

17 SUMMARY OF MITIGATION MEASURES

17.1 Introduction

This Chapter of the EIAR collates and summarise the mitigation measures recommended for each of the environmental topics examined in Chapters 5 – 16 of this EIAR.

These mitigation measures and any associated monitoring comprise what would be implemented during the Demolition, Construction and Operational Phase to reduce the potential for significant adverse impact of the proposed development on the environment.

This Chapter does not expand on the reasoning or expected effectiveness of the proposed mitigation or monitoring measures. For such descriptions, we refer to each of the individual chapters of the EIAR.

A number of the recommended mitigation measures would be expected to be required as a condition of any grant of permission by An Bord Pleanála.

17.2 Proposed Mitigation Measures

17.2.1 Population and Human Health (Chapter 5)

There are no specific mitigation measures proposed for Human Health. Mitigation measures proposed to minimise the potential impacts on human health in terms of air quality, landscape and visual impact and noise and vibration are discussed in the relevant sections of Chapter 9: Climate (Air Quality and Climate Change), Chapter 12: Air (Noise and Vibration), and Chapter 13: Landscape and Visual Impact, respectively.

Chapter 14: Material Assets (Transportation), addresses mitigation measures proposed to reduce the impact of additional traffic movements to and from the development.

17.2.2 Biodiversity (Chapter 6)

Proposed Development

A number of measures to minimise adverse impacts on Key Ecological Receptors have been incorporated into the design of the development and are considered in the operational stage section below, while others will be implemented for particular phases of the development works and are largely discussed in the construction stage section.

Construction Stage

Habitats – Hedgerow & Treelines

- Implement and demarcate a 3m root protection zone from the edge of each hedgerow prior to the commencement of construction works;
- Implement and demarcate a Root Protection Area around retained trees and treelines prior to the commencement of construction works. The Root Protection Area will be calculated following *Guidelines for the protection and preservation of trees, hedgerows and scrub prior to, during and post construction of National Road Schemes* (NRA, undated); and,
- Implementation of an Invasive Species Management Plan prior to the commencement of construction to eradicate and prevent any spread of Japanese Knotweed. This plan will include: -

- a) A buffer of at least c. 10m¹ will be applied to the stand of Japanese knotweed. This area will be clearly demarcated by fencing, prior to and during construction, to avoid any disturbance and to exclude access by plant and machinery. Signs will be erected on fencing to inform contractors of any risks posed;
- b) Prior to any works taking place, a toolbox talk will be given to all relevant site personnel to ensure they are aware of the location of the stand of Japanese knotweed, the impacts of this species and associated risks;
- c) Posters outlining the key features of this plant will be displayed in communal areas on-site to ensure all site personnel are aware of this species and the associated risks;
- d) Prior to construction works commencing, the adjacent landowner(s) will be liaised with regarding the treatment of Japanese knotweed that may extend outside of the ownership of the applicant;
- e) Designated haul routes located on lands within the ownership of the applicant will be clearly marked up to ensure no contamination occurs. In the case, that infested soils are excavated, infested soils will be transported along these designated routes; and,
- f) If any materials are to be imported into the site, it is recommended that the contractor obtains documentation from suppliers that the material is free from Knotweed and other invasive species. No new materials will be stored adjacent to the stand of Japanese knotweed.

Bats

- A number of trees located within the proposed development site contained suitable features for roosting bats. As a precautionary measure, it is recommended that the potential bat roost trees are inspected by an experienced ecologist for the presence of bats prior to felling and are section-felled using controlled rigging under the supervision of an experienced ecologist. If bats are present, the relevant works will have to cease and NPWS will have to be contacted in order to obtain a derogation licence;
- Construction phase lighting will follow advice provided in *Bats and lighting – Guidance for Planners, Engineers, Architects and Developers* (Bat Conservation Ireland 2010), *Guidance Notes for the Reduction of Obtrusive Light GN01* (Institute of Lighting Professionals, 2011), and *Guidance Note 08/18: bats and artificial lighting in the UK; Bats and the Built Environment* (Bat Conservation Trust & institute of Lighting Professionals, 2018). Construction stage lighting details shall be reviewed by a qualified bat ecologist. If necessary the bat ecologist shall recommend adjustments to directional lighting (e.g. through cowls, shields or louvres) to restrict light to those areas where it is needed with a light level of 3 lux or less at ground level.

