LAND PLANNING & DESIGN

Environmental Impact Assessment Report

Volume 1 – Updated Main Report in response to Request for Further Information for An Bord Pleanala dated 6th February 2019

Comhairle Contae Átha Cliath Theas
South Dublin County Council

Prepared by **Cunnane Stratton Reynolds** in Association with

CUNNANE STRATTON REYNOLDS
LAND PLANNING & DESIGN

~~July 2017~~ December 2019

CATHAL CRIMMINS

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ROUGHAN & O'DONOVAN

Updated Environmental Impact Assessment Report in response to Request for Further Information from An Bord Pleanala dated 6th February 2019

Volume 1 - Main Report

Proposed Dublin Mountains Visitor Centre

~~July 2017~~ December 2019

Prepared by **Cunnane Stratton Reynolds**

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PREFACE

Response to the Request for Further Information from An Bord Pleanala

The applicant's agent, Paul Keogh Architects received a Request for Further Information dated 6th February 2019. The letter from the Board in respect of the above requested the following from the applicant:

- The undertaking of additional bird surveys in optimal conditions to ensure that, having regard to the precautionary principle, the potential impact on merlin as a qualifying interest of the Wicklow Mountains Special Protection Area (Site Code 004040) has been fully addressed;
- The preparation and submission of a Natura Impact Statement including mitigation proposals to address any potential likely significant effects of the proposed development either individually or in combination with other plans or projects, on European sites in view of the sites' Conservation Objectives; and
- In relation specifically to biodiversity undertake the relevant sections of the EIAR to incorporate the results of these surveys.

It is in the context of the last item above that the submitted EIAR from July 2017 has been updated in the context specifically related to biodiversity. The applicant has also been requested by the Board in their letter of 6th February to incorporate the results of necessary surveys and any mitigation measures that are require to address the likely significant impacts from the proposed development. The Board's letter additionally requires that additional surveys and monitoring be undertaken during recognised optimal conditions, inter alia, of vegetation and habitats, protected species including bats and otter, and chemical substances and freshwater invertebrates upstream and downstream of the surface water discharge point in Glendoo Brook.

Please note that the appendices to the originally lodged EIAR remain unchanged in this EIAR update except for Chapter 6 (Biodiversity) Appendices to updated Chapter 6 are identified with a 'S' prefix ie. S1-Merlin Survey Report.

Those updates and amendments in this EIAR related to the update of surveys and assessments of the impact of the proposal in the context of biodiversity are identified in green text to be distinguished from the update and additional text required as a result of updating the EIAR in the context of EU Directive 2014/52/EU which amends codified Directive 2011/92/ EU. Updates and additional text in the context of the 2014/52/EU Directive is shown in red text.

Updates in the Context of EU Directive 2014/52/EU and the European Union (Planning and Development) (environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018)

Although not specifically required in the Board's letter Requesting Further Information dated 6th February 2019 the applicant has taken the opportunity to update the previously submitted EIAR in the context of additional requirements contained within *EU Directive 2014/52/EU* and the *European Union (Planning and Development) (environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).* In updating this EIAR the applicant and their technical team have had regard to *Guidelines for Planning Authorities and An Bord Pleanala on Carrying Out Environmental Impact Assessment* published in August 2018 and also the Environmental Protection Agency's *Draft Guidelines on the Information to be Contained Within Environmental Impact Assessment Reports* published in August 2017.

As indicated above where amendments and updates are required as result of the above legislation and guidelines specifically additional text is shown in red. For example Climate Change, Major Accidents and Disasters and use of natural resources are considered within each of the relevant chapters.

Where text is required to be deleted text is struck through where necessary (ie ~~strike through~~)

This EIAR Update should be considered along with the submitted material in response to the Board's request including the accompanying Natura Impact Statement undertaken by Roughan & O'Donovan.

NON TECHNICAL SUMMARY

POPULATION & HUMAN HEALTH

The Population and Human Beings chapter of the Environmental Impact Assessment Report (EIAR) has been prepared by Cunnane Stratton Reynolds Ltd. The assessment of impact on population and human beings is based on the EPA's Advice Notes for Preparing Environmental Impact Statements (Draft September 2015).

For the purpose of population and demographic analysis a study area was defined comprised of nine electoral districts (EDs), including Bohernabreena in which the Hell Fire and Massy's Wood site is located, and eight adjoining EDs to the north, west and east. The key population demographic features of the nine EDs are as follows. In 2016 the area had a population of 50,338. Bohenrabreena, the ED in which the site is located, is the only ED that experienced population decline between 2011 and 2016. The majority of the population and the greatest population growth was concentrated in the EDs extending into the urban area to the north. The area has a high percentage of young people. The average age of seven of the nine EDs is lower than the national average – in some significantly lower. In all but one of the EDs a greater percentage than the national average classify themselves as being in 'good health'.

In summary, the receiving environment of the site/proposed development is characterised by a growing population with a high proportion of younger people in good health. It can be surmised that this population has a high demand for active outdoor recreation options.

The population forecasts presented in the South Dublin County Development Plan 2016-2022, by the CSO and the Dublin Regional Planning Guidelines, both suggest an increase in South Dublin's population of approximately 7.4% over this period. A significant proportion of this population growth is likely to occur in lands zoned for residential development around the southern edge of the urban area, within 2km of the site.

The EPA Guidelines and Advice Notes identify sensitive receptors as neighbouring landowners, local communities and other parties which are likely to be directly affected by the project. In particular homes, hospitals, hotels and holiday accommodation, schools and rehabilitation workshops and commercial premises are noted. Regard is also given to transient populations including drivers, tourists and walkers. The Geodirectory was used to identify addresses within a 1km radius of Steward's (Killakee) House - the closest address point to the proposed development, to identify receptors potentially directly affected by the proposed development. This identified 31 residential addresses and 11 commercial addresses (which include farms). The addresses include:

- Three houses directly to the south of the Hell Fire property to the west of the R115, and another house a short distance further south;
- Steward's House immediately to the north of the Hell Fire property to the west of the R115. This was previously in use as a restaurant but is now used as a residence;
- A linear cluster of houses extending north from Steward's House along the R115 west of the road, two of which are located up the hillside behind the roadside houses, backing onto the Hell Fire property;
- A farm/large agricultural enterprise (and houses) north of these houses;
- A cluster of five houses directly north of Massy's Wood east of the R115, between the site and the Timbertrove property;
- Timbertrove, an extensive timber products manufacturing and resale enterprise which has an attached homeware shop and café;

- A row of houses and rural enterprises including farms and a livery yard north of Timbertrove to the east of the R115.

