than the peak hour predicted for the operational stage.

Construction traffic will consist of the following categories:

- Private vehicles owned and driven by site construction staff and by full time supervisory staff. On-site employees will generally arrive before 07:30, thus avoiding the morning peak hour

traffic. These employees will generally depart after 18:00. It should be noted that a large proportion of construction workers would arrive in shared transport. The site is readily accessible by public transport with Northern Commuter Train services and Dublin Bus stops all within nearby walking distance.

- Excavation plant and dumper trucks involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready-mix concrete and mortar, concrete blocks, miscellaneous building materials, etc.

Deliveries will arrive at a steady rate during the course of the day. It is estimated that peak delivery rates would be in the region of 1 - 2 deliveries per hour throughout the day.

In the absence of a contractor's final construction programme it is difficult to assess the exact impact during the construction period. Nevertheless; the following mitigation measures / estimates have been made in respect of the construction period impacts:

- Appropriate on-site parking and compounding will be provided to prevent overflow onto the local network. Parking in nearby residential estates shall be strictly prohibited.
- It is likely that some numbers of the construction team will be brought to/from the site in vans/minibuses, which will serve to reduce the trip generation potential.
- During the period of excavation and disposal off site, it is likely that up to 2 no. truck trips per hour (on average) will be generated by vehicles removing unwanted materials from the site to allow for the construction of the development and for the removal of any waste and other materials.

The site offices and compound will be located within the site boundary.

3.1 Reductive/Mitigation Measures

Traffic Management during Construction

A Traffic Management Plan will be prepared prior to the commencement of construction work on site. This plan will be prepared in consultation with Fingal County Council in order to agree on traffic management and monitoring measures are outlined below:

During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads.

All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel.

Appropriate on-site parking and compound area will be provided to prevent overflow onto the local network.

It is likely that some numbers of the construction team will be brought to/from the site in vans/minibuses, which will serve to reduce the trip generation potential.

Delivery vehicles to and from the site will be spread across the course of the working day, therefore, the number of HGVs travelling during the peak hours will be relatively low.

Truck wheel washes will be installed at construction entrances and any specific recommendations with regard to construction traffic management made by Fingal County Council will be adhered to.

Potential localised traffic disruptions during the construction phase will be mitigated through the implementation of industry standard traffic management measures. These traffic management measures shall be designed and implemented in accordance with the Department of Transport's Traffic Signs Manual "Chapter 8 Temporary Traffic Measures and Signs for Roadworks" and "Guidance for the Control and Management of Traffic at Roads Works – 2nd Edition" (2010).

Site entrance point/s from the public highway will be constructed with a bound, durable surface capable of withstanding heavy loads and with a sealed joint between the access and public highway. This durable bound surface will be constructed for a distance of 10m from the public highway.

Material storage zone will be established in the compound area and will include material recycling areas and facilities.

'Way finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas.

Dedicated construction haul routes will be identified and agreed with Fingal County Council prior to commencement of activities on-site.

On completion of the works, all construction materials, debris, temporary hardstands etc. form the site compound will be removed off-site and the site compound area reinstated in full on completion of the works.

4 Road Cleaning

A programme of street cleaning (at site frontage on Golf Links Road) will be implemented.

Provision will be made for the cleaning by road sweeper etc. of all access routes to and from the site during the works. Road cleaning shall be undertaken as required during the completion of the works.

All road sweeping vacuum vehicles will be emptied off site at a suitably authorised facility.

5 Working Hours

For the duration of the proposed works the maximum working hours shall be 07:00 to 19:00 Monday to Friday (excluding bank holidays) and 07:00 to 13:00 Saturdays, subject to the restrictions imposed by the planning authority . No working will be allowed on Sundays and Public Holidays.

6 Construction Methodology

6.1 Protection of Adjacent Areas

Work areas will be segregated from the adjacent public areas for the extent of the project by means of a suitable hoarding fence. All hoardings will be designed by a competent Structural Engineer to resist wind loads.

All materials being hoisted by crane or other means will be controlled using guide ropes where possible.

6.2 Excavation and Rock Breaking

A specialist ground works contractor will be appointed to carry out the excavation and rock breaking works. The appointed specialist contractor will carry out a full risk assessment prior to the commencement of work.

Trial pits have been carried out on the site and are detailed as follows.

The topsoil in the investigation locations on the subject site was present to a maximum depth of 0.5m below ground level.

The cohesive deposits were encountered beneath the topsoil and were described as brown sandy gravelly Clay or silty Clay with occasional cobbles and boulders. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. The strength of the cohesive deposits varied across the site but generally increased with depth and was typically soft to depth of 1.7m and 3.4m below ground level overlaying firm, firm to stiff or stiff in the majority of the exploratory holes.