Breeding birds

- In order to avoid disturbance of breeding birds, their nests, eggs and/or their unflown young, all works involving the removal of trees or hedgerows will be undertaken outside of the nesting season (1st March to 31st August inclusive);
- Where this seasonal restriction cannot be observed, a breeding bird survey will be undertaken during the appropriate survey season (between early March and late June) by an ecologist with experience undertaking breeding bird surveys in order to confirm whether birds are nesting within suitable habitat affected by or immediately adjacent to the subject lands. Should nesting birds be encountered during surveys, the removal of trees or hedgerows may be required to be delayed until after the nesting season (1st March to 31st August inclusive);

¹ The rhizomes of Japanese knotweed are known to extend up to 7m from visible growth above ground (Environment Agency, 2013), an addition of 3m has been added to the buffer as a precaution.

- Installation of bird boxes to provide suitable nesting habitat for urban bird species that will continue to use the site during the operational stage.

Camac River

- See Water EIAR Chapter (Chapter 8), Section 8.6.1.1 for mitigation measures which will be implemented to protect the receiving hydrological environment and the Camac River during the construction stage.

Operational Stage

Habitats – Hedgerow & Treelines

- Implementation of a Habitat Management Plan to maintain or enhance condition of retained hedgerows and treelines.

Camac River

As part of the proposed development design no untreated surface water run-off will be discharged from the site. The below SuDS measures incorporated into the design will protect the receiving hydrological environment:

- For housing and apartment blocks: rainfall gathered for irrigation of local roof planting and cleaning (apartment blocks only); soakage pits in rear gardens (Individual housing units); biofilter boundary planting (housing unit boundaries and landscaped areas in apartment blocks); and, low maintenance below ground attenuation tanks, with and without direct soakage;
- For road network and parking areas: tree pits for drainage of footpath areas and road network; biophilic streets; and, swales (infiltration ditch) alongside open green space; and,
- Site Wide: bioretention areas; flow controls at exit from site; light liquid interceptors; and, publicly managed low maintenance below ground attenuation tanks together with above ground detention areas for site wide management of surface water run-off. These systems will be designed to promote natural soakage to the underlying geology.

17.2.3 Land, Soils and Geology (Chapter 7)

Construction Stage

The following measures are designed to address the impacts of construction activities, associated with the development, on soils, geology and land use.

At detail design stage a number of measures will be employed to minimise impact on the land use and soil resource.

- The width of the roads will be minimised to fit with current urban road policy, resulting in reduced effect.
- A comprehensive cut and fill assessment, based on a systematic site investigation of the entire site development, will be undertaken to balance the amount of material excavated and replaced, ultimately reducing the amount of material leaving the subject site as waste.
- The detail design will also seek to minimise the amount of material to be imported. (Any material that is to be imported will be purpose specified engineered material). At this stage a soil resource plan will also be developed for the site identifying the specific soil make up for the site at the locations of excavation. It will provide a clear breakdown of materials and how they can be incorporated into the works or disposed safely offsite in accordance with the Site Waste Management Plan.

Planned construction works will be carried out with the least feasible disturbance of soils. It is envisaged that the majority of excavated materials will be retained and re-used as part of the designed works. Provisional quantities were outlined previously to illustrate this.

Each classification of excavated material will be stored in separate stockpiles in accordance with the soil resource plan. All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. This will be outlined in the Site Waste Management Plan. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contamination in order to ensure that historical pollution of the soil has not occurred. The material will be classified and disposed of in accordance with current best practice and as directed by the Waste Management Act of 1996 and associated amendments.

All stockpiled material will be stored away from receiving watercourses with run-off from the stockpiles directed to temporary holding lagoons for filtration prior to entry to the receiving watercourse.

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within specially constructed dedicated temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas with an impervious base. These areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Filling and draw-off points will be located entirely within the bunded area(s). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area, off site, away from surface water gullies or drains. The vehicles will never be left unattended during refuelling. Spill kits and hydrocarbon adsorbent packs will be stored in this area and operators will be fully trained in the use of this equipment.