The adjacent and local farms are also potential receptors of environmental effects, not only as local population/residents but also as land uses/economic enterprises which can be impacted by recreational use in the rural environment (e.g. by trespass on property, disturbance of animals, etc.).

It is noteworthy that the number of local receptors with potential to experience direct impacts is small. The immediate receiving environment of the proposed development is a relatively sparsely populated rural area.

Another significant group of potential receptors is the existing recreation users of the site. These include local people who might walk (or drive) to the site to walk off road, horse riders accessing the site along the road from nearby stables, users from the wider Dublin area who might drive or cycle to the site, and domestic and international tourists some of whom arrive by coach. Additionally, the site is well used by school groups accessing the archaeological and cultural heritage features of the site.

Tourism figures indicate that there were over 10 million visitors to Ireland in 2015. There is a significant 'home holiday' market of approximately 9 million people accounting for multiple holidays. One quarter of the top 32 tourism attractions in the State are outdoor orientated parks. The top three tourist activities engaged in by foreign tourists in the period 2015 and 2016 were hiking/cross country walking, followed by cycling and golf. Significantly, Fáilte Ireland figures show that the three activities that showed the greatest growth in participation by domestic tourists between 2015 and 2016 were hiking/hillwalking, heritage/interpretive centres, and monuments. These are all features of the site and proposed development.

The impacts of the proposed development have been assessed as follows:

Potential Operational Phase Impacts

Local Residents and Businesses (Including Farms)

There will be disturbance to residential amenity in the vicinity of the site resulting from construction activity and traffic movements which may be visible and audible from nearby homes and farms. Certain construction activities (e.g. vegetation clearance, excavation and earth shaping) and erection of new structures, e.g. the parking area and the visitor centre, will be visible during construction from a small number of houses, notably the clusters of houses directly to the north and south of the Hellfire property west of the R115. Possible dust emissions from the construction activity may affect air quality locally. There will be impacts on traffic flow on the R115 as a result of construction traffic and as a result of construction works to the road corridor, although two way traffic will be maintained throughout.

The significance of these effects is considered to be minor-moderate, and adverse.

Existing Recreational Users of the Site (Including Tourists)

Construction activities and erection of new structures will be visible during construction from within the site. Construction activities will be audible on the site. Dust emissions will result from the construction activities. The existing parking area will be occupied for a period by the construction of a new replacement car park, although the construction will be phased so as to maintain the existing parking capacity on the site throughout the construction period. Access to existing trails on the site may be

temporarily, locally restricted during upgrade of the trails and construction of new sections of trail. These impacts will affect people's experience of the site, and may cause people to avoid using the site.

The significance of these effects is considered to be moderate adverse, but temporary.

Potential Operational Phase Impacts

Local Residents and Businesses (Including Farms)

There will be an minor increase in traffic to the site along the R115; the road has adequate capacity for the predicted increase in traffic. The proposed improvements to the R115 will improve the safety of all road users, including cars, but particularly for walkers and cyclists. The increased parking capacity on the site (and on-site management/marshalling capacity) will have the effect of reducing illegal parking on the R115 outside of the site, improving traffic flow and safety for all road users including cars, walkers and cyclists. The pedestrian bridge over the R115 will reduce the number of pedestrians crossing the R115, improving road safety for all users.

The visitor centre buildings will be visible from a number of houses nearby to the south, and from further away to the east of the site (Jamestown and Cruagh areas). Elements of the parking area, including the prior removal of mature trees, will be visible from a small number of houses nearby to the north of the Hell Fire property (Steward's House and the neighbouring houses), and from a wider area to the east (Jamestown and Cruagh). The presence of the structures will reduce and soften over time as new vegetation matures around the structures and in the screening belts inside the site boundary. The conversion of a large area of coniferous forest on the east face of Montpelier Hill to permanent mixed deciduous woodland will be visible from the surroundings, with beneficial visual effect - although the conversion to woodland will take time. The clearance of coniferous forest from behind the Hell Fire Club building will return the building to its original prominence on the hilltop in views from the north and east, with beneficial visual effect.

It is possible that increased usage of the site will result in an increase in nuisance and impacts to neighbouring land owners/farms, e.g. trespass and littering on their properties, and disturbance of animals. However, it is not considered that the formalisation and improvement of visitor facilities will attract nuisance-causing users. It will more likely attract more responsible/considerate types of users. The increase in usage and a presence of permanent staff on the site with management responsibility for parts of the site, will provide passive surveillance and discourage nuisance behaviour. Improved information (on signage, maps available at the visitor centre, online, etc.) will also encourage responsible/considerate behaviour. Litter bins will be provided and a litter management plan implemented should An Bord Pléanala so wish (the Operational Management Plan includes proposals for waste management on site).

The establishment of a management steering group for the site, comprised of SDCC, Coillte and the Dublin Mountains Partnership (DMP), and the presence of an operator and the DMP volunteer rangers on site, will generally provide channels of communication and improved management/response capacity for any issues that arise as a result of increased usage or nuisance-causing activity.

The appearance, condition and management of the site will be improved overall (there is no current management plan for the existing recreational facility) and it is considered that this will have a minor to moderate positive impact on local residents and business including farms.

Existing Recreational Users of the Site (Including Tourists)

The development would result in the realisation of numerous policy objectives contained in national, regional and local policy documents, including policies relating to (a) cultural heritage and economic development including tourism, (b) recreation and open space, (c) movement strategies and human health, (d) infrastructure and environmental quality including green infrastructure, and (e) heritage, conservation and landscape. The realisation of these policies would have positive impacts on population and human health. Access to the site will be significantly improved by the improvement to the roads accessing the site including the provision of a footpath and cycle lane, and by the increased parking capacity on site. The shuttle bus service from Tallaght, along with the footpath and cycle lane, will improve access and provide more sustainable means of access to the site (compared to the current situation where car is the predominant mode of transport).

The new visitor facilities such as improved trails, heritage interpretation and education room, food, beverage and information, toilets and shelter, would enhance the majority of visitors' experience of the site – if they choose to avail of them. The amenities will widen the appeal of the site, making it suitable for people of all ages and physical abilities including the elderly, families and children. The proposed development provides an education facility which would benefit school groups and special interest groups.

