

17.0 MITIGATION MEASURES AND MONITORING

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This chapter summarises the mitigation measures proposed in the various chapters throughout this Environmental Impact Assessment Report.

The *draft EPA Guidelines (2017)* describe mitigation measures as follows:

'measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements.'

Full details of mitigation measures are included within each individual chapter of this EIAR.

17.1 Population and Human Health

The mitigation measures incorporated in Chapter 4 of the EIAR have been broken down under the following headings:

Population Profile and Trends

The development will have a long term positive impact on population once operational due to the provision of a wide range of dwelling unit types which includes provision for Part V units and will cater for a wide cohort of persons.

As noted, during the construction phase the local population will be impacted during the construction period due to the influx of construction traffic, noise and dust. However, we note that these impacts are short-term and mitigation measures will be put in place to minimise such impacts which are discussed in other sections of this EIAR such as the implementation of a dust minimisation plan, a Mobility Management Plan and Parking Strategy. Please see further details in Chapter 12 (Air Quality and Climate), Chapter 14 (Traffic and Transportation) in addition to the Infrastructure Report and Preliminary Construction Management Plan submitted as a separate document.

Housing

The proposed development of 590 No. units will be a positive addition to the availability of housing in the area by providing a wide choice in tenure for a range of persons. The short-term impacts associated with the construction stage are associated with any new development and will not be significant once the mitigation measures outlined in other sections of this EIAR such as the Noise and Vibration chapter (Chapter 12) and the Traffic and Transportation chapter (Chapter 14) in addition to the Infrastructure Report and Preliminary Construction Management Plan submitted as a separate document. These mitigation measures include the implementation of a Dust Minimisation Plan, Mobility Management Plan and Parking Strategy.

Employment/Economy

The proposed development will have a significant positive impact on the economy and employment of the area due to the influx of jobs that will be created at construction and operation stage. We also note that during construction, local business will benefit from workers utilising their services and during operation stage there will be an increased population at the subject lands which will support the local economy. New jobs will also be created at the subject lands during construction and operational stage. It is considered that the impact that will occur on employment and the local economy will be positive and long-term therefore no specific mitigation measures are proposed.

Local Services and Amenities

As discussed previously, the proposed development will benefit the local economy as local shops and other amenities will benefit economically from the construction stage and operational stage.

We note that a crèche is proposed on site with the capacity to cater for 101 No. children which is proposed to serve the subject development and surrounding residential areas if necessary. The Schools Demand Assessment enclosed as a separate document prepared by Future Analytics Consulting concludes there is capacity in the primary and post-primary schools in the area to absorb the limited demand predicted to arise from the subject development.

The provision of a crèche in addition to retail units and café/restaurant units will ultimately ensure that the area has sufficient services and amenities to cater for this increase in population and thus no mitigation measures are required in this regard. In addition, the large expanse of open space proposed, and the pedestrian link proposed will be an attractive addition to the area.

Health and Safety

As set out in the Preliminary Construction Management Plan, the Contractor shall be responsible for overall management of the site for the duration of the proposed works and must progress their works with reasonable skill, care, diligence and to proactively manage the works in a manner most likely to ensure the safety and welfare of those carrying out construction works. The Contractor shall comply with all relevant Statutory requirements such as the 2005 Safety Health and Welfare at Work Act, The Construction Regulations (SI 291 of 2013), the General Application Regulations (SI 299 of 2007), etc. (and any amendments thereof). In addition, the Contractor shall comply with all the reasonable safety requirements of the Client, the Project Supervisor for the Design Process and the Project Supervisor for the Construction Stage.

To negate any potential impacts during construction stage, a dust minimisation plan is proposed to be implemented.

During the operation stage of the development, the implementation of the Mobility Management Plan and the Parking Strategy which will encourage the use of sustainable transport modes. The scheme has been designed fully in accordance with the *Design Manual for Urban Roads and Streets (2009)*, which is set out in the DMURS Design Statement prepared by DBFL Consulting Engineers.