All associated hazardous waste residual materials will also be stored within temporary bunded storage areas prior to removal by an appropriate EPA or South Dublin County Council approved waste management contractor for off-site treatment/recycling/disposal.

Operational Stage

There is no direct impact on the soils in operation. However, there is an indirect impact of poor-quality surface water runoff impacting on the subsoil. Appropriate measures for reducing this impact are considered in Chapter 8: Water of this EIAR.

17.2.4 Water (Chapter 8)

Construction Stage

In order to minimise the potential impacts from the development of the subject site during construction, the following ameliorative, remedial or reductive measures will be implemented. These measures will ensure that contamination of groundwater receptor and receiving surface water course does not occur.

The Department of the Marine and National Resources published guidelines in 1997 that are designed to ensure the impact of construction work on the water environment is minimised. The United Kingdom (UK) Department of the Environment has also published guidance as to the approach to minimise impacts of construction and operation of developments on the water environment. A joint publication by the Environment Agency (EA), Scottish Environmental Protection Agency (SEPA) and the Environment and Heritage Services (EHS) are also relevant in relation to the proposed development. These publications are used to develop appropriate management measures during construction activities.

Receiving Surface Watercourse

There will be no uncontrolled discharge to any watercourse during construction. Any surface water collecting in excavations will be directed to onsite sedimentation ponds to settle solids, where it will be filtered of possible pollutants prior to discharge to the receiving surface water course at a controlled rate.

Sub surface tanks, planted open green depressions and petrol oil interceptors will form part of the permanent works to provide attenuation and a final treatment level in advance of discharge to the receiving watercourse. [Further detail on the attributes of the individual areas is provided in the Infrastructure Design Report for the subject site and produced by DBFL and submitted with this application. The location of the permanent attenuation areas is illustrated on DBFL drawing series 17019-11055.] The attenuation depressions and interceptors will be installed as part of an enabling phase package of works for the site that will include temporary drainage routes and holding areas for the monitoring and management of construction stage run-off or pumped waters from excavations.

The construction of the development is to be progressed in phases. Each phase will create a temporary holding pond at exit for discharge of waters that will be connected to the permanent systems outlined above. Further direction on phasing is provided in the Infrastructure Design Report included with this submission.

Oil and fuel storage tanks will be stored in designated areas, and these areas will be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30mm for rainwater ingress). Filling and draw-off points will be located entirely within the bunded area(s). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area (where possible) of the site, which will be away from any active drainage component leading to the receiving watercourse. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment.

The guidelines provided by the Department of the Marine and Natural Resources, with respect to concrete wash water, and the UK Department of the Environment will be adhered to, in order to ensure that there is a neutral and imperceptible impact on the receiving surface watercourse during the construction phase.

Each classification of excavated material will be stored in separate stockpiles in accordance with the soil resource plan. All stockpiled material will be stored away from receiving watercourses with run-off from the stockpiles directed to temporary holding lagoons for filtration prior to entry to the receiving watercourse.

The aforementioned measures will ensure that accidental inputs to, and subsequent contamination of, the active drainage network and receiving surface watercourse do not occur during normal and or emergency conditions.

Groundwater Receptor

To limit any impact on the underlying subsurface strata and groundwater receptor, the above ameliorative, remedial or reductive measures for the receiving surface water course also apply.

In the event of groundwater being encountered during the construction phase, additional measures may be necessary. These will include dewatering of excavations to appropriate treatment/ filtration areas prior to discharge. Other measures include restrictions on use, or storage of, potentially contaminating material such as fuels and oils onto this part of the site.

Any groundwater ingress to excavations will be pumped to onsite temporary sedimentation pond/lagoon/tank to settle solids, where it will be tested and filtered of any possible pollutants prior to discharge to the surface water system or back to ground water at a controlled rate.

Operational Stage

The ameliorative, remedial or reductive measures outlined in this section will ensure that, specifically in terms of wastewater and storm water discharges, the residual effect on the receiving water environment is reduced to neutral.

Receiving Surface Watercourse

Surface water run-off from the proposed development will be designed to replicate existing flow characteristics from the predevelopment lands to counteract the risk of flooding. Further detail is provided in the Infrastructure Design Report and Site Specific Flood Risk Assessment for the proposed development, produced by DBFL Consultants Limited, and submitted with this application. The proposals detailed in the reports when applied as indicated on DBFL Drawing Series 170191-1055, will ensure the effect of flooding is reduced to neutral.