The facilities are sufficiently modest in scale, in the context of the 152 ha forested/woodland site, to be avoided by users if they choose to do so. Those users wishing to arrive on site and follow a trail directly into the forested mountain landscape of the Hell Fire property, or Massy's Wood in which only minor interventions are proposed, without accessing the visitor centre, will have that option.

Health and safety will also be enhanced with improved signage and way finding, improved access for emergency vehicles, improved walking and trekking information, shelter from the elements, and facility for provision of first aid equipment such as defibrillators, blankets etc. The provision of a pedestrian bridge will reduce the potential for accidents on the R115 as will the provision of a designated cycle lane and a footpath.

A distinct tourist attraction and activity hub in the Dublin Mountains will be created. This will generate employment on the site itself, with an estimate of 14 full time equivalent positions to be created – skilled and unskilled. The local population and businesses may benefit from employment in the construction phase, and in providing services during operation. It is possible – and it is the intention of the applicant - that the development it will act as a catalyst for heritage-based tourism enterprise in the wider Dublin Mountains and South Dublin.

In summary, the suite of facilities and amenities, the appearance, condition and management of the site will be improved overall and it is considered that this will have a moderate positive impact on population and human health, including recreational users and tourists – existing and new – over the long term.

However, the development will be considered by some as the spoiling of a landscape (and its natural and cultural heritage assets) highly valued in its current condition. It is possible that increased usage of the site will be perceived as a nuisance by some existing users. The degree of significance of these effects will vary depending on the particular receptor. Some will experience the effects as highly significant and adverse.

The 'Do Nothing' Scenario

If the proposed development is not granted planning permission, the current use of the site will continue in the absence of a formal management regime. The Hell Fire forest property will remain a commercial coniferous plantation – with cycles of felling, replanting and growth – with use as a recreation amenity being secondary or ancillary. Massy's Wood will remain a mixed deciduous woodland used and managed predominantly for recreation.

If planning permission is not granted, it can be expected that recreational usage of the site will continue to grow un-managed. The private car will remain the only mode of transport available for most potential users to access the site. There will be no parallel increase in the capacity of the facilities to accommodate greater numbers or a greater variety of visitors/users, and no management facility or capacity to monitor and control visitors and manage impacts of increased usage on natural and cultural heritage assets. The archaeological and architectural heritage assets of the site will not be routinely monitored, protected, managed and repaired where needed. Access to and interpretation of the heritage assets will not be improved. The problem of illegal parking on the R115 will continue with further negative effects on traffic flow and road safety for all users. Numerous policies and objectives at national, regional and local level promoting development such as that proposed for the benefit of the local population and domestic and international tourists, and human health, will not be realised.

Remedial and Mitigation Measures

Proposed mitigation measures follow the principles of avoidance, reduction and remedy. The most effective impact avoidance and mitigation occurs during the site selection and design stage. In Chapter 4 the considerations and reasons for the selection of the site are explained in the context of alternatives considered. The design/layout and activity alternatives considered are also discussed.

In the design process, as a general approach the sensitive environmental factors were identified at an early stage and the physical elements of the development designed to avoid significant impacts. Operational management measures for the development were considered and prepared in parallel with the design to further reduce environmental impacts, and where possible to result in positive impacts,

Construction Phase

An outline Construction and Traffic Management Plan has been prepared by Roughan and O'Donovan, the project engineers, and provided under separate cover. This document provides the outline/framework for the conduct of detailed construction management practices to be agreed by the contractor, SDCC, Coillte and other stakeholders in the event of development approval.

Operational Phase

An Operational Management Plan has been prepared and submitted under separate cover. This document sets out the envisaged structure and responsibilities for management of the proposed development during operation. The measures include the establishment of a permanent management steering group comprised of SDCC, Coillte and the DMP with responsibility for:

(a) management and maintenance of the development overall, and specifically the facilities outside of the direct responsibility of the private operator;
(b) management of the contract, lease or license of the private operator of the facilities;
(c) liaison with neighbouring landowners, residents and stakeholders, facilitated through the consultation forum of the Dublin Mountains Partnership;

(d) coordination of forest operations ongoing in the western part of the Hell Fire forest property (the area largely unaffected by the proposed development), and
(e) monitoring and management programmes for:
- the trails network;
- archaeological and architectural heritage features, and
- biodiversity (specifically the Key Ecological Receptors identified in the EIA process).

The Operational Management Plan also identifies access and parking management measures including:

(a) car park monitoring and variable message signs to prevent queuing and overspill parking;
(b) the proposed shuttle bus from Tallaght;
(c) the proposed park and ride facility at Tallaght Stadium.

Construction Phase

While best practice in construction and traffic management can reduce construction impacts affecting population and human health, such as noise, dust, visual impact and traffic congestion, the effects of these cannot be entirely avoided or remedied. Nonetheless there are no significant negative impacts predicted to arise during construction, and those impacts that do arise will be temporary.

Operational Phase

It is considered that the physical elements and the Operational Management Plan would improve the operation and quality/condition of the site as a recreation and heritage appreciation facility, improve access to the site, and improve the management and condition of cultural and natural heritage resources on the site despite increased visitor usage – all with moderate positive impact on local receptors (residents, businesses and landowners) and recreational users including tourists – existing and new.

BIODIVERSITY

The process of identifying, analysing and evaluating the potential impacts of the Dublin Mountains Visitor Centre ("the proposed development") on the topic of Biodiversity, i.e. habitats, species and designated sites, was undertaken in accordance with guidance on ecological and environmental survey and assessment provided by the Heritage Council, the Environmental Protection Agency, Transport Infrastructure Ireland and the Chartered Institute of Ecology and Environmental Management. These guidelines informed the planning and conducting of field survey work, and the analysis and evaluation of the potential impacts of the proposed development on Biodiversity.

A desk study was undertaken to establish the "zone of influence" of the proposed development, i.e. the geographical area over which any effects are likely to be significant, and to examine any recent or historical records of features of ecological significance in this area, including any sites designated for nature conservation at the national or international level. As part of the desk study, statutory consultees and relevant stakeholders, e.g. the National Parks & Wildlife Service, were consulted. Field survey work carried out to establish the ecological baseline included multidisciplinary walkover surveys of the development site and an appropriate buffer zone around the site to describe and map the habitats, species and evidence of species present. Habitats were classified and mapped in accordance with guidelines published by the Heritage Council (Fossitt, 2000; Smith et al., 2011).