Traffic/Commuter Patterns

The scheme will be developed in line with the Traffic and Transport chapter (Chapter 14 of this EIAR) and the separately enclosed Preliminary Construction Management Plan (PCMP) to ensure any impacts on local traffic is minimised during the construction stage. The PCMP notes that a large quantum of the on-site employees will arrive in shared transport therefore reducing the potential for associated temporary negative impacts on the surrounding road network.

The promotion of sustainable modes of transport from the site during the operational stage will mitigate against any potential impacts that may arise on traffic in the area. Please see Chapter 14 of this EIAR (Traffic and Transport) which details the proposed development further in relation to potential traffic impacts and mitigation measures such as the implementation of the Mobility Management Plan and Parking Strategy. As previously noted, that the scheme has been designed in line with the *Design Manual for Urban Roads and Streets (2009)*.

17.2 Archaeological and Cultural Heritage

17.2.1 Mitigation and Monitoring

Mitigation measures shall be undertaken as directed by the DCHG in compliance with national policy guidelines and statutory provisions for the protection of archaeology and cultural heritage.

Recommended Mitigation Measure 1

It is acknowledged that archaeological excavation of the settlement cemetery is complete, and it is recommended that the archaeological post-excavation analysis and report preparation currently underway is brought to completion.

Recommended Mitigation Measure 2

Following mitigation of any impacts to the identified archaeological site, all ground disturbance works across the remainder of the development site should be monitored by a suitably qualified archaeologist. In the event that archaeological material is recorded during monitoring, further discussion/consultation with the DCHG should be sought in order to ascertain the appropriate treatment (i.e. preservation by record/preservation in situ) of any additional archaeological remains. Should the DCHG recommend preservation by record/full archaeological excavation, this work should be undertaken under the appropriate license.

17.3 Architectural Heritage

17.3.1 Avoidance, Remedial and Mitigation Measures

Avoidance of damage to the entrance, avenue and all lands pertaining to the protected structure Ros Mor will be included in a protection plan forming part of a detailed construction management plan.

Remedial measures to supplement existing fencing to the shared boundary between Ros Mor and the subject development site will ensure that the characteristics of the boundary condition are restored to their present character on completion of the development. These will include protection of mature trees and planting during the construction phase that contribute to the sylvan character of the protected fabric of Ros Mor, which will be unaffected by the consolidation of fenced boundaries.

17.4 Biodiversity

17.4.1 Mitigation Measures

Construction Phase

1: Disturbance of birds' nests/bats

Deliberate disturbance of a bird's nest is prohibited unless under licence from the National Parks and Wildlife Service. If possible, site clearance works should proceed outside the nesting season, i.e. from September to February inclusive. If this is not possible, vegetation must first be inspected by a suitably qualified ecologist. If a nest is encountered then works must stop, until such time as nesting has ceased. Otherwise, a derogation licence must be sought from the NPWS to allow the destruction of the nest.

The following mitigation is taken from the bat report:

'All mature trees shall be checked for the presence of bats prior to felling. All the mature trees within the site shall be examined for the presence of bats prior to felling by a bat specialist. Should bats be noted in any tree, it is a protected structure and a derogation must be sought as discussed above. Furthermore, should buildings still be in place by the end of 2019, they must be examined by a bat specialist for the presence of bats. If bats are present, the building is a protected structure and derogation must be acquired from NPWS to allow exclusion of bats under specific conditions as proposed or supported by NPWS.'

As part of the post-construction phase, 12 No. artificial bat roosting boxes are to be installed at suitable locations (6 No. on trees and 6 No. on apartment buildings).

2: Pollution during Construction

Construction management should follow guidance from Inland Fisheries Ireland (2016). In this instance there are no water courses in this vicinity. Silt laden water will not be allowed to enter surface drains during the construction phase. Water leaving the site can be directed

to drains only via a suitably sized silt trap. Full details of how these measures can be implemented will be included in a Construction Management Plan (CMP) prepared prior to the start of works. A preliminary, planning stage CMP has been prepared by DBFL Engineers and is presented under separate cover as part of this application.

3: Alien Invasive Species

The patch of Three-Cornered Garlic and Spanish Bluebell has been assessed by Invasive Plant Solutions and a management plan has been prepared. This recommends that the area be cordoned off, not disturbed in any way and that spraying with herbicide occurs in Spring 2020 when the plant is in growth phase. Further spraying treatment may be required.