The majority of surface water run-off from the site will be directed to the groundwater receptor or taken up by plants in the first instance with only residual flows in more critical events taken to the surface water course in a controlled and managed network. Waters will be directed above ground as far as possible, before moving to conveyance infiltration systems below ground for management in accordance with the recommendations of the GSDSDS. In extreme events (above 100 year return periods), water will move along designated flood routes and in above ground channels and swales and held until the storm recedes. Therefore, by applying the management procedures outlined in the Infrastructure Design Report and the Site Specific Flood Risk Assessment, the impact on the receiving surface water course will be long term and neutral.

Groundwater Receptor

In operation the majority of surface water run-off from the site will be directed to the groundwater receptor or taken up by plants. Waters will be directed at source and allowed to filtrate slowly to the underlying soil.

Roof run off from housing and apartment blocks will be directed through rain gardens. This will prevent the risk of contamination with low accumulation and filtration of particulates. The rain gardens will also assist with the management of flood risk with additional support from harvesting tanks in apartment blocks.

In hard landscaped areas run off will be directed over the edge into trenches and tree pits. Areas will fall towards green areas and allowed to drain naturally to the underlying soil. Diffusion storage may be required alongside larger areas to avoid local ponding. Overflows in extreme events will pass to the main conveyance drainage network for volume management.

The moderate risk from run off from Roads & Public Parking Areas is reduced by the fact that the contaminants entering the receiving water body are not allowed to substantially accumulate before discharge. Protection is also provided by road gullies that will initially intercept road run-off removing any contaminated detritus, before being directed to the infiltration system. As the levels of contamination close to source will be limited, the two levels of treatment provided by the managed gully network and infiltration will provide the necessary treatment levels prior to discharge to the groundwater receptor.

17.2.5 Climate (Air Quality and Climate Change) (Chapter 9)

Construction Stage

Air Quality

The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation and ongoing monitoring of the dust management plan. The key aspects of controlling dust are listed below. Full details of the dust management plan can be found in Appendix 9.3.

- The specification and circulation of a dust management plan for the site and the identification of persons responsible for managing dust control and any potential issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust management plan can be monitored and assessed;
- The specification of effective measures to deal with any complaints received.

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

Climate

Construction traffic and embodied energy of construction materials are expected to be the dominant source of greenhouse gas emissions as a result of the construction phase of the development. Construction vehicles, generators etc., may give rise to some CO₂ and N₂O emissions. However, due to short-term and temporary nature of these works, the impact on climate will not be significant.

Nevertheless, some site-specific mitigation measures can be implemented during the construction phase of the proposed development to ensure emissions are reduced further. In particular the prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

Operational Stage

No additional mitigation measures are required as the operational phase of the proposed development as it is predicted to have an imperceptible impact on ambient air quality and climate.

17.2.6 Climate (Sunlight) (Chapter 10)

Construction Stage

Remedial measures during the construction phase in relation to sunlight are not considered to be required.

Operational Stage

As previously noted the performance targets set out in the BRE Guidelines should be used with a degree of flexibility as per the extract below from the BRE Guide: -

“The advice given here is not mandatory and this document should not be seen as an instrument of planning policy. Its aim is to help rather than constrain the designer. Although it gives numeral guidelines these should be interpreted flexibly because natural lighting [and sunlight] is only one of the many factors in site layout design.”

The development layout has been arranged so that all green open spaces and green loops are fully addressed by residential frontages to ensure a secure public realm with passive overlooking, which has led to the block layout arrangement with varying orientations across the development. North facing amenity spaces have been limited as far as possible and the net residential density for the site is c. 42 no. units per Ha, which is compliant with the Masterplan net residential density range of 35 – 50 unit per Ha.

In summary, 82% of private amenity areas receive a minimum of 2 hours of sunlight on the 21st March on 50% of the amenity space. Those that fall slightly short of the 50% are predominantly spaces orientated to the north, however, it should be noted that beyond the 21st March sunlight access to private amenity space continues to improve and excellent access to sunlight is experienced across the development during summer months when amenity space will predominantly be used.

