

16 SUMMARY OF MITIGATION MEASURES

For ease of reference and clarity, all mitigation measures contained in this EIAR have been summarised below. All measures included below form part of the proposed development and will be implemented in full.

16.1 Population & Human Health

Character of potential impact	Mitigation measure
Construction Phase	
Potential Impacts on Residential Amenity	<ul style="list-style-type: none"> • A construction management plan will be prepared to minimise impacts on adjacent residents and the operation of the college. • A construction traffic management plan will be prepared to mitigate against any potential traffic delays and then facilitate the existing patterns of vehicular movement. • The mitigation measures in relation to construction, traffic, noise, air quality and landscaping as set out in this EIS will be carried out in full to minimise impacts on adjacent residencies.
Operational Phase	
Potential Impacts on Residential Amenity	The mitigation measures relating to the operation phase of the development concerning traffic, transport, noise, vibration, water, air and dust quality and landscaping as set out in this EIAR will be carried out in full to minimise impacts on adjacent residents, the university, and human health

16.2 Soils & Geology

Character of potential impact	Mitigation measure
Construction Phase	
Subsoil erosion and generation of sediment laden runoff	<p>Stripping of topsoil will be coordinated with the proposed staging for the development.</p> <p>Topsoil stockpiles will also be located so as not to necessitate double handling.</p>
Subsoil erosion and generation of sediment laden runoff	The extent of topsoil strip (and consequent exposure of subsoil) shall be limited to the immediate vicinity of active work areas.
Subsoil erosion and generation of sediment laden runoff	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.
Subsoil erosion and generation of sediment laden runoff	Disturbed subsoil layers will be stabilised as soon as practicable
Rutting and deterioration of the topsoil layer and any exposed subsoil layers from construction traffic	Earthworks plant and vehicles delivering construction materials to site will be confined to predetermined haul routes around the site.
Rutting and deterioration of the topsoil layer and any exposed subsoil layers from construction traffic	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.
Deposition of mud and soil on the surrounding road network	Dust suppression measures (e.g. dampening down) will be implemented as necessary during dry periods.
Contamination of the soils underlying the site	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.
Contamination of the soils underlying the site	Refueling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any surface water inlets.
Operational Phase	
No significant impacts	No mitigation measures required.

16.3 Water: Hydrogeology & Hydrology

Character of potential impact	Mitigation measure
Construction Phase	
Surface water runoff during the construction phase may contain increased silt levels or become polluted by construction activities.	Weather conditions and seasonal weather variations to be taken into account when planning stripping topsoil to minimise soil erosion. Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
Discharge of rainwater pumped from excavations.	Rainwater pumped from excavations is to be directed to on-site settlement ponds.
Accidental spills and leaks associated with storage of oils and fuels, leaks from construction machinery and spillage during refuelling and maintenance contaminating the surrounding surface water and hydrogeological environments.	All oils, fuels, paints and other chemicals shall 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.
Concrete runoff, particularly discharge of wash water from concrete trucks.	Concrete batching will take place off site and wash down and wash out of concrete trucks will take place off site.

Discharge of vehicle wheel wash water.	Discharge from any vehicle wheel wash areas is to be directed to on-site settlement ponds.
Infiltration of groundwater into excavations.	Groundwater pumped from excavations is to be directed to on-site settlement ponds.
Operational Phase	
Increased impermeable surface area will reduce local groundwater recharge	<ul style="list-style-type: none"> Permeable paving to be installed in driveway areas, swales and open bottom attenuation to be installed to encourage infiltration and recharge of groundwater to replicate the greenfield scenario. Surface water runoff from roofs will be routed to the proposed surface water pipe network via the porous aggregates beneath permeable paved driveways.
Increased impermeable surface area will potentially increase surface water runoff (if not attenuated to greenfield runoff rate).	<ul style="list-style-type: none"> Attenuation for the 100-year return period storm and a Hydrobrake to be installed limiting surface water discharge from the site to greenfield runoff rates in accordance with GSDSDS. Installation of a Hydrobrake limiting surface water discharge from the site to greenfield runoff rates.
Accidental hydrocarbon leaks and subsequent discharge into piped surface water drainage network (e.g. along roads and in driveway areas).	Surface water discharge will also pass via a Class 1 fuel / oil separator (sized in accordance with permitted discharge from the site) to remove hydrocarbons from run-off.