Dedicated surveys for rare and protected flora and fauna, as well as invasive alien species, were also undertaken during the optimal survey seasons.

Following the desk study and field surveys, Key Ecological Receptors were identified. These are features of ecological significance at the local (higher level) scale or above and should be a material consideration in the decision-making process. A total of ~~eight~~ eleven Key Ecological Receptors were identified within the study area: Red Squirrel, Pine Marten, Badger, Otter, Bats (all Irish species except Lesser Horseshoe Bat), Bryophytes and Tufa Springs, Upland Habitats, Amphibians, Invasive Plants, Birds and the Glendoo Brook. ~~ponds, invasive alien plant species, treelines and hedgerows, and Glendoo Brook. Four~~ Each Key Ecological Receptor was evaluated in terms of its conservation value on a geographical scale. The assessment analysed the potential impacts of the proposed development on these Key Ecological Receptors and characterised these impacts in terms of their magnitude, extent, duration, frequency and reversibility, thereby evaluating their significance on a geographical scale. ~~designated sites were identified within the zone of influence. However, these were not selected as Key Ecological Receptors. The Glenasmole Valley proposed Natural Heritage Area was not selected as a Key Ecological Receptor because the proposed development does not provide for any impacts whatsoever on the particular sensitivities of that site at the distance that it is removed from the site. The Glenasmole Valley Special Area of Conservation, the Wicklow Mountains Special Area of Conservation and the Wicklow Mountains Special Protection Area were not selected as Key Ecological Receptors because of the conclusions of the Appropriate Assessment Screening Report, as explained in the following paragraph.~~

The assessment determined that, in the absence of mitigation, the construction and operation of the proposed development had the potential to have significant negative effects on the Key Ecological Receptors. In light of this finding, appropriate mitigation measures were proposed, aimed at eliminating or minimising these effects. In the case of all Key Ecological Receptors, it was found that any residual effects following the application of the proposed mitigation measures would not be significant at any geographical level.

With the implementation of the proposed mitigation measures described in the EIAR, there will be no significant residual effects on biodiversity in the Zone of Influence. Furthermore, the assessment found no significant impacts arising from the cumulation of the impacts from proposed development with the impacts from other past, present or reasonably foreseeable future developments.

In addition to mitigation of the likely ecological effects on the proposed development, the biodiversity assessment also proposed a number of ecological enhancement measures aimed at having a positive impact on ecology, wherever possible.

A separate Natura Impact Statement (NIS), which complements the EIAR and vice versa has also been prepared and is provided as a separate document to this EIAR, as requested by An Bord Pleanala.

~~European Union law requires the designation and protection of sites that support examples of natural habitat types and populations of birds and other species that are of conservation importance in a European context ("European sites"). Furthermore, any plan or project not directly connected with or necessary to the management of a European site, but likely to have a significant effect thereon, either individually or in combination with other plans or projects, must be subject to an assessment of its implications for the site in view of the site's conservation objectives ("Appropriate Assessment"). The responsibility for determining whether or not Appropriate Assessment is required in respect of any plan or project and for undertaking Appropriate Assessment, where it is required, lies solely with "the competent authority", i.e. the relevant planning authority. In order to enable the competent authority to comply with this requirement, an Appropriate Assessment Screening Report was produced, which concluded on the basis of objective information and in view of the sites' conservation objectives that~~

~~the proposed development, either individually or in combination with other plans or projects, is not likely to have a significant effects on the Glenasmole Valley Special Area of Conservation, the Wicklow Mountains Special Area of Conservation, the Wicklow Mountains Special Protection Area or any other European site and, therefore, that Appropriate Assessment is not required in this case.~~

~~The Key Ecological Receptors were characterised in terms of their conservation value and assigned a level of importance on a geographical scale that increases from the local (lower value) level, through the local (higher value), county and national levels, to the international level. All of the Key Ecological Receptors identified were considered to be important at the local (higher value) scale. Similarly, the likely impacts of the proposed development on these Key Ecological Receptors were characterised in terms of their magnitude, extent, duration, frequency and reversibility, their significance evaluated on the same geographical scale.~~

~~As part of the assessment, mitigation was developed to address all of the likely significant effects of the proposed development on its Key Ecological Receptors. Mitigation included design measures such as the avoidance of particularly sensitive areas, construction methods measures such as the imposition of seasonal restrictions on certain construction activities and operational phase measures such as habitat enhancement, in addition to the implementation of best practice guidance and an Environmental Operating Plan during construction. The residual effects, i.e. those effects remaining following the inclusion of mitigation, were also characterised and evaluated as was done for the pre-mitigation impacts.~~

~~Following the full and proper implementation of the mitigation described in Chapter 6, the only likely significant residual effect on Biodiversity arising from the proposed development is a medium-term effect on Red Squirrel, which is significant at the local (higher level) scale and arises as a result of the impacts of habitat loss and fragmentation, which, given that the habitat to be lost is currently conifer plantation, would occur irrespective of whether or not the proposed development were to progress. However, the planting of native tree species as part of the proposed development will, over time, provide replacement habitat for the Red Squirrel, resulting in no significant effect in the long term. There are no other residual effects likely to be significant at any geographical scale and the proposed development is not likely to give rise to significant effects through the combination of its impacts with those of other past, present or reasonably foreseeable developments.~~

~~SOILS, GEOLOGY & HYDROGEOLOGY~~ LAND

The site is comprised of shallow depths of topsoil with granite bedrock either at, or close to, the surface. The anticipated depth to bedrock is approximately 1.5m in the car park area and approximately 1.0m at the visitor centre. The rock in this area is considered to have a low capacity to store water. Due to this and the low depth of soils, the majority of rainfall flows to the Glendoo Brook to east of Massy's Wood.

The primary effects considered in the EIA were the disturbance of soils & bedrock and pollution spillages to the soil and underlying groundwater. The proposed development has been designed to ensure that the volume of material to be excavated and disturbance to soils and bedrock is minimized. The visitor centre has been designed as a split level building and the new circulation roads and parking tiers match the existing ground levels where possible.