Other aspects to consider that contribute to the shortfall are privacy and security requirements for the development. Back garden fencing has been designed as 1.8m high, for privacy and overlooking requirements. The fences do impact on sunlight access to the spaces on the 21st March given the lower angle of the sun, however in later months where the angle of the sun is higher minimal impact from the fencing is apparent.

In addition to private amenity space, extensive areas of communal open space has also been provided as part of the development for all future occupants, and analysis has demonstrated that 100% of these areas receive 2 hours of sunlight on 21st March, demonstrating that excellent levels of sunlight will be realised in these areas to which the residents have full access. In considering all of the above, minimal impact, if any, is expected in relation to sunlight levels experienced by the future inhabitants of the proposed site and to the existing inhabitants of the adjoining sites, therefore no remedial or reductive measures are considered to be required.

17.2.7 Climate (Daylight) (Chapter 11)

Construction Stage

Remedial measures during the construction phase in relation to daylight are not considered to be required.

Operational Stage

Minimal impact, if any, is expected in relation to the daylight levels experienced by the future inhabitants of the proposed site and to the existing inhabitants of the adjoining sites, therefore no remedial or reductive measures are required.

17.2.8 Air, Noise and Vibration (Chapter 12)

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 best practice measures set out in BS 5228 (2009) Parts 1 & 2 will be complied with. 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.

Detailed comment is offered on these items in the following paragraphs. 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. This will specifically be required to protect neighbouring sensitive location during the demolition works.

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 mitigation 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 pneumatic 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 can provide adequate sound insulation.

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.

Operational Stage

Outward Noise Impact

The noise impacts on the surrounding area as a result of the operation of the proposed development are minor and no mitigation is required.

Inward Noise Impact

The facades highlighted in Figure 12.3 and Figure 12.4 below will be provided with upgraded glazing that achieves the minimum sound insulation performance as set out in the Table 12.12 below.

Glazing Specification	Octave Band Centre Frequency (Hz)						R _w
	125	250	500	1k	2k	4k	
Red	26	28	38	47	43	51	40
Elsewhere	22	20	26	34	46	39	32

Table 12.12: Sound Insulation Performance Requirements for Glazing, SRI (dB)

The upgraded glazing and ventilation is specified for the most exposed facades, i.e. those facing the R136 road. These facades are highlighted red in the figure below. All other facades require standard glazing. Upgraded ventilators are specified for these highlighted facades.