The granular deposits were encountered within the cohesive deposits and were typically described as grey or brown clayey sandy sub rounded to sub angular fine to coarse Gravel with occasional cobbles or gravelly fine to coarse Sand. Based on the SPT N values, the deposits are typically medium dense and become dense with depth although loose deposits were recorded in places.

Groundwater strikes were noted in the majority of the boreholes generally on encountering or within the granular deposits.

The rotary core boreholes recovered medium strong to strong grey fine grained limestone. Calcite veins were noted during logging which are typically present within the limestone. The depth to rock varies from 9.80m below ground level in Borehole 02 to a maximum of 19.70m below ground level in Borehole 104.

The geotechnical testing carried out on soil samples recovered generally confirm the descriptions on the logs with the primary constituent of the cohesive deposits found to be a CLAY of low to intermediate plasticity. The Particle Size Distribution tests confirm that generally the cohesive deposits are well-graded with percentages of sands and gravels ranging between 15% and 45% generally with fines contents of 30 to 40%.

The Particle Size Distribution tests confirm that generally the granular deposits are well-graded with percentages of sands/gravels and silt/clay typically between 20% and 30% with a gravel/sand content of typically 60% to 75%.

The CBR testing on remoulded samples from the subject site gave results ranging between 2% and 23% and generally undertaken on fill deposits.

The maximum allowable vibrations (as measured by peak particle velocity (PPV)) along the Dublin-Belfast Railway tracks due to the breaking out of the rock or general excavation will be in accordance with Irish Rail requirements and code of practice. A monitoring regime will be agreed with Irish Rail and implemented in advance of works commencing on site.

The ground works operation will be carried out in order to ensure that material removed from the ground is taken away at regular intervals in order to reduce the amount of material that can be stored on site.

Topsoil stripping associated with the proposed development will be monitored by a suitably qualified archaeologist, which will ensure the identification of any small archaeological features that may survive within the site. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation will be required, such as preservation in-situ or by record. Any further mitigation will require approval from the National Monuments Service of the Department of Housing, Local Government and Heritage (DoHLGH).

Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development. At any given time, the extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas. Topsoil stockpiles will also be located so as not to necessitate double handling.

Disturbed subsoil layers will be stabilized as soon as practicable (e.g. backfill of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping). The duration that subsoil layers are exposed is to be minimised in order to mitigate against weather effects.

Similar to the comments regarding stripped topsoil, stockpiles of excavated subsoil material will be protected for the duration of the works. Stockpiles of subsoil material will be located separately from topsoil stockpiles.

6.3 Material Hoisting

It is envisaged that tower cranes will be erected to hoist materials on site in the construction of apartments and/or housing units. The cranes will be designed by a specialist to free stand full height without the need to be connected to the structure. The crane details and number are yet to be confirmed and these will be dictated by the main works contractor.

The crane(s) is likely to be founded on a concrete base foundation. This foundation may be piled or ground bearing depending on the suitability of the ground conditions at the location where the crane is

proposed. The geometry of this concrete base is envisaged to be 8m x 8m x 1m deep. It is intended that the tower crane will be erected and dismantled by a mobile crane from within the site boundary.

Careful consideration will be given to the recruitment of suitably qualified crane drivers and banksmen given the location of the site and the proximity of neighbouring properties.

In order to control the risks associated with lifting operations beside the live Dublin-Belfast Railway tracks, an electronic limiting system will be fitted to the cranes. This system will prevent the crane operator from deviating from the previously agreed operating environment. At no point will load be permitted to overhang over the Dublin-Belfast Railway.

6.4 Waste Management Plan

A detailed waste management plan will be agreed with Fingal County Council and put in place in order to manage any waste on site, promote the circular economy and increase segregation and minimise construction waste costs. Waste arising from the site will be considered in relation to the waste management hierarchy of prevention, reduce, reuse, recycle, energy recovery and disposal. All materials capable of being re-used will be sent for re-use. The maximum possible materials will be categorised as by-products. All waste will be sent to appropriately authorised facilities.

7 Noise and Vibration

During the construction works the Contactor shall comply with:

- BS 5228: 2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites, Part 1 and Part 2.
- Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRS, Revision 1, 2004)
- Safety, Health and Welfare at Work (General Application) Regulations 2007, Part 5 Noise and Vibration.

The following acceptable levels are described in the Transport Infrastructure Ireland (TII) publication Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes, March 2014. These limits are applied during the construction of road infrastructure projects at the facades of NSRs:

Table 10.10 TII Acceptable Levels for Construction

Day	Working Hours	Level dB (LAeq,1hr)	Level dB (LAmax)
Mon-Fri	07.00 – 19.00	70	80
Mon-Fri	19.00 – 22.00	60*	65*
Saturday	08.00 – 16.30	65	75
Sundays & Bank Holidays	08.00 – 16.30	60*	65*

Note *: Construction activity at these times, other than emergency works, will normally require specific permission from the local authority.