Ensuring that the Contractor implements a satisfactory Construction Management Plan should reduce the potential for pollution spillages. The use of competent construction methodologies will further reduce this. The risk of pollutant spillages to the soils and underlying groundwater will be mitigated by surveying drainage sewers prior to operation and the inclusion of a petrol interceptor on site.

WATER & HYDROLOGY

There is currently no surface water drainage / storage system at the site. There is a steep fall to the east from the Hellfire Club to the Massy Estate. The soil has poor water storage characteristics so the majority of rainfall flows to the Glendoo Brook to the east of Massy's Wood. The Glendoo Brook is a tributary of the Owenadoher River which is the most important nursery and recruitment tributary in the Dodder system. It performs well in a number of water quality tests performed as part of the Water Frameworks Directive and the Environmental Protection Agency sampling program indicates clean waters for the Owenadoher River. Therefore, the water quality of the Glendoo Brook can be considered to be of good quality.

The impact that an increase in surface water runoff from the proposed development would have on the existing hydrology was a key consideration in the EIA. The inclusion of a hydrobrake manhole and surface water storage features will ensure that this is reduced to a level where it is not deemed to have a significant impact.

To maintain the current water quality the potential for spillages during the construction phase and operational phase will be minimized. This will be done by ensuring that the Contractor implements a satisfactory Construction Management Plan. The implementation of competent construction methodologies will further reduce this.

The risk of pollutant spillages to the surface water will be mitigated by surveying drainage sewers prior to operation and the inclusion of a petrol interceptor on site.

AIR QUALITY, CLIMATE, NOISE & VIBRATION

The proposed development is anticipated to attract approximately 300,000 visitors per year. The existing noise climate along the R115 Killakee Road was found to be dominated by road traffic. It is predicted that the proposed development will increase the peak hour traffic flows by 56 cars. This relates to a change in noise level of +0.9 dB(A) which is considered to be a negligible impact on the noise environment.

The UK Design Manual for Roads and Bridges (DMRB) guidance (UK Highways Agency 2007) considers the predicted change in traffic volumes from the proposed development to be low enough that a local air quality assessment is not required.

There will be a small increase in general traffic noise from construction traffic, however, this is considered negligible in the overall context of the current traffic volumes and predicted traffic levels.

Noise and air impacts from the construction work itself may be experienced; however, these will be reduced by implementing the following measures:

- Noise and vibration monitoring at key receptors and along neighbouring property boundaries;
- The contractor will be required to use off-site parking and provide shuttle service to the site;
- Construction will be limited to 07:00-19:00 Monday to Friday and 08:00 and 13:00 on Saturdays. No works will be allowed to take place on Sundays and bank holiday weekends which are the busiest time at the Hellfire Club.

LANDSCAPE & VISUAL IMPACT

The landscape sensitivity of the receiving environment of Montpelier Hill and Massy's Wood are classified differently.

Montpelier Hill is classified as being of Medium Sensitivity reflecting its robust working commercial forest whilst still a much loved and visited destination, containing panoramic views, a range of heritage features and experiences of nature.

Massy's Wood is classified as being of High Sensitivity reflecting its broadleaved woodland amenity character, with a strong biodiversity function, numerous heritage features and ruins and its distinctive romantic and magical character.

The proposed development consists of

- New Visitor Centre, associated parking and infrastructure including the tree canopy bridge located on the lower slopes of Montpelier Hill;
- Enhanced amenities, trails, interpretation and presentation of built and cultural heritage – throughout both Montpelier Hill and Massy's Wood;
- Landscape change to the northeast slopes of Montpelier Hill seeing the phased transformation of the commercial forestry plantations to native broadleaved woodland.

The Magnitude of Landscape Change is categorized as Low - Change that is moderate or limited in scale, resulting in minor alteration to key elements features or characteristics of the landscape, and/or introduction of elements that are not uncharacteristic in the context. Such development results in minor change to the character of the landscape.

In Massy's Wood the Magnitude of Landscape Change should be regarded as Negligible - Change that is limited in scale, resulting in no alteration to key elements features or characteristics of the landscape, and/or introduction of elements that are characteristic of the context. Such development results in no change to the landscape character.

The Significance of the Landscape Change is Low to Moderate.

The construction of new buildings and parking facilities could be regarded as intrusive in such a location. However the values associated with the receiving environment, the sensitive design of the new centre and its infrastructure, and the context of Enhanced Amenities and the long term landscape development proposed suggest the Quality of Landscape Change is Beneficial – "Improves landscape quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses."

In terms of landscape change only the new buildings and associated infrastructure, and the landscape change to the north east of Montpelier Hill will have visual effects. The Enhanced Amenities relate to the character of the site at a very local/detailed level and are improvements to what is already there rather than change, with beneficial effects. Therefore visual effects relate primarily to changes on Montpelier Hill and its interface, via the new tree canopy walk, with Massy's Wood.

30 viewpoints were assessed over three Zones:

- Zone A – Within the site;
- Zone B - Immediate Environs and Middle Distance;

- Zone C - Viewpoints within the wider landscape/long distance.

All but two of these viewpoints will experience change that will be neutral or beneficial in qualitative terms, although the significance ranges from Very Significant to Slight or Not Significant. The two viewpoints that experience adverse impacts are located within the site and this effect relates to the short term impacts of the improvements and extensions to the car-park. Over time the effects here mitigate to neutral and beneficial as the new landscape establishes itself.

The project is benign in landscape terms. A much valued site with existing high visitor numbers is recognised as having potential to be a gateway location to the wider Dublin Mountains experience. To develop this opportunity requires a visitor facility / building and improved parking and services, but also a transformation of the landscape offer / experience in terms of trails and walks, interaction with natural and cultural heritage and the transformation of the commercial forest plantations to permanent broadleaved woodland with the resultant net benefits to landscape, biodiversity and amenity. The above analysis indicates that site selection and sensitive design has minimised the potential adverse effects so that they are now confined to localised impacts within the site for a short time frame. In landscape and Visual terms the proposed development protects and enhances landscape and visual amenity in the medium and long term and is an appropriate change to the receiving environment.

ARCHAEOLOGY AND CULTURAL HERITAGE

The Dublin/Wicklow Mountains are an area of huge archaeological significance and contains a multitude archaeological sites which date from the Neolithic to the early modern period. The Coillte land holdings at Montpelier Hill and Massey's Woods alone contain the remains of two Neolithic passage tombs, a Bronze Age wedge tomb, a standing stone, an enclosure, and the well-known Hell Fire Club, an early 18th century hunting lodge that was built using masonry from the adjoining passage tombs. Non-invasive investigations such as aerial photography and geophysical survey suggest that there are further potential features on Montpelier Hill.