After mitigation, no significant residual effects are likely to arise to biodiversity arising from this project.

17.4.2 Monitoring

Monitoring is required where the success of mitigation measures is uncertain or where residual impacts may in themselves be significant. In this case no significant negative effects are likely to arise, and so additional monitoring is not required.

17.5 Landscape and Visual Impact

17.5.1 Mitigation Measures

Construction Phase

The building site including a site compound with site offices, site security fencing, scaffolding and temporary works will be visible during the construction phase. This is generally viewed as a temporary and unavoidable feature of construction in any setting. Other mitigation measures proposed during this delivery stage of the development, revolve primarily around the implementation of appropriate site management procedures during the construction works – such as the control of lighting, storage of materials, placement of compounds, control of vehicular access, and effective dust and dirt control measures, etc.

Such mitigation is set out in the Preliminary Construction Management Plan prepared by DBFL Consulting Engineers. This is a working document which will be continually reviewed and amended to ensure effective mitigation throughout the construction period. The Preliminary Construction Management Plan references the following construction phase mitigation measures as relevant to the assessment of Landscape and Visual impact:

- Site hoarding will be erected to restrict views of the construction activity e.g. standard 2.4 metres high construction hoarding
- Establishment of tree protection measures as required (no-dig construction zones, tree protection fencing and existing hedgerow retention). Any trees which are not to be taken down shall remain undisturbed and undamaged

- Tree protection fences if required are to be constructed in accordance with BS 5837:2012 "Trees in Relation to Design, Demolition and Construction - Recommendations"
- A 'Construction Exclusion Zone' notice shall be placed on tree protection fencing at regular intervals
- Tree Protection Zones are not to be used for car parking, storage of plant, equipment or materials
- A post construction re-assessment of any retained trees shall be carried out.

Operational Phase

The proposed scheme is designed to integrate well within its existing context. This will be accomplished through:

- establishing an integrated and respectful relationship between the existing housing and the proposed development, incorporating aspects of prevalent built forms, scale, texturing, colour and materials;
- the insertion, positioning and modelling of the built elements, in order to assist in the visual reduction of the apparent mass of buildings – in particular; the siting of the higher 6 No. storey apartment blocks along the main road and within the central part of the site, coupled with the positioning of the lower 3 No. storey blocks at the west, north and east site edges, adjacent to existing dwellings;
- appropriate architectural detailing to assist in the respectful integration of the external building facades – including the modulation of openings and fenestration in a manner that reflects current local proportions and rhythms;
- rationalisation of all services elements and any other potential visual clutter and its incorporation internally within building envelopes (as far as practically possible).
- use of appropriate and harmonising colour, tones and materials; and
- the provision, maintenance and management of a sensitively considered soft landscape design for the development, which interacts with Hydrology (SuDS) and Biodiversity, and which assists in the integration and screening of the buildings within the existing landscape.

17.5.2 Monitoring

The retention of most of the existing boundary hedgerows and existing trees coupled with the effective use of new planting to screen and integrate the built elements of the proposal into the existing landscape are important aspects of the proposed scheme design. The success of the proposed scheme is dependent on both operations being properly executed. Effective tree and hedgerow protection measures must be established in advance of construction work commencing and an approved system of monitoring the on-going health and vigour of both existing and proposed planting will be necessary.

The timely planting and the maintenance and management required to successfully establish new planting with the projected rates of growth and general performance required, needs a significant and effective input from professionals with the necessary expertise to ensure it is effectively delivered. The monitoring of the planting performance

and suitably appropriate responses to ensure same will be essential to the success of the development as proposed.

17.6 Land, Soils and Geology

17.6.1 Ameliorative, Remedial or Reductive Measures

Construction Phase

Stripping of Topsoil

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 be protected for the duration of the works and not located in areas where sediment laden runoff may enter existing surface water drains.

Topsoil stockpiles will also be located so as not to necessitate double handling.

Surface water runoff from areas stripped of topsoil 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.

On-site settlement ponds are to include geotextile liners and riprapped inlets and outlets to prevent scour and erosion.