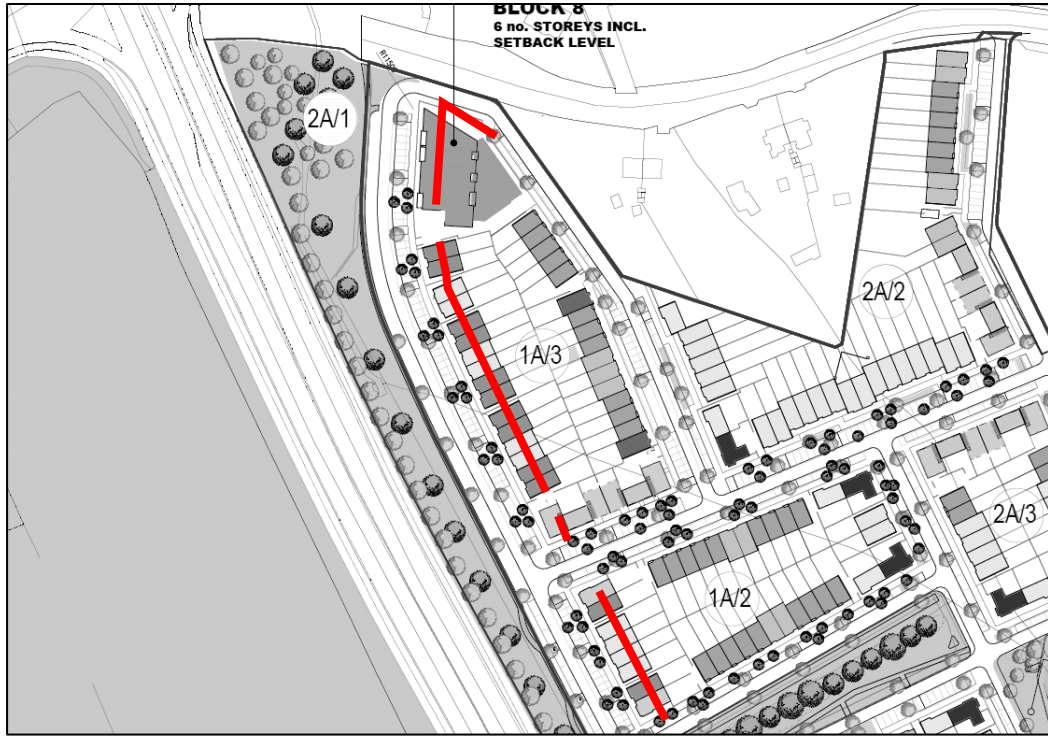


Figure 12.3: Northern Sector of Site

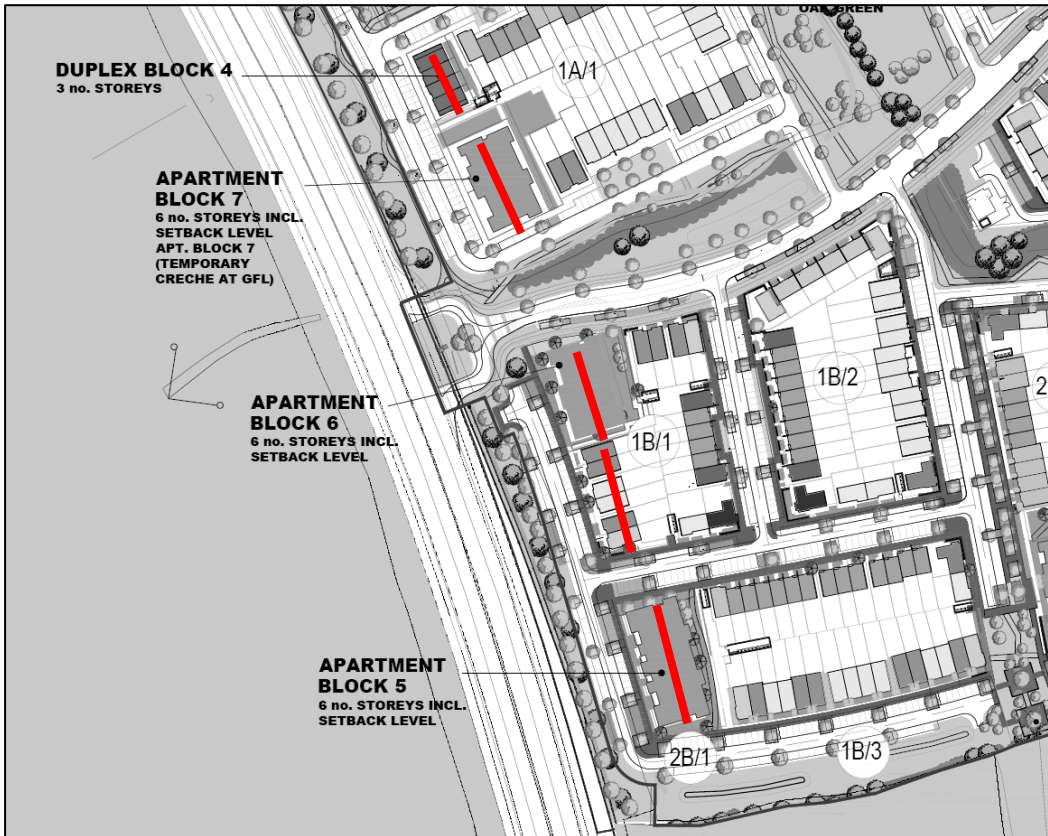


Figure 12.4: Southern Sector of Site

The overall R_w outlined above are provided for information purposes only. The over-riding requirement is the Octave Band sound insulation performance values which may also be achieved using alternative glazing configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Table 12.12 or greater.

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

In addition, any background ventilators through the façade, e.g. trickle vents, will be selected to achieve an acoustic performance of at least 36dB $D_{ne,w}$ when in the open position for those facades identified in Figure 12.3.

With these measures in place the internal noise levels within those proposed buildings most exposed to environmental noise from the R136 will achieve the criteria outlined in Table 12.5 when the windows are closed and the ventilators are open.