The archaeological sites within the Coillte land holdings form part of the wider archaeological landscape of the Dublin and Wicklow Mountains region. The distribution of megalithic tombs suggests a strong similarity with other well-known complexes such as those at Brú na Boinne in the Boyne Valley, county Meath and Carrowkeel and Keshcorran in Sligo, which are of international significance. As well as being of archaeological significance the Hellfire Club is also of historic and cultural interest as a result of its connection with the 18th century gentleman's club of the same name, its occult associations and the rich folklore that has grown up around the site.
Issues relating to the access, safety, vandalism, major accidents and climate change were noted however. Additionally, some of the sites including the passage and wedge tombs are not easily discernible to average visitor.

The purpose of the proposed visitors centre at Montpelier Hill is to highlight the Dublin Mountains as a heritage and recreational resource and will draw on the result of recent archaeological investigations. As with the architectural features on site, a minimal intervention approach has been adopted. In conjunction with the proposed visitors centre it is proposed that access and signage around the various sites be improved. Issues relating to the condition of upstanding monuments and anti-social behaviour and the ongoing maintenance of the site are also to be addressed. The potential impacts of the proposed visitors centre, associated services, the car park and landscaping on any underlying archaeological features as well as the long term maintenance of the site has also been considered.

ARCHITECTURAL HERITAGE

The land holdings at Montpelier Hill and Massy's Wood contain a large number of buildings and other structures. These include the 18th century Hellfire Club which was designed by Edward Lovett Pierce

as a hunting lodge for William Connoly, Speaker of the Irish House of Commons from 1715 – 1729. Another significant feature are the early 19th century walled gardens designed by Sir Ninian Niven containing the remains of glass houses designed by Richard Turner, both of whom were previously involved in the design of the National Botanic Gardens in Glasnevin. Other structures within the designed landscape include the remains of a mill complex, sluice, Ice house, gothic gate lodge, numerous stone bridges and the only surviving section of the early 19th century Military Road that has not been paved over.

Though of considerable architectural significance most of these structures have been affected by long term neglect or have become overgrown, obscuring features and causing damage to masonry and brickwork, whilst other structures have been affected by vandalism. Potential issues associated with major accidents and climate change were also considered.

Under the current project and taking a minimal intervention approach, it is proposed that repairs will be carried out to both the Hellfire Club and the structures within Massy's Woods in order to make them safe, address issues associated with vandalism and anti-social behaviour, improve access and to reveal features which are currently obscured. The proposed works will be followed by a program of regular monitoring and repair where necessary to ensure their survival as a heritage resource.

MATERIAL ASSETS - FORESTRY

The proposed development will take place on a site comprising two Coillte owned forest properties. Therefore, forestry – as a material asset - was included in the environmental impact assessment. The forestry consultancy Veon prepared the assessment of the forest resources, and this also informed the landscape development proposals.

The forests across the two properties are very diverse, ranging from commercial plantations to native woodlands of all ages. The range of benefits that these forests deliver is also diverse, extending beyond basic timber production to encompass bio-diversity, wildlife conservation, environmental protection, rural development, carbon sequestration, amenity and recreation, and tourism.

Although considerable overlap does occur, the forests can be roughly divided into two types, amenity to the east (Massy's Wood) and timber production forests (The Hell Fire Club) to the west. Both forest properties are managed under the principles of sustainable forest management and are certified by the Forest Stewardship Council (FSC). Coillte's primary focus for its properties is the production of high quality timber and this is the case for the Hell Fire forest; however, given the species breakdown in Massy's Wood high quality timber production would be of lesser concern.

Hell Fire Wood is almost entirely coniferous with a range of ages present including areas recently clear-felled and replanted, areas of mature forest due for harvesting/clear-felling in the near future and middle forest management.

Massy's Wood, by contrast is predominantly broadleaved woodland of beech and oak, ash, fir, larch and spruce. There are some areas of coniferous plantations and specimen trees from the original Killakee demesne, species such as Giant Sequoia, Monkey Puzzle, West Himalayan spruce, Monterey Pine, and Western red cedar. In places, exotic invasive species such as Cherry laurel and rhododendron have a strong hold and are being cleared and reduced. Whilst predominantly a recreational forest with a high biodiversity function, woodland management works are ongoing with areas of beech wood thinned in 2016.

As a result of the already high amenity values in Massy's Wood, it is not proposed to carry out any large interventions that would greatly affect the forest's character or significance as an asset. Smaller operations such as repairing the wall structure in the walled garden, building a treetop foot bridge and ongoing forest enhancement management to promote amenity and nature conservation will be carried out.

The western section of The Hellfire Club (west of the summit of Montpelier Hill) will continue to be managed as a commercial conifer plantation. This part of the property has a species mix of predominantly Sitka spruce, ranging from one year to approximately 25 years of age. There is a good road network through this area of the forest, which is also used by walkers and for horse riding.

The eastern part of the property – an area of 26.12 ha - is the focus of the development proposals and will undergo a phased plan of conversion from coniferous forest into a predominately broadleaved woodland. As a result, the value of the land – as a forest asset – will depreciate.

The affected area can be divided into nine separate sub compartments or plots with distinct forest characteristics. The most significant physical element of the proposed development is the expanded parking area and this would be located in the area of Plot 1. Plot 1 is located above the existing car park. The species composition is predominately Douglas fir. The majority of the trees have reached their critical height and are beginning to blow down and snap. The prevailing wind blows from the south west, and with the adjacent Plot 3 having been clear felled in 2016, Plot 1 has become more exposed. The development will require the trees in Plot 1 to be removed. It is proposed that where possible, any broadleaves present should be retained. Replanting in the area, after construction of the car park, should include oak, rowan, cherry, hazel, alder, birch, holly and scots pine. For the other plots, various strategies are proposed. These include re-planting of clear-felled areas, partial clearance to encourage development of a deciduous understorey or facilitate safe walking, enrichment planting with deciduous species, and pruning to open particular views from the site.