It is unlikely that there will be a requirement for night-time or evening (19.00 – 23.00 hrs) construction works. Accordingly, based on BS5228 and TII acceptable levels for construction and also the existing ambient sound environment, the following construction noise criteria are proposed:

- · 65 dB LAeq,1hr, Mon-Fri (07.00 – 19.00hrs) and Sat (07.00 – 13.00 hrs) at existing NSRs.

See EIAR Chapter 10 for further information on noise requirements.

Vibration impacts can typically potentially occur during site development and construction phases of development through the use of equipment such as rock breakers or piling. Vibration can affect both human beings and buildings (although most concern is with damage to buildings from site development and construction). Accordingly, there are separate criteria for both.

Guidance relevant to the protection of building structures is contained in the following documents:

- British Standard BS 7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration, and;
- British Standard BS 5228: 2009+A1 2014: Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.

Both standards contain similar guidance relating to building damage criteria. The standards note that the risk of cosmetic damage to residential buildings starts at a Peak Particle Velocity (PPV) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above for unreinforced or light framed structures. For reinforced or heavier commercial buildings, the standard notes that the risk of cosmetic damage commences at 50mm/sec at 4 Hz and above. This is for transient or intermittent vibrations which do not cause a resonant response in buildings. The criteria should be reduced by half for more sustained or continuous vibration which may occur during activities such as continuous piling.

Humans are particularly sensitive to vibration stimuli and responses typically occur well below the order of magnitude for building damage. BS5228-2 also provides the following range of vibration values and associated potential effects on humans:

Table 10.11 Vibration Criteria – Human Beings

Vibration Level mm/sec PPV	Effect
0.14	Vibration might just be perceptible in the most sensitive in the most sensitive situations for most vibration frequencies.
0.3	Vibration might just be perceptible in residential environments.
1	A vibration level of this magnitude is likely to cause complaint.
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

In general the contractor shall implement the following mitigation measures during the proposed works:

- Avoid unnecessary revving of engines and switch off equipment when not required.
- Keep internal haul roads well maintained and avoid steep gradients.
- Minimise drop height of materials.
- Start-up plant sequentially rather than all together

More specifically the Contractor shall ensure that:

- In accordance with Best Practicable Means, plant and activities to be employed on site are reviewed to ensure that they are the quietest available for the required purpose.
- Where required, improved sound reduction methods are used e.g. enclosures.

- Site equipment is located away from noise sensitive areas, as much as physically possible.
- Regular and effective maintenance by trained personnel is carried out to reduce noise and / or vibration from plant and machinery.
- Hours are limited during which site activities likely to create high levels of noise and vibration are carried out.

A site representative responsible for matters relating to noise and vibration will be appointed prior to construction on site. Any complaints received will be thoroughly investigated and a log kept.

A noise and vibration monitoring specialist will be appointed to periodically carry out independent monitoring of noise and vibration during random intervals and at sensitive locations for comparison with limits and background levels. It is proposed that noise and vibration levels be maintained below those outlined above as part of these works.

All vehicles and mechanical plant used for the purpose of the Works shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order. In addition, all diesel engine powered plant shall be fitted with effective air intake silencers. All compressors shall be "sound reduced" models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use. All ancillary pneumatic percussive tools shall be fitted with mufflers or silences of the type recommended by the manufacturers, and where commercially available, dampened tools and accessories shall be used.

All ancillary plant, such as generators and pumps, shall be positioned so as to cause minimum noise disturbance. If operating outside the normal working week acoustic enclosures shall be provided.

Temporary acoustic screening shall be placed along the boundaries with NSRs where works take place close to the boundary. As a general rule of thumb, it is recommended that temporary screening break the "line of sight" from the sources to the affected windows of the nearest NSRs where possible. It is likely that screening will be required at NSR1 throughout the duration of the proposed works.

The screening should be of sufficient surface density (minimum 10 kg/m^2) to mitigate temporary noise impact associated with the construction phase.

Local screening should be provided for stationary plant such as generators and compressors.

An acoustically screened area should be provided on the site specifically for noisy operations such as grinding and cutting metal.

A noise liaison officer should be appointed and charged with the responsibility of keeping people informed of progress and by setting down procedures for dealing with complaints.

During the construction phase all equipment shall be required to comply with noise limits set out in EC Directive 2000/14/EC as amended by Directive 2005/88/EC on the approximation of the laws of the Member States relating to the noise emission in the environment by equipment for use outdoors. The

directive covers equipment such as compressors, welding generators, excavators, dozers, loaders and dump trucks.