16.4 Noise & Vibration

Character of potential impact	Mitigation measure
Construction Phase	
Construction Noise & Vibration	<ul style="list-style-type: none"> Contractor will be required to comply with the construction noise and vibration limits in Tables 8.5 & 8.6 of this EIAR Contractor Will be required to ensure all best practice control from BS 5228 (2009 +A1 2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2 will be used to control noise and vibration impacts
Operational Phase	
Building services Plant Items	The operation of any fixed plant items used to serve the development buildings will be required to comply with BS 4142 (2014) to avoid any adverse noise impacts to noise sensitive locations external to the site.

16.5 Air, Dust & Climatic Factors

Character of potential impact	Mitigation measure
Construction Phase	
Dust Impacts	<p>A dust minimisation plan has been formulated in order to minimise dust emissions during construction.</p> <p>The pro-active control of fugitive dust will ensure that the prevention of significant emissions. The key features with respect to control of dust will be:</p> <ul style="list-style-type: none"> • The specification of a site policy on dust and the identification of the site management responsibilities for dust 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 minimisation plan can be regularly monitored and assessed; and • The specification of effective measures to deal with any complaints received.
Air Quality	<p>There are no significant impacts predicted for the construction phase with respect to air quality with the exception of dust therefore no site-specific mitigation measures are required during the construction phase of the proposed development. However, the proposed development should, where possible, minimise construction vehicle idling on site and use of generators.</p>
Climate	<p>There are no significant impacts predicted for the construction phase with respect to climate therefore no site-specific mitigation measures are required during the construction phase of the proposed development. However, the proposed development should, where possible, minimise the carbon footprint of the scheme by the efficient use of materials, choosing materials with a lower carbon footprint, minimise construction vehicle idling on site and use just in time deliveries can also be used to avoid material wastage.</p>
Operational Phase	
Air Quality and Climate	<p>There are no significant impacts predicted for the operational phase with respect to air quality and climate therefore no site-specific mitigation measures are</p>

Character of potential impact	Mitigation measure
	required during the operational phase of the proposed development.

16.6 Biodiversity

Character of potential impact	Mitigation measure
Construction Phase	
Loss of high local value hedgerows/treeline	The loss of mature trees or hedgerows has been avoided where possible. Where this cannot be avoided, the landscaping scheme has been designed to compensate for the loss of habitat. This entails biodiversity friendly planting of natural meadow areas and clusters of native trees. Biodiversity value will be enhanced by installing bird nesting boxes and artificial bat roosts. The felling of large trees with bat roost potential will be supervised by a bat specialist as per recommendations in the bat report.
Mortality to animals during site clearance including birds and bats	The removal of vegetation will not take place between March and August as per section 40 of the Wildlife Act. Where this cannot be avoided, vegetation must first be inspected by a suitably qualified ecologist for signs of nesting. Where no nesting is observed, vegetation can be removed within 48 hours. Where nesting is underway, vegetation cannot be removed unless under licence from the NPWS.
Loss of bat roost	A derogation licence from the National Parks and Wildlife Service is a prerequisite to disturbance of the agricultural shed which is acting as a bat roost and this has been issued with conditions (licence reference number: DER/BAT 2019-61). This will require the installation of new/alternative roosting locations and this is provided for within the bat report.
Pollution to water courses during construction	A Construction Management Plan will be prepared as part of the planning application with regard to guidelines on the protection of fish habitat from Inland Fisheries Ireland. This recommendation is intended to tackle the pollution of water courses through the ingress of silt, oils and other toxic substances, as identified in section 10.7.1 of this chapter. Measures will include storage of dangerous substances in bunded areas. Only clean, silt-free surface water run-off will leave the site. Any discharge to local drains will only be permitted after suitably-sized attenuation/silt-removal measures have