MATERIAL ASSETS - ROADS, TRAFFIC & TRANSPORTATION

Visitor Numbers

The Hell Fire and Massy's Wood forest properties are currently estimated to be visited by 100,000 people per annum, nearly a quarter of the total estimate of 435,000 visitors to the Dublin Mountains. It has been estimated that visitor numbers to the proposed development will reach 225,000 over five years, and could achieve 300,000 over a further five years of operation. This includes increases in domestic/local amenity visitors, domestic and international tourists, school groups and corporate visitors. Weekend demand is expected to double on average due to greater spread across the week with growth of tourist visits. Longer duration visits are expected due to expanded range of activities on site. A large increase to 4 hours has been assumed.

Access Proposals

a) It is proposed to improve pedestrian and cyclist facilities along Killakee Road and Gunny Hill for access from the nearby urban area. A footpath of between 1.5m and 2.0m wide will be provided along these roads to the site at Hell Fire Wood.
b) A shuttle bus service is proposed to the site from Tallaght LUAS stop and Public Transport Hub at Tallaght Town Centre over a 7.5km long route via Oldbawn and Ballycullen. A 20 to 30 seater midi-coach will operate at 15 to 30 minute frequency to provide the required capacity.

c) A Park & Ride facility with 400 parking spaces is proposed at Tallaght Stadium located at Whites town Way just south of the N81 Tallaght Bypass. This will be served by the proposed shuttle bus.

d) A tree-top walkway and bridge will provide a pedestrian link over Killakee Road into the adjoining Massy's Estate, which will also be served by the visitor centre and parking at Hell Fire Wood.

e) Three traffic access routes are available from the Dublin city direction to Hell Fire Wood converging on Killakee Road via Stocking Lane from Rathfarnham, from M50 Junction 12 via Ballycullen Road and from Tallaght via Oldbawn Road and Killininny Road to Gunny Hill through Woodstown.

Public Transport Demand

a) Mode Share assumptions in the Transport Impact Assessment are:
- 30% by car and 70% by public transport for international tourists;
- 70% by car and 30% by public transport for domestic tourists;
- 100% by car for local amenity users to estimate maximum potential parking demand;
- 70% by car for local amenity users to estimate maximum potential shuttle bus demand;
- Average Mode Share by car is projected to range between 56% and 71% depending on the degree of shift by local amenity users to the proposed new public transport service.

b) Estimated demand for the proposed Shuttle Bus: 770 passengers daily / 120,000 passengers annually.

Car Parking

a) Estimated car park demand is for between 227 and 270 spaces at peak, depending on the mode share by public transport

b) The existing car park at Hell Fire Wood will be expanded from 75 car spaces to 275 car spaces and 5 coach spaces to cater for the additional number of visitors expected in the worst-case demand scenario.

c) If a reasonable mode shift occurs to public transport for local amenity visitors, there should be spare car parking capacity of 48 spaces (21%) at the times of peak demand in the summer.

d) A permanent electronic car park monitoring system will be provided to record the occupancy rate at the Hell Fire Wood Car Park. This will link to Variable Message Signs (VMS) to the north on the two main approach routes from the city and M50 directions. At unusually busy periods the VMS signs will alert drivers to the lack of parking spaces at Hell Fire Wood and will instead direct them to the Park & Ride site.

e) Visitor centre personnel will provide a Car Park Marshal Service at peak periods and to manage any risk of overspill parking on Killakee Road.

Traffic Impact

a) Traffic surveys were undertaken on Killakee Road at the Hell Fire Wood car park and the Gunny Hill junction to the north in November 2016 and June 2017.

b) The peak hourly traffic flow on Killakee Road north of the Hell Fire Wood car park entrance was 244 vehicles per hour on Sunday 4th June between 3pm and 4pm. In that hour the number of vehicles entering and exiting from the Hell Fire Wood car park was 111, which is 45% of the total traffic in Killakee Road. The average traffic flow in and out of the car park in the busiest 6 hours was 91 vehicles per hour.

c) The projected peak period traffic flow in and out of the extended car park is estimated as 165 vehicles per hour, which is an increase of 54 vehicles per hour, 50% approximately, compared to the existing peak traffic of 111 vehicles per hour recorded on Sunday 4th of June 2017.

- Peak Traffic on Killakee Road will increase from 244 vehicles per hour by 54 to approximately 300 vehicles per hour, an additional 23%.
- A single carriageway rural road has capacity for about 1,800 vehicles per hour, so Killakee Road will operate at about 17% of capacity with the visitor centre development.
- At the Gunny Hill junction the peak hour traffic movements will increase from 373 to 427 vehicles per hour (+14%). The peak traffic demand at the junction is only approximately 20% of the capacity. This junction will easily cater for the minor level of traffic increase expected due to the proposed visitor centre expansion.

Conclusions for Transport Impacts

a) Significantly improved accessibility will be provided to the proposed Hell Fire Wood Visitor Centre by public transport, walking and cycling, which will support a significant mode shift from the current reliance on private car access;
b) The main target market for the growth of visitor numbers to the Dublin Mountains at the Hell Fire Wood is aimed at international and domestic tourists. These visitors are much more likely to use public transport to reach the site than the local amenity visitors;
c) Peak spreading across the week will reduce the current peaks in demand at the site, and will balance the daily demands to less than a proportional increase in line with the overall annual increase in visitor numbers;
d) More than sufficient increase in car parking capacity will be provided at the site to cater for the projected demand and to avoid risk of overspill parking on the public road;
e) The access roads to the site are suitable in layout and will not be impacted significantly by the proposed development;
f) A fully sustainable transport access strategy will serve the site.

INTERACTIONS

The Interactions chapter (Chapter 15) discusses the main interactions between the different aspects of the environment likely to be significantly affected by the proposed development in addition to cumulative impact.

The table below provides a matrix summarising the interactions between the various environmental topics addressed in the EIAR. The matrix identifies where there is potential for the environmental topic in the left-hand column to have an effect on the topic listed in the top row of the matrix. If there is the potential for an effect during the construction phase of the development, this is indicated by a ‘C’. An ‘O’ indicates the potential for an effect during the operational phase and ‘CO’ indicates the potential for effects during both the construction and operational phases. If there is considered to be no potential for significant interaction of effect, this is indicated by ‘-‘. This assessment was based on information contained within this EIAR, and the outcome of discussions and interactions between the EIA team and the design team.