Excavation of Subsoil Layers

Excavation of existing subsoil layers has been minimised. Cut type earthworks operations will not be required to achieve designed site levels.

Disturbed subsoil layers will be stabilised 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 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.

Measures will be implemented to capture and treat sediment laden surface water runoff (e.g. sediment retention ponds, surface water inlet protection and earth bunding adjacent to open drainage ditches).

Imported Fill

Importation of fill to site will be required. No large or long-term stockpiles of fill material will be held on the site. At any time, the extent of fill material held on site will be limited to that needed in the immediate vicinity of the active work area.

Smaller stockpiles of fill, where required, will be suitably protected to ensure no sediment laden runoff enters existing surface water drains. Such stockpiles are to be located in order to avoid double handling.

Construction Traffic

Earthworks plant and vehicles delivering construction materials to site will be confined to predetermined haul routes around the site.

Vehicle wheel wash facilities will be installed in the vicinity of any site entrances and road sweeping implemented as necessary in order to maintain the road network in the immediate vicinity of the site.

Dust suppression measures (e.g. dampening down) will be implemented as necessary during dry periods.

Accidental Spills and Leaks

In order to mitigate against spillages contaminating underlying soils, all oils, fuels, paints and other chemicals will be stored in a secure bunded hardstand area.

Refuelling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any surface water inlets (when not possible to carry out such activities off site).

Geological Environment

No mitigation measures are proposed in relation to the geological environment.

Operational Phase

On completion of the construction phase no further mitigation measures are proposed as there will be no further impact on soils and the geological environment.

17.6.2 Monitoring

Proposed monitoring during the construction phase in relation to the soil and geological environment are as follows:

- Adherence to Preliminary Construction Management Plan.
- Construction monitoring of the works (e.g. inspection of existing ground conditions on completion of cut to road formation level in advance of placing capping material, stability of excavations etc.).

- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision vehicle wheel wash facilities.
- Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill, protection of soils for removal from site from contamination).
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.).
- No ongoing monitoring is proposed on completion of the construction phase.

17.7 Water-Hydrology

17.7.1 Ameliorative, Remedial or Reductive Measures

Construction Phase

The following measures are proposed during the construction phase to mitigate against risks to the surrounding hydrological environment:

- A site-specific Construction and Environment Management Plan will be developed and implemented during the construction phase. Site inductions will include reference to the procedures and best practice as outlined in the Construction and Environment Management Plan.
- 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 to the surface water network at a controlled rate.
- Weather conditions and typical seasonal weather variations will also be taken account of when planning stripping of topsoil and excavations with an objective of minimising soil erosion.
- In order to mitigate against spillages contaminating the surrounding surface water and hydrogeological environments, all oils, fuels, paints and other chemicals should be stored in a secure bunded hardstand area. Refuelling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any surface water inlets (where not possible to carry out such activities off site).
- 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).
- Discharge from any vehicle wheel wash areas is to be directed to on-site settlement ponds.
- The construction compound will include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be tankered off site to a licensed facility until a connection to the public foul drainage network has been established.
- The construction compound's potable water supply shall be protected from contamination by any construction activities or materials.

Operational Phase

Following the Site Specific Flood Risk Assessment, it has been determined that the proposed development is located in Flood Zone C as defined by the Guidelines i.e. proposed development is considered to have the required level of flood protection up to and including the 1% AEP flood event.

Surface water runoff from the site will be attenuated to the greenfield runoff rate as outlined in the Greater Dublin Strategic Drainage Study (GSDSDS). Surface water discharge rates will be controlled by a Hydrobrake type vortex control device in conjunction with below ground attenuation storage.

The following methodologies are being implemented as part of a SuDS surface water treatment train approach:

- Permeable paving in on street parking.
- Surface water runoff from duplex roofs will be routed to the proposed surface water pipe network via the porous aggregates beneath permeable paved driveways.
- Surface water runoff from apartment roofs will be captured by green roofs (sedum blanket) prior to being routed to the piped surface water drainage network.
- A drainage reservoir (drainage board) is to be provided on the podium slab over basement. The podium will have a typical roof garden build up with a mix of soft landscaping and permeable hard landscaping (over a drainage board which would serve as a reservoir).
- Attenuation of the 30 and 100 year return period storms.
- Installation of a Hydrobrake (limiting surface water discharge from the site to 2.5 l/sec/ha).
- Surface water discharge will also pass via a fuel / oil separator (sized in accordance with permitted discharge from the site).