While piling is dictated by constraints such as ground conditions, the design and final method chosen shall ensure compliance with the threshold limits for noise and vibration as set out in EIAR Chapter 10 – Noise and Vibration and limits proposed by Irish Rail for the rail line.

Measures such as use of an acoustic shroud, damping of the hammer impact and enclosure of the hammer shall be considered for reducing noise impact if applicable to the final piling design.

At the time of tender, the contractor will be obliged to review all systems taking noise and vibration into account in the choice of equipment. As noted in BS5228-1, “the construction industry is generally innovative and constantly developing, and there may be proprietary systems available at the time of tender that were not known or available at the planning stage.”

Vibration monitoring will be conducted when sources which potentially could cause vibration impact to buildings will be in use. Test monitoring will be conducted with the equipment on at low levels before increasing incrementally to operational levels if deemed necessary. Works will be ceased and mitigation measures implemented during the construction phase where monitoring detects vibration levels associated with the works above the relevant guidance values for building damage as set out in EIAR Chapter 10 – Noise and Vibration.

See EIAR Chapter 10 for further information on noise and vibration requirements/standards and mitigation measures.

8 Sediment and Water Pollution Control Plan

All works carried out as part of these works will comply with all Statutory Legislation including the Local Government (Water Pollution) acts, 1977 and 1990. This standard is extremely strict, allowing any entry onto water of deleterious material or polluting matter is an offence. The contractor will co-operate in-full with the Environmental Department of Fingal County Council.

As part of the overall construction methodology, the following issues will be addressed and have been identified as being of particular risk and/or concern to pollution.

- Contamination of Watercourse / Groundwater –

  Although the proposed excavation works will temporarily increase the vulnerability of the underlying aquifer, the thickness of the low permeability subsoil and the shallow depths of excavation involved will minimise the risk to groundwater.

  There is a risk that ground water could become contaminated with lime from cement which subsequently finds its way into the local adjacent watercourses. The measures proposed to be put in place to mitigate any potential damage from the effluent of contaminated ground water would be to create an exclusion zone, as far as reasonably practicable.

  Concrete batching will take place off site and wash down and wash out of concrete trucks will take place off site (at authorized concrete batching plant in full compliance with relevant planning and environmental consents). Concrete trucks, cement mixers or drums/bins are only permitted to wash out in designated wash out area greater than 50m from sensitive receptors including drains and drainage ditches. Abstraction of water from watercourses will not be permitted. Discharge from any vehicle wheel wash areas is to be directed to on-site settlement ponds.

- Sediment & Erosion – Similar to the above, adjacent watercourses/groundwater need to be protected from sedimentation and erosion due to direct surface water runoff generated onsite during the construction phase. To prevent this from occurring surface water discharge from the site will be managed and controlled for the duration of the construction works until the permanently attenuated surface water drainage system (Regional Drainage Facility – RDF) of the proposed site is complete. A temporary positive drainage system shall be installed prior to the commencement of the construction works to collect surface water runoff by the site during construction. A series of geotextile lined cascading, high level outfall, settling basins will be installed upstream of the agreed discharge point by the appointed contractor. Alternatively, a ‘siltbuster’ silt control unit can be used on the outfall. This temporary surface water management facility will throttle runoff and allow suspended solids to be settled out and removed before water is discharged in a controlled manner to the agreed outfall. All inlets to the cascading settling basins will be riprapped to prevent scour and erosion in the vicinity of the inlet. There will be:

  - Minimisation of site disturbance

- Implementation of sediment control (as outlined above)
- Minimisation of the potential for erosion
- Prevention of sediment-contaminated water leaving the site

Such measures shall be undertaken as part of the site's discharge licence.

Temporary mounding and sediment control will be implemented to ensure silts do not enter the existing ditch during the construction stage.

- Water quality monitoring – It is proposed to implement a programme for monitoring water quality at the outfall as part of the construction of this development, in agreement with the Planning Authority. Monitoring prior to, during and post construction works of surface water quality shall be undertaken to ensure minimum disturbance of water quality in the boundary ditch and Mill Stream. During the construction phase, the monitoring programme will include daily checks, weekly inspections and monthly audits. This programme and locations of sampling will be agreed with Fingal County Council.
- Discharge Licences – It will not be permitted to discharge into any newly constructed storm water systems or watercourse without adhering to the conditions of the discharge licence and agreeing the same with the Site Manager and Local Authority Area Engineer for implementation.
- Over Ground Oil / Diesel Storage – Appropriate safe storage of all by-product and waste materials shall be implemented during the construction works in accordance with the Construction & Demolition Waste Management Plan (C&DWMP) for the works. Only approved storage system for oil / diesel within the site will be permitted, (i.e. all oil / diesel storage to be located within a designated area placed furthest away from adjacent watercourses and contained within constructed bunded areas e.g. placed on 150mm concrete slab with the perimeter constructed with 225mm solid blockwork rendered internally). The bunded area will accommodate the relevant oil / diesel storage capacity in case of accidental spillage. Any accidental spillages will be dealt with immediately on site however minor by containment /removal form site.