Character of potential impact	Mitigation measure
Spread of invasive species	<p>been installed.</p> <p>A management plan for Japanese Knotweed will be included within the Construction Management Plan. This has been prepared by Cairn Homes and is presented at Appendix 10.D. It provides for deep burial of any remaining fragments of plant within the site boundary. No contaminated material is to be moved off-site. Further monitoring will be required to ensure that further spread of the plant does not occur. This will include annual inspections for signs of re-growth.</p>
Operational Phase	
Disturbance to bats from artificial lighting	<p>Nocturnal mammals are impacted by lighting. Therefore, it is important that lighting installed within the proposed development site is completed with sensitivity for local wildlife while still providing the necessary lighting for human usage. The following principals should be followed: - Artificial lights shining on bat roosts, their access points and the flight paths away from the roost must always be avoided. This includes alternative roosting sites such as bat boxes.</p> <ul style="list-style-type: none"> - Lighting design should be flexible and be able to fully take into account the presence of protected species. Therefore, appropriate lighting should be used within a proposed development and adjacent areas with more sensitive lighting regimes deployed in wildlife sensitive areas. - Dark buffer zones can be used as a good way to separate habitats or features from lighting by forming a dark perimeter around them. This could be used for habitat features noted as foraging areas for bats. - Buffer zones can be used to protect Dark buffer zones and rely on ensuring light levels (levels of illuminance measured in lux) within a certain distance of a feature do not exceed certain defined limits. The buffer zone can be further subdivided in to zones of increasing illuminance limit radiating away from the feature or habitat that requires to be protected. - Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and

Character of potential impact	Mitigation measure
	<p>specifications which a lighting professional can help to select. The following should be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT, 2018).</p> <ul style="list-style-type: none"> ○ All luminaires used should lack UV/IR elements to reduce impact. ○ LED luminaires should be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability. ○ A warm white spectrum (<2700 Kelvins is recommended to reduce the blue light component of the LED spectrum). ○ Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats. ○ The use of specialist bollard or low-level downward directional luminaires should be considered in bat sensitive areas to retain darkness above. ○ Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible. ○ Only luminaires with an upward light ratio of 0% and with good optical control should be used. ○ Luminaires should always be mounted on the horizontal, i.e. no upward tilt. ○ Any external security lighting should be set on motion-sensors and short (1min) timers. ○ As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

16.7 Landscape & Visual Impact Assessment

Character of potential impact	Mitigation measure
Construction Phase	
Loss of Hedgerows	Additional hedgerows planted to compensate for loss. No overall loss of native hedgerow post-construction.
Construction Traffic/Cranes	Site hoarding will be erected to restrict views of the site during construction
Operational Phase	
Change in landscape character	Retention of existing boundary hedgerows where

Character of potential impact	Mitigation measure
	possible. Proposed planting within development of 900 standard trees and 7,000 sq.m. of native shrub planting. Additional native hedgerow to ameliorate loss of existing hedgerows.
Negative effect on adjacent visual receptors	Proposed tree, shrub and hedgerow planting will mature over time, contributing to the visual softening of the development.