A contract will be entered into with a suitably qualified contractor from maintenance of the attenuation system, Hydrobrake and full retention fuel / oil separator noted above.

No specific mitigation measures are proposed in relation to foul drainage however, all new foul drainage lines will be pressure tested and be subject to a CCTV survey in order to identify any possible defects prior to being made operational.

No specific mitigation measures are proposed in relation to water supply, however, water conservation measures such as dual flush water cisterns and low flow taps will be included in the design.

The potential impact of climate change has been allowed for as follows;

- Pluvial flood risk - attenuation storage design allows for a 10% increase in rainfall intensities.
- Pluvial flood risk - drainage system design allows for a 10% increase in flows, as recommended by the GSDSDS.
- Provision of min. freeboard (500mm) from 1% AEP as required by GSDSDS (mitigation against impact of climate change).

17.7.2 Monitoring

Proposed monitoring during the construction phase in relation to the water and hydrogeological environment are as follows:

- Adherence to Outline Construction Management Plan.
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and vehicle wheel wash facilities.
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.).
- Monitoring of discharge from sediment retention ponds (e.g. pH, sediment content).

During the operational phase an inspection and maintenance contract is to be implemented in relation to the proposed Class 1 full retention fuel / oil separators.

17.8 Air Quality and Climate

17.8.1 Mitigation Measures

Construction Phase

A dust minimisation plan will be formulated for the construction phase of the project, as construction activities are likely to generate some dust emissions. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of any dust produced will be deposited close to the potential source and any impacts from dust deposition will typically be within 200m of the construction area. A detailed dust minimisation plan associated with a high level risk of dust impacts is outlined in Appendix 11.3. This plan draws on best practice mitigation measures from Ireland, the UK and the USA in order to ensure the highest level of mitigation possible.

In summary some of the measures which will be implemented will include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction will be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.

- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- Hoarding or screens shall be erected around works areas to reduce visual impact. This will also have an added benefit of preventing larger particles of dust from travelling off-site and impacting receptors.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Operational Phase

Impacts to air quality and climate are predicted to be imperceptible for the operational phase therefore, no mitigation is required.

17.8.2 Monitoring

Construction Phase

Due to the close proximity of the site to a number of high sensitivity receptors, monitoring of construction dust deposition at these nearby sensitive receptors during the construction phase of the proposed development is recommended. This is to ensure the proposed mitigation measures are working satisfactorily. Monitoring can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 mg/(m²*day) during the monitoring period between 28 - 32 days.

Operational Phase

As the predicted impacts to air quality and climate will be imperceptible during the operational phase, no monitoring is proposed.

17.9 Noise and Vibration

17.9.1 Avoidance, Remedial & Mitigation Measures

Construction Stage

Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid significant impacts at the nearest sensitive buildings. The Construction Management Plan (CMP) will sets out the key control measures for noise and vibration during this phase. The best practice measures set out in BS 5228 (2009 + A1 2014) Parts 1 and 2 will be complied with which are set out below and also outlined in the CMP. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- selection of quiet plant;
- noise control at source;
- screening, and;
- liaison with the public.

Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring.

Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

Referring to the key noise generating sources during the construction phases, the following best practice migration measures should be considered:

- For mobile plant items such as cranes, dump trucks, excavators and loaders, maintaining enclosure panels closed during operation can reduce noise levels over normal operation. Mobile plant should be switched off when not in use and not left idling.

- For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system.
- For percussive tools such as concrete breakers, a number of noise control measures include fitting muffler or sound reducing equipment to the breaker 'tool' and ensure any leaks in the air lines are sealed. Erect localised screens around breaker or drill bit when in operation in close proximity to noise sensitive boundaries.
- For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Standard construction site hoarding with a mass per unit of surface area greater than 7 kg/m² has been assumed along all noise sensitive boundaries (2.4m high) as part of noise control measures during the construction phase.