  Surface water runoff from this bunded hardstanding area will discharge to a drain via a full retention petrol interceptor or to the on-site WWTP. Prior to the interceptor, a silt trap will be installed in order to remove the majority of suspended solids.
- Disposal of Wastewater off Site – The construction compound will include adequate staff welfare facilities including foul drainage. Foul drainage discharge from the construction compound will be removed off site to a licensed facility until a connection to the public foul drainage network has been established. The Site Management Team will maintain a record of all receipts for the removal of toilet or interceptor waste off site to ensure its disposal in a

traceable manner to an authorised facility. These will be available for inspection by the Environment Section of Fingal County Council at all times.

- Road Sweepers / Cleaning – The cleaning of public roads in and around the subject site will be undertaken to reduce environmental impacts and care will be taken to prevent any pollution of watercourses from this activity.
- Waste Arisings - Appropriate safe storage of all by-product and waste materials shall be implemented during the construction works in accordance with the Construction Waste Management Plan (CWMP) for the works.
- Construction Stage Dewatering - Appropriate monitoring of groundwater levels during site works shall be undertaken. Standard construction phase filtering of surface water for suspended solids will be carried out. Unfiltered surface water discharges or runoff shall not be permitted from the site into the onsite watercourse during the works. Trenched double silt fencing shall be put in place along boundary of the proposed development site with 10m buffer from the onsite drainage ditch. This fencing shall be in place as one of the first stages on site and prior to the full site clearance. The silt fencing shall act as a temporary sediment control device to protect the watercourse from sediment and potential site water runoff. The fencing shall be inspected twice daily, based on site and weather conditions, for any signs of contamination or excessive silt deposits.

Further details on proposed mitigation measures can be found in EIAR Chapter 9 – Water.

9 Biodiversity Protection Measures

All site clearance and landscaping works will comply with current legislative requirements and best practice. All retained trees that are within or close to the working wayleave of the proposed development will be protected in accordance with the requirements of British Standard BS5837:2012 Trees in Relation to Design, Demolition and Construction' – Recommendations, with protective fencing being installed around all trees to be retained, prior to commencement of development. The planting plans and landscaping proposals will ensure that no invasive species are introduced, either deliberately or inadvertently, to the site from imported materials or other activities. Any licence necessary will be obtained if there could be a significant disturbance of any protected species.

9.1 Aquatic Flora Fauna

Given the nature of the works, adjacent to an onsite drainage ditch and Mill Stream (Skerries_10), all effects would be expected to be localised in nature, restricted to the immediate vicinity of the site. However, without the presence of mitigation measures there is a potential for downstream effects if significant quantities of pollution or silt were introduced into the onsite drainage ditches and Mill Stream (Skerries_10) with potential for downstream impacts on Skerries Islands SPA.

The storage of topsoil or works in the vicinity of the drainage ditch on onsite could lead to dust, soil or silt laden runoff entering adjacent watercourses and drainage ditches. Contaminated surface water runoff on site during construction or operation may lead to silt or contaminated materials from site entering the onsite ditch and Mill Stream (Skerries_10) with downstream impacts on the SPA. If on-site concrete production is required or cement works are carried out in the vicinity of watercourses/drainage ditches there is potential for contamination of watercourses. The use of plant and machinery, as well as the associated temporary storage of construction materials, oils, fuels and chemicals could lead to pollution on site or in adjacent watercourses.

Construction Mitigation Measures

- All works methodologies will have prior approval of a project ecologist. The project ecologist will have experience with instream works.
- Best available technology (BAT) mitigation measures designed by project ecologist
- Staging of project will be carried out to reduce risks to drainage ditches from contamination
- Local drainage ditches and watercourses must be protected from dust, silt and surface water throughout the works.
- Mitigation measures on site include dust control, stockpiling away from drains.
- The project ecologist will be present for the culvert installation to ensure that sufficient measures will be in place.
- Stockpiling of loose materials will be kept to a minimum of 20m from watercourses and drains.