17.2.9 Landscape and Visual Impact (Chapter 13)

During construction, the existing hedges and trees that are being retained shall be fenced off, so that they are protected during construction. An Environmental Management Programme of good husbandry will be undertaken to ensure environmental protection and that there is no debris, pollutants or otherwise that would damage the landscape.

An arborist has been employed to survey the existing trees and hedgerows and may be employed to review operational works and prepare a final report on the status of the retained trees and hedgerows.

The landscaping proposals for this scheme shall be developed to form an integral part of the development. There are a number of measures that shall reduce the impact of this proposed development, extensive planting, retention of existing hedgerows and trees, development of pathways, seating areas and textured road & path surfaces

In the operational stage, the site will have established a landscape that shall be integrated around the houses. The planting will have matured and the amenity open spaces will be actively used by the residents and therefore having a positive visual impact on the landscape. The Green belt function of Corkagh Park to the south and open lands of Grange golf club to the west beyond the R136 (lands to the north and east are otherwise built up rather than green belt) – the proposed development, including the biophilic landscape strategy, would have the effect of enhancing biodiversity and providing green links accessible and of benefit to the wider community.

The Buildings shall be screened by planting, trees and hedges. The landscaping shall reduce the visual impact of straight lines and hard surfaces, with extensive tree and shrub planting. There shall be a defensive planted buffer to the proposed housing and apartments, the landscaping of the gardens surrounding the buildings shall soften hard edges.

Although some of the existing hedgerows internally shall be removed due to the layout, it is proposed to retain many of the existing mature trees and shrubs in the open spaces. This coupled with an extensive landscape programme, shall create the best landscape solution within this environment. The impact of the building shall be reduced through retention and planting of mature trees, shrubs and careful use of hard landscape material, both hard and soft.

The car spaces and paths to the front of the house shall be surfaced with high quality materials – increasing the texture in the environment – a further positive visual improvement. The organisation of the hard landscape elements with soft landscape shall provide an ordered and sustainable new landscape. The increased number and range of species of plant shall be an improvement on the existing plant species currently in Kilcarbery, in terms of variety and in number. They shall replace the monoculture of grass and the increased range of pollinator species shall benefit the existing habitats.

Monitoring

A Landscape Architect & Arborist shall be appointed to oversee and monitor the project at construction & operational stage. They shall liaise with other project members in relation to any existing and proposed trees.

The landscape architect shall overview all hard & soft landscape works. Initially, the protective fence shall be installed under the guidance & supervision of the Arborist, if required. As works continue the Arborist shall make visits to review the condition of any tree & hedgerow that are to be retained and liaise with resident engineer, project team and contractor. The landscape architect shall also inspect the trees; however, most of the monitoring works shall be during and post civil construction stage. The landscape architect shall review and instruct on details of soft planting, trees, shrubs and of paving materials, walls & railings.

During the operational stage, the landscape Architect & Arborist shall review the state of any retained trees, The landscape architect shall review for period of 18 months, from practical completion of each stage the standard and quality of the materials and workmanship. A final certificate of completion shall be issued by the landscape architect in respect of this.

17.2.10 Material Assets (Transport) (Chapter 14)

Construction Stage

A Construction Management Plan and the associated Construction Traffic Management Plan (CTMP) in addition to the application accompanying Construction and Waste Management Plan will be developed by the appointed contractor and submitted to South Dublin County Council for approval prior to commencement of works.

The Construction Management Plan will incorporate a range of integrated control measures and associated management initiatives with the objective of mitigating the impact of the proposed development's on-site construction activities.

In order to ensure satisfactory operation of the construction stage the following is proposed:

- Provision of sufficient on-site parking and compounding to ensure no potential 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.
- Site offices and compound will be located within the site boundary. The site will be able to accommodate employee and visitor parking throughout the construction period through the construction of temporary hardstanding areas.
- Finally, truck wheel washes will be installed at construction entrances and any specific recommendations with regard to construction traffic management made by the Local Authority will be adhered to.

Operational Stage

With the objective of mitigating the potential impact of the proposed development during its operational stage, the following initiatives and associated timescale for their implementation have been identified and subsequently form an integral part of the subject development proposals.