16.8 Material Assets: Traffic & Transport

Character of potential impact	Mitigation measure
Construction Phase	
Increase in volume of heavy goods vehicles due to construction activities on the surrounding road network	The Construction and Environmental Management Plan (an outline CEMP accompanies the application) and the associated Construction Traffic Management Plan (CTMP) in addition to the applications accompanying Construction and Waste Management Plans will incorporate a range of integrated control measures and associated management initiatives with the objective of mitigating the impact of the proposed developments on-site construction activities.
Increase in vehicular traffic on the local road network	Management – A Mobility Management (MMP) is to be compiled 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.
Increase in cycle and pedestrian movements	Infrastructure - The proposed scheme design incorporates the LAP objectives of 'Green Links' through the site for the benefits of pedestrians and cyclists. The implementation of dedicated infrastructure along an integrated area wide catchment provides an attractive, convenient, seamless 'green' corridor providing a permeable, safe connection between existing (and future) residential neighbouring's and key community facilities including schools, shops and local service centres.
Traffic impact at key off-site junctions	Infrastructure - The future (long term) Western Dublin Orbital Route as proposed by SDCC will, once implemented, result in a significant reduction in traffic travelling through Newcastle Village centre and the N7

Character of potential impact	Mitigation measure
	Rathcoole Interchange. Following the delivery of this infrastructure objective all local junctions along the existing R120 Main Street corridor are projected to operate within capacity. Accordingly, the long term performance of the local road network is safeguarded.

16.9 Water: Water Supply, Drainage & Utilities

Character of potential impact	Mitigation measure
Construction Phase	
Contamination of surface water runoff due to construction activities	Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
Improper discharge of foul drainage from contractor's compound	Foul drainage discharge from the construction compound will be tinkered off site to a licensed facility until a connection to the public foul drainage network has been established.
Cross contamination of potable water supply to construction compound	The construction compound's potable water supply shall be located where it is protected from contamination by any construction activities or materials.
Damage to existing underground and overground infrastructure and possible contamination of the existing systems with construction related materials.	A site specific Construction & Environmental Management Plan will be developed and implemented during the construction phase.
Relocation or diversions to existing ESB lines may lead to loss of connectivity to and / or interruption of supply from the electrical grid.	Relocation of existing overhead ESB lines will be fully coordinated with ESB Networks to ensure interruption to the existing power network is minimised.
Potential loss of connection to the Gas Networks Ireland and Telecommunications infrastructure while carrying out works to provide service connections	Connections to the existing gas and telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.
Operational Phase	
Increased impermeable surface area will reduce local ground water recharge and potentially increase surface water runoff	Please refer to Table 16.3 – Water Hydrogeology and Hydrology for mitigation measures associated with the surface water treatment.
Accidental hydrocarbon leaks and subsequent discharge into piped surface water drainage network (e.g. along roads and in driveway areas).	Please refer to Table 16.3 – Water Hydrogeology and Hydrology for mitigation measures associated with the surface water treatment.
Increased discharge to foul drainage network	Water conservation measures such as dual flush water

Character of potential impact	Mitigation measure
	cisterns and low flow taps will be included in the design.
Increased potable water consumption	Water conservation measures such as dual flush water cisterns and low flow taps will be included in the design.
Contamination of surface water runoff from foul sewer leaks.	All new foul drainage lines will be pressure tested and will be subject to a CCTV survey in order to identify any possible defects prior to being made operational.

16.10 Archaeology & Cultural Heritage

Character of potential impact	Mitigation measure
Construction Phase	
Direct, negative, significant – impact on three archaeological pit features	The three pits within Field 2 will be subject to preservation by record prior to the commencement of construction. This work will be carried out by a suitably qualified archaeologist under licence and in consultation with the National Monuments Service of the DoCHG and the National Museum of Ireland. Archaeological preservation in-situ prior to the commencement of construction (excavation).
Direct, negative – impact on archaeological remains outside of the test trench footprints	Archaeological monitoring of topsoil stripping.
Operational Phase	
N/A	N/A
NOTE: All mitigation measures expressed in respect of Archaeology are subject to the approval of The Department of Arts, Heritage Regional, Rural and Gaeltacht Affairs (DAHRRG) and the relevant local authorities. As the statutory body responsible for the protection of Ireland’s archaeological and cultural heritage resource, the DAHRRG may issue alternative or additional recommendations.	