- Stockpiles and runoff areas following clearance will have suitable barriers to prevent runoff of fines into the drainage system and watercourses.
- Fuel, oil and chemical storage will be sited within a bunded area. The bund will be at least 50m away from drains, ditches or the watercourse, excavations and other locations where it may cause pollution.
- Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. Any water-filled excavations, during construction, that require pumping will not directly discharge to the stream. Prior to discharge of water from excavations adequate filtration will be provided to ensure no deterioration of water quality.
- The excavation of the 10m buffer surrounding the drainage ditch should be carried out in dry weather with no runoff entering the drainage ditch.
- During the construction works silt traps will be put in place in the vicinity of all runoff channels the stream to prevent sediment entering the drainage ditch.
- Planting in the vicinity of the crossing should be put in place as soon as possible to allow biodiversity corridors to establish.
- On-site inspections to be carried out by project ecologist.
- Maintenance of any drainage structures (e.g. de-silting operations) must not result in the release of contaminated water to the surface water network.
- No entry of solids to the associated stream or drainage network during the connection of pipework.
- Landscaping of the Riparian corridor will be carried out to the satisfaction of ecologist at an early stage of the project.
- Full compliance with the water Pollution Acts will be carried out on site.
- Silt traps established throughout site including a double silt fence between the site and the watercourse.
- The Site Manager will be responsible for the pollution prevention programme and will ensure that at least daily checks are carried out to ensure compliance. A record of these checks will be maintained.
- A project ecologist will be appointed and consulted in relation to all onsite drainage during construction works. Consultation with the project ecologist will not involve the formulation of new mitigation measures for the purposes of protecting any European Site, and relate only to the implementation of those mitigation measures already stated in the submission or the formulation of mitigation for other purposes.

- Dewatering of excavations may be necessary. Appropriate monitoring of groundwater levels during site works will be undertaken. Standard construction phase filtering of surface water for suspended solids will be carried out. Unfiltered surface water discharges or runoff are not permitted from the site into the onsite watercourse during the works. Trenched double silt fencing shall be put in place along boundary of the proposed development site with 10m buffer from the onsite drainage ditch. This fencing must be in place as one of the first stages on site and prior to the full site clearance. The silt fencing will act as a temporary sediment control device to protect the watercourse from sediment and potential site water runoff. The fencing will be inspected twice daily, based on site and weather conditions, for any signs of contamination or excessive silt deposits.
- Spill containment equipment shall be available for use in the event of an emergency. The spill containment equipment shall be replenished if used and shall be checked on a scheduled basis.
- All site personnel will be trained in the importance of good environmental practices including reporting to the site manager when pollution, or the potential for pollution, is suspected. All persons working on-site will receive work specific induction in relation to surface water management and run off controls. Daily environmental toolbox talks / briefing sessions will be conducted to outline the relevant environmental control measures and to identify any environment risk areas/works.
- Environmental risks due to construction and operation of the proposed development do potentially exist, particularly in relation runoff from sloping site, drains that could lead to the onsite watercourse. Ecological supervision will be required during diversion, excavation and enabling works stages. Silt interception measures will need to be in place to ensure that the watercourses are not impacted during works and in particular during the site clearance, in-stream works and reprofiling stages. Landscaping of the grassed areas of the site proximate to the onsite watercourse should take place immediately following re-profiling, to act as a buffer to protect the drainage ditch.
- Maintain a vegetated strip and vehicle exclusion zone between the works and the onsite watercourse in consultation with the project ecologist.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.

- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.
- The Contractor will be required to consult with an ecologist prior to the beginning of works to identify any additional measures that may be appropriate and/or required.

Storage/Use of Materials, Plant & Equipment

- Materials, plant and equipment shall be stored in the proposed site compound location;
- Plant and equipment will not be parked within 50m of the onsite watercourse at the end of the working day;
- Hazardous liquid materials or materials with potential to generate run-off shall not be stored within 50m of the onsite watercourse.
- All oils, fuels and other hazardous liquid materials shall be clearly labelled and stored in an upright position in an enclosed bunded area within the proposed development site compound. The capacity of the bunded area shall conform with EPA Guidelines – hold 110% of the contents or 110% of the largest container whichever is greater;
- Fuel may be stored in the designated bunded area or in fuel bowsers located in the proposed compound location. Fuel bowsers shall be double skinned and equipped with certificates of conformity or integrity tested, in good condition and have no signs of leaks or spillages;
- Smaller quantities of fuel may be carried/stored in clearly labelled metal Jeri cans. Green for diesel and red for petrol and mixes. The Jeri cans shall be in good condition and have secure lockable lids. The Jeri cans shall be stored in a drip tray when not in use. They will not be stored within 50m of the onsite watercourse;
- Drip trays will be turned upside down if not in use to prevent the collection of rainwater;
- Waters collected in drip trays must be assessed prior to discharge. If classified as contaminated, they shall be disposed by a permitted waste contractor in accordance with current waste management legal and regulatory requirements;
- Plant and equipment to be used during works, will be in good working order, fit for purpose, regularly serviced/maintained and have no evidence of leaks or drips;
- No plant used shall cause a public nuisance due to fumes, noise, and leakage or by causing an obstruction;
- Re-fuelling of machinery, plant or equipment will be carried out in the site compound as per the appointed Construction Contractor re-fuelling controls;
- All persons working will receive work specific induction in relation to material storage arrangements and actions to be taken in the event of an accidental spillage. Daily

environmental toolbox talks / briefing sessions will be conducted for all persons working to outline the relevant environmental control measures and to identify any environment risk areas/works.