Liaison with the Public

A designated noise liaison officer will be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, prior to particularly noisy construction activity, e.g. demolition, breaking, piling, etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. If piling or breaking works are in progress on a site at the same time as other works of construction or demolition that themselves may generate significant noise and vibration, the working programme will be phased so as to ensure noise limits are not exceeded due to cumulative activities.

Operational Phase

During the detailed design stage, external plant items and those venting to atmosphere will be designed and selected to ensure an operational noise limit of 45dB and 35dB L_{Aeq,T} at the nearest off-site noise sensitive locations external to the development site are achieved during day and night-time periods respectively. The use of low noise operational plant items, siting items of plant away from noise sensitive boundaries, screening and acoustic attenuation measures will all be considered, where relevant during this stage.

The development will be designed to ensure that the design goals relating to recommended indoor ambient noise levels are achieved for occupants of the dwelling units within the proposed development.

17.9.2 Monitoring

Construction Phase

The contractor will be required to ensure construction activities operate within the noise limits set out within Section 12.2.2 of Chapter 12. The contractor will be required to undertake regular noise monitoring at locations representative of the closest sensitive locations to ensure the relevant criteria are not exceeded. Any noise complaints will be logged and followed up in a prompt fashion by the liaison officer.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise*.

Operational Phase

Noise or vibration monitoring is not required once the development is operational.

17.10 Material Assets - Waste Management

17.10.1 Mitigation Measures

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

Construction Stage

A project specific Construction & Demolition Waste Management Plan (C&D WMP) has been prepared in line with the requirements of the requirements of the guidance document issued by the DoEHLG and is included as Appendix 13.1. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the proposed development. Prior to commencement, the contractor(s) will be required to refine/update the C&D WMP or submit an addendum to C&D WMP to SDCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

A quantity of soil, stone, gravel and clay which will need to be excavated to facilitate the proposed development. Project Engineers have estimated that c. 30,000m³ of excavated material will need to be removed offsite, however it is envisaged that c. 10,000m³ of topsoil and c. 11,000m³ of subsoil will be reused onsite. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to 'design out waste';
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated:
 - Concrete rubble (including ceramics, tiles and bricks);
 - Plasterboard;
 - Metals;
 - Glass; and
 - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the EC (Waste Directive) Regulations (2011). EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that Article 27 will be used.

These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, the EMR Waste Management Plan (2015-2021). It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

Operational Stage

A project specific Operational Waste Management Plan (OWMP) has been prepared and is included as Appendix 13.2. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of

materials from landfill, thus achieving the targets set out in the EMR Waste Management Plan 2015 – 2021 and abiding by the SDCC waste bye-laws and draft waste bye-laws. In addition, the following mitigation measures will be implemented:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
 - Organic waste;
 - Dry Mixed Recyclables;
 - Mixed Non-Recyclable Waste;
 - Glass;
 - Waste electrical and electronic equipment (WEEE);
 - Batteries (non-hazardous and hazardous);
 - Cooking oil;
 - Light bulbs;
 - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.);
 - Furniture (and from time to time other bulky waste); and
 - Abandoned bicycles.
- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities; and

These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations, the Litter Pollution Act 1997, the Eastern-Midlands Region Waste Management Plan (2015 - 2021) and the South Dublin County Council waste bye-laws and draft waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

17.10.2 Monitoring

Construction Stage

The management of waste during the construction phase should be monitored to ensure compliance with relevant local authority requirements, and effective implementation of the C&D WMP including maintenance of waste documentation.

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the demolition, excavation and construction phases where there is a potential for waste management to become secondary to progress and meeting construction schedule targets.

The C&D WMP specifies the need for a waste manager to be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

Operation Stage

The management of waste during the operational phase should be monitored to ensure effective implementation of the OWMP by the building management company and the nominated waste contractor(s).

Waste generation volumes should be monitored against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the WSAs where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contractor costs.