- Management - A Mobility Management (MMP) is to be rolled out with the aim of guiding the delivery and management of coordinated initiatives by the scheme promotor. The MMP ultimately seeks to encourage sustainable travel practices for all journeys to and from the proposed development site. This MMP will be developed in partnership with SDCC to specifically consider the opportunities of shaping all journeys and promoting sustainable transport habits at both the proposed development.
- Services – The high provision of a total of 251 short term and 854 long term bicycle parking stands/opportunities (1105 in total).

17.2.11 Material Assets (Waste) (Chapter 15)

Ameliorative, Remedial or Reductive measures are set out in the sections below to minimise the effect of the this scheme on the environment, reduce the quantity of waste sent for final disposal and to promote sustainable waste management practices.

Waste from the scheme will be managed in accordance with the principles of the waste hierarchy presented earlier i.e. prevent, reduce, re-use, re-cycling, energy recovery and disposal.

The contractor undertaking the works will minimise waste disposal so far as is reasonably practicable.

Construction Stage

In order to minimise the potential impacts from the development of the subject site during construction, the following ameliorative, remedial or reductive measures will be implemented.

- Construction and Demolition Waste Management Plan (CDWMP): Preparation of a Construction and Demolition Waste Management Plan which meets the requirements of the DoEHLG Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (DoEHLG, 2006a) is recommended.
- Where waste generation cannot be avoided this will maximise the quantity and quality of waste delivered for recycling and facilitate its movement up the waste hierarchy away from landfill disposal and reduce its environmental impact.
- As part of the CDWMP a soil resource plan will be developed to ensure that all excavated materials are excavated, stored and re-used in accordance with the design proposals. It is anticipated, based on the findings of the site investigation, that the majority of excavated material will be re-used as fill within the subject site or in landscaping works and will be fully considered following appropriate progressive testing to ensure material is suitable for its proposed end use. Where excavated material may not be re-used within the proposed works the Contractor will endeavour to send material for recovery or recycling so far as is reasonably practicable. The Contractor will ensure that any off-site interim storage facilities for excavated material have the appropriate waste licenses or waste facility permits in place.
- Source Segregation: Waste produced will be segregated. Where possible metal, timber, glass and other recyclable material will be segregated during the works and removed off site to a permitted/licensed facility for recycling. Waste stream colour coding and photographs will be used to facilitate segregation.
- Material Management: 'Just-in-time' delivery will be used so far as is reasonably practicable to minimize material wastage.
- Supply Chain Partners: The Contractor will engage with the supply chain to supply products and materials that use minimal packaging, and segregate packaging for reuse.
- Waste Auditing: The Contractor will record the quantity in tonnes and types of waste and materials leaving the development site during the construction phase. The name, address and authorization details of all facilities and locations to which waste and materials from the construction phase are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material which is recovered and disposed of.

Operational Stage

All wastes emanating post development and during operation will typically be domestic waste and will be managed through the municipal waste management programme. Periodic residential waste collections will allow for the majority of domestic waste to be disposed of without significant impact. This will include management of food waste and common recyclable products aimed at minimising disposal to landfill or the need for specialist attention. Residual waste such as batteries, WEEE, printer cartridges.

Sufficient at source waste storage and residual waste management facilities will be provided in accordance with the Operational Waste management Plan developed for the site by AWN Consulting.

17.2.12 Cultural Heritage (Archaeology and Architectural Heritage) (Chapter 16)

Construction Stage

Archaeology

All topsoil stripping that is associated with the proposed development will be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation *in-situ* or by record. Any further mitigation will require approval from the National Monuments Service of the DoCHG.

It is the developer's responsibility to ensure full provision is made available for the resolution of any archaeological remains, both on site and during the post excavation process, should that be deemed the appropriate manner in which to proceed.

Please note that all recommendations are subject to approval by the National Monuments Service of the Heritage and Planning Division, Department of Culture, Heritage and the Gaeltacht.

Architecture

No mitigation is required.

Cultural Heritage

No mitigation is required.

Operational Stage

Archaeology

No mitigation is required.

Architecture

The boundary between the south-eastern section of the proposed development and Corkagh Park will be augmented with appropriate planting in order to minimise the visual disturbance of the former demesne.

Cultural Heritage

No mitigation is required.