9.2 Birds

- Compensatory hedgerows will be planted along the northern boundary to maintain and enhance a biodiversity corridor.
- Relevant guidelines and legislation (Section 40 of the Wildlife Acts, 1976 to 2012) will be followed. Should the removal of potential nesting habitats outside of bird breeding season not be possible, a pre-works check by a qualified ecologist will be undertaken to ensure nesting birds are absent.
- 30 Nest boxes will be placed on site to compensate for temporary resource loss. These will be located within the compensatory hedgerow.
- Noise mitigation measures will be carried out as previously out lined.
- Removal of potential nesting habitats will take place outside of bird breeding season (March to August inclusive). Should this not be possible, a pre-works check by a qualified ecologist will be undertaken to ensure nesting birds are absent.
- As outlined in the landscape plan the planting of the hedgerow will be with semi-mature trees to allow for the rapid establishment of the hedgerow and bird nesting resource.

9.3 Bats

- Landscaping as outlined in the Landscape masterplan will provide unlit replacement foraging corridors for bat species within the drainage ditch buffer zone. Tree planting will be done in consultation with the onsite ecologist to reinstate foraging corridors.
- Lighting at all stages will be done sensitively on site with no direct lighting of hedgerows, treelines and drainage ditch, swale and buffer zone.
- 6 bat boxes will be placed on site.

9.4 Hedgerows and Treelines

- Landscaping will provide additional nesting and food resource for birds equivalent to that lost during site clearance.
- A semi mature hedgerow will be placed across the northern portion of the site above the swale to enhance the biodiversity corridor on site. This has been designed to guide biodiversity to the mammal passes under the road on site

9.5 Amphibians

- Preconstruction amphibian survey by ecologist.

- Compensatory habitat within the drainage ditch/swale as a frog breeding area. This breeding area will be fenced off from the general public.

Please refer to the biodiversity chapter within the EIAR submitted as part of this planning application under separate cover for further details of the existing lands / species.

10 Surface Water Drainage Works

The drainage infrastructure will be constructed and protected through the following measures:

- Hoarding or fencing to be provided to cordon-off completed infrastructure works: As is standard practice on construction sites, elements of works may be completed on a phased basis. As works are completed and handed over within each phase, this area will be enclosed with hoarding or fencing offset a safe distance from the line of the existing infrastructure and no further excavation works will be allowed within this area unless agreed with site management.
- Contractor to produce as-built construction records of drainage infrastructure. These records will be submitted to the engineer for approval in advance of handover. The as-built records will be reviewed and will need to be approved by the engineer before practical completion can be certified. The as-builts will be used by site personnel as a working record of where drainage infrastructure is located. The locations of these will be recorded on the as-built and will be marked out on the ground in advance of any works commencing in later stages. This methodology will be formally incorporated into a method statement to be completed by the groundworks sub-contractor before excavations commence.
- Marker tape to be provided on top of sewers running through live areas of site: As part of the methodology laying of drainage pipes, drainage works will have marker tape placed at a depth of 300mm above the pipe to warn the excavator and banksman of the service below. It is noted that the placing of marker tape over drainage lines is not a standard construction detail. However, the vulnerability of live drainage infrastructure serving a previous area of development within the proposed site is noted and these measures will form part of the works.
- Site personnel to be informed of works already completed and commissioned: As part of the Safe System of Work Plan (SSWP), site personnel will be made aware of the drainage lines which are in operation. A site-specific method statement will be required in all cases where it is deemed that there is a risk of damaging such services. Those involved in direct management and supervision of site-based excavations require relevant competencies to deliver safety standards on site. They will have health and safety training in order to design safe systems of work that are appropriate to specific site conditions. They will need to prepare clear and simple safety method statements that can be used and understood by site workers. Ongoing checks will be carried out to ensure that appropriate equipment has been provided and is being used correctly.
- Monitoring of excavation and prevention of undermining of infrastructure: Special care will be taken when digging above or close to the lines of services. The locations of these will be marked out on the ground in advance of any excavation being undertaken. The general principles outlined in the Health and Safety Authority document: ‘Code of Practice for Avoiding Danger from Underground Services’ will be followed to ensure the safety of workers and to minimise the risk of damage to any existing pipelines or buildings.