17.11 Material Assets - Traffic and Transportation

17.11.1 Mitigation Measures

Construction Stage

A Traffic Management Plan (TMP) will be prepared for the site works in accordance with the principles outlined below and shall comply at all times with the requirements of:

- Department of Transport Traffic Signs Manual 2010 – Chapter 8 Temporary Traffic Measures and Signs for Roadworks
- Department of Transport Guidance for the Control and Management of Traffic at Road Works (2010)
- Any additional requirements detailed in the Design Manual for Roads and Bridges (DMRB) & Design Manual for Urban Roads & Streets (DMURS)

All construction related parking will be provided on site. Construction traffic will consist of the following categories:

- Private vehicles owned and driven by site staff and management;
- Construction vehicles e.g. excavation plant, dump trucks (including trucks for delivery of imported fill to site);
- Materials delivery vehicles involved in site development works.

It is anticipated that the generation of HGVs during the construction period will be evenly spread throughout the day and as such will not impact significantly during the peak traffic periods.

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

Works are proposed along Scholarstown Road (formation of site access including upgrade of existing traffic signals and improvement to pedestrian and cycle facilities). The contractor shall prepare a detailed traffic management plan for works at these interfaces with the existing road network and obtain all required road opening licenses from South Dublin County Council.

Operation Stage

A number of walking and cycling connection points are proposed within the development; two of these are situated along Scholarstown Road, the third connection is a proposed walking and cycling route to the north east of the site that connects to Dargle Park. It is also proposed to upgrade the footpaths and cycle facilities along the Scholarstown Road, in the vicinity of the site. These upgraded facilities and convenient access points will provide safe and attractive routes for residents and will encourage the use of more sustainable modes of travel.

A Mobility Management Plan (MMP) has been prepared by DBFL Consulting Engineers for this development and is submitted as part of this application. The MMP has been prepared to guide the delivery and management of a package of integrated initiatives which seek to encourage sustainable travel practices at the proposed residential and commercial development in Scholarstown.

A Parking Strategy document has been prepared by DBFL for this development and has been submitted as part of this application. This document presents the rationale for the quantum of vehicular parking as well as cycle parking that is being proposed as part of this development. It sets out the management measures that will be deployed to allocate the use and control of parking provision at the proposed development.

There are a number of sustainable facilities provided within the development including the provision of 800 cycle spaces, good linkages to public transport, reduced parking for the Build-to-Rent apartments and the representation of GoCar within the development.

It is considered that all of the above measures will help encourage the use of sustainable transport modes as a means of accessing the development rather than a reliance on the private vehicle.

17.12 Material Assets – Site Services

17.12.1 Ameliorative, Remedial or Reductive Measures

Construction Phase

Provision of connections to the existing electricity, gas and telecommunications networks are to be coordinated with the relevant utility provider and carried out by approved contractors.

A GPR utility survey has been carried out along Scholarstown Road to confirm the location of the power, gas and telecommunication infrastructure. This survey is to be supplemented with slit trench investigations as required by the contractor in advance of commencing works along Scholarstown Road.

Operational Phase

No mitigation measures are proposed in relation the site services described in this chapter.

17.13 Cumulative Impacts

At the time of writing this Environmental Impact Assessment Report, it appears that there are no significant projects in the vicinity of the site seeking planning permission. We note that under SDCC Reg. Ref. SD18A/0227 [ABP Ref. ABP-304162-19], permission has recently been granted by An Bord Pleanála for 6 No. dwellings at a site to the northwest of the subject site (known as Mount Michael & Wits End, The Rookery, Scholarstown, Dublin 16). However, having regard to the separation distances provided and the existing buildings located between the subject site and the development at the Rookery when constructed, it is considered that no cumulative impacts will occur as a result of the proposed development.

There has been one other development project in the vicinity of the subject site in recent years, 'Scholarstown Wood' which was granted under SDCC Reg. Ref. SD15A/0017 [ABP Ref. PLo6S.244732] (as amended). This development is located c. 550 No. metres from the subject site and has been reviewed and included within the traffic analysis for the Traffic and Transport Assessment. This application was granted in 2015 and has been incorporated into the TTA assessment as a 'committed development' with traffic generated from this proposed development applied to the base road network within the traffic excel model.

Any future development in the vicinity of the subject site would have to similarly undergo Traffic and Transport assessments to assess the potential cumulative impacts to the transport network.

Therefore, it is not proposed to include any specific measures for monitoring or mitigation to be undertaken in relation to cumulative impacts.