- Water quality control of discharges to watercourse or drainage network: As detailed within the previous section, adjacent watercourses/groundwater need to be protected from sedimentation and erosion due to direct surface water runoff generated onsite during the construction phase. This includes preventing any sediment laden water from entering the surface water outfalls serving a previous phase of the development. To prevent this from occurring surface water discharge from the site will be managed and controlled as detailed above for the duration of the construction works until the permanently attenuated surface water drainage system of the proposed site is complete. Any manholes will need to be securely covered and gullies fitted with a geotextile filter to allow protection of the surface water within the pipe. Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- Protection of services from breakage or crushing: Where drainage infrastructure serving a previous section of the proposed development is located within the extents of the current works, the drainage infrastructure will have to be protected from breaking or crushing. Consideration will be given to areas where heavy plant is going to be tracked across the existing drainage infrastructure. This may require construction of temporary protective concrete slabs to bridge across the existing lines where haul roads are required.
- In order to reduce the risk of defective or leaking sewers, all new sewers should be laid in accordance with the relevant standards, pressure tested, and CCTV surveyed to ascertain any possible defects.

11 Dust Control

The objective is to ensure that dust does not impact significantly at nearby receptors. Therefore, a dust management plan (DMP) will be formulated for the site, which will address the following:

- Specify a site policy on dust
- Identify site management of dust
- Develop documented systems for managing site practices and implementing management controls
- Outline how the DMP can be assessed

11.1 Site Management

The following measures will be implemented:

- The siting of construction activities and storage piles will consider the location of sensitive receptors and prevailing wind conditions to minimise the potential dust nuisance.
- Site management will include the ability to respond to adverse weather conditions by either restricting operations on site or using effective control measure in a timely manner before potential for nuisance occurs.
- During working hours the site agent or another competent appointed member of staff shall monitor dust control methods.
- A register shall be kept on site logging all correspondence and telephone / verbal complaints regarding construction activities outlining remedial actions if any.
- A site representative responsible for matters relating to dust management will be appointed prior to construction on site.
- The site representative responsible for dust management shall ensure that dust management procedures are followed and ensure monitoring and assessment of same.

11.2 Dust Control Measures

The following measures will be implemented:

- Apply a speed limit of at least 20km/hr for on-site vehicles
- Provide water bowsers during periods of dry weather to ensure unpaved areas are kept moist. Spray exposed site haul roads during dry and / or windy weather.
- Ensure paved roads are kept clean and free of mud and other materials. Sweep hard surface roads, inside and outside the site, to ensure roads are kept clear of debris, soil or other material.
- Restrict un-surfaced roads to essential site traffic.

- Provide water bowsers during periods of high winds and dry weather conditions to ensure moisture content is high to increase the stability of the soil.
- During the proposed works the following mitigation measures shall be implemented to minimise dust emissions:
    - Protect overburden material from exposure to wind by storing the material in sheltered regions of the site.
    - Regular watering of stockpiles during dry and windy periods.
    - Located any stockpiles away from sensitive receptors, (i.e. receptors sensitive to dust release).
    - Provide tarpaulins over all unacceptable excavated materials being carted off site.
    - Control vehicle speeds and impose speed restrictions, (speed can mobilise dust).
    - During dry spells and if deemed necessary monitoring of dust levels shall be carried out using the Bergerhoff Method i.e. analysis of dust collecting jars left on-site (German Standard VDI 2119, 1972). Results will be compared to the TA Luft guidelines (TA Luft, 1972). Should an exceedance of the TA Luft limit occur during, additional mitigation measures, for example more regular spraying of water, shall be implemented.
    - The excavating machines will be cleaned on a daily basis to ensure no excess grease and dust is left on the machine. This will be carried out at low level below the height of the hoarding to prevent any mud coming in contact with the public.

The Contractor will be required to produce an Air Quality and Dust Management Plan including Best Practice Measures to control dust and in particular, measures to prevent dust nuisanceThe principal objective of the Air Quality and Dust Management Plan will be to ensure that dust emissions do not cause significant nuisance at receptors near the Proposed Project. A dust deposition monitoring programme will be implemented during the Construction Phase in order to verify the continued compliance with relevant standards and limits.

12 Conclusion

The construction management plan addresses construction activities on site that may result in noise, air quality, water quality, biodiversity or waste management issues, should the plan not be put in place and implemented.

These include procedures for monitoring and tracking construction activities and ensuring construction personnel are trained and educated as necessary. The Construction & Environmental Management Plan should be reviewed after planning conditions are imposed on any permission granted and as the construction phase progresses to accommodate any changes in activities on site.

The final CEMP, to be submitted and approved by the local authority prior to the commencement of construction, will make provision for and ensure adherence to any and all Covid regulations and guidelines as is relevant at the time of submission.