Potential Interaction of Environmental Effects

Key Environmental Interactions Matrix	Population & Human Health	Biodiversity	Soils, Geology & Hydrogeology	Water & Hydrology	Air, Noise & Vibration	Landscape & Visual Resources	Archaeology & Cultural Heritage	Architectural Heritage	Material Assets - Forestry	Roads, Traffic & Transportation
Population & Human Health		O	-	-	-	-	O	O	-	CO
Biodiversity	CO		-	CO	-	O	-	-	CO	-
Soils, Geology & Hydrogeology	-	-		CO	-	-	-	-	CO	O
Water & Hydrology	-	CO	-		-	-	-	-	CO	O
Air, Noise & Vibration	C	-		-		-	-	-		CO
Landscape & Visual Resources	CO	CO	-	-	-		-	-	CO	-
Archaeology & Cultural Heritage	O	-	-	-	-	-		-	-	-
Architectural Heritage	O	-	-	-	-	-	-		-	CO
Material Assets - Forestry	-	-	-	-	-	-	-	-		-
Roads, Traffic & Transportation	CO	-	-	-	CO	-	-	C	-	

All of the interactions identified are discussed in Chapter 15. Some of the key interactions are outlined below. No additional interactions have been identified arising from the additional Biodiversity surveys and no significant change to the already specified interactions have been identified.

Population and Human Health; Biodiversity; Archaeology and Culture; and Architectural Heritage; Roads, Traffic and Transportation

The main impact on population and human health – and the intended outcome of the development - will be increased usage of the site for recreation by the local community, the wider Dublin population, domestic and international tourists and other groups, e.g. schools, special interest groups, and corporate groups. The increased usage of the site will have effects on other environmental aspects.

During operation, increased use of the site may result increased disturbance to certain habitats and species. Key Ecological Receptors have been identified and it is not predicted that any will experience significant negative impacts from increased usage of the site. It is expected that most users will stay on the trails network, which will largely remain the same in extent, so the area of disturbance by human presence will not expand significantly although the footfall in the affected area (the trails) will. A successful and well managed woodland park can be well-used by people and remain rich in biodiversity, if managed. A monitoring and management programme is proposed which will identify if any negative impacts are arising from use, and prescribe mitigation measures if necessary.

During operation, increased use of the site may result increased access to and potential disturbance of archaeological and architectural heritage features. An initial reparation programme is proposed, and thereafter regular monitoring of the effects of increased use of the site on these features, with mitigation

measures to be put in place if necessary. These resources are predicted to be better managed (and in better condition) as a result of the development over time.

Biodiversity; Population and Human Health; Water and Hydrology; Landscape and Visual Resources, and Material Assets

During construction there will be vegetation/habitat loss and disturbance of wildlife which will have a temporary negative impact on people's enjoyment of the site.

During operation there will be habitat enhancement as commercial coniferous forest is replaced with mixed deciduous woodland, and the drainage system creates new habitat, and operational management measures take effect (e.g. monitoring of the identified sensitive species and habitats, and responsive management for their protection). This will have a long term positive impact on the landscape and views, and people's enjoyment of the site.

During the operation the replacement of coniferous forest with amenity woodland will reduce the value of the forest as a material asset, but this accepted by Coillte as the asset owner and is in line with Coillte's policy to promote recreation and biodiversity on a proportion of its property portfolio.

Landscape and Visual Resources; Population and Human Health; Biodiversity, Material Assets (Forestry)

During construction and for a short period thereafter the landscape will be disturbed and views will be compromised locally, affecting people's residential amenities and visitors' enjoyment of the site. During operation, it is predicted that the landscape quality and views will improve and continue improving over time, as the large area of mixed deciduous woodland on the eastern face of Montpelier Hill matures and the other physical improvements to the site including the introduction of an attractive building take effect. The effects on the landscape and views will in turn have a beneficial impact on people's enjoyment of the site.

The landscape changes, notably the conversion of coniferous forest to woodland, the surface water drainage features, and proposals for restoration of the Glendoo Brook corridor and associated trail realignment, will have positive impacts on biodiversity. The effects of increased usage of the landscape for recreation on biodiversity will be monitored and managed.

The landscape change on part of the Hell Fire forest property (an area of 26 ha excluding areas to be occupied by the expanded parking area, buildings and any new trails, etc.), from productive coniferous forestry to mixed deciduous woodland managed for amenity and biodiversity, will reduce the value of the property as a forest asset.

Archaeology and Cultural Heritage; Architectural Heritage and Population and Human Health

During construction all excavation and construction works with potential effects on archaeological features will be preceded by test excavations by a licensed archaeologist, subject to requisite ministerial consent and permissions. These investigations may increase understanding of the archaeological landscape of the Dublin Mountains. Any information recovered will be incorporated in to the exhibition in the visitor centre along with information gathered from archaeological excavations at the Hell Fire Club in 2015 and 2016.

Reparation works and minor interventions are proposed to improve the condition of the Hell Fire Club and its safety for visitors. Vegetation clearance is proposed in the Massy's Wood walled garden, for protection

of the structure and better appreciation by visitors. A programme of initial inspection and repair if necessary, followed by annual monitoring of condition/effects of visitors and mitigation measures if necessary is proposed for all architectural heritage features. The effects of this will be improved condition and protection of the architectural heritage, with benefits for visitors to the site – existing and new.

During operation the proposed interpretation of the site archaeological, cultural and architectural heritage, and associated opportunities for education and tourism development, will increase the attractiveness of the site for visitors, and increased usage will benefit the population and human health.

Roads, Traffic and Transportation; Population and Human Health; Architectural Heritage

During construction, there will be an increase in traffic on the road although two-way vehicular flow will be maintained throughout. A Construction and Traffic Management Plan will be implemented to ensure that any traffic based threat to traffic flow and roads, cyclist and pedestrian safety is minimised.

The increase in traffic to the site during construction and operation is not predicted to cause a significant noise impact on the local population.

During construction, the localised widening of the R115 along the Massy's Wood frontage will impact on the estate boundary wall, and the setting of the gothic lodge located close to the wall near the Massy's entrance. Careful road widening, including a small buried retaining wall to accommodate the level difference between the road and the ground level at the gate lodge, will ensure no damage to the building, and the western elevation of the gate lodge will become the boundary at this point, revealed to public view (the lodge is currently hidden from view).

During operation, the provision of a footpath and cycle lane on the R115 will improve accessibility and safety along the road for all modes of transport, with significant positive impact. The provision of a shuttle bus from Tallaght to the site will constitute a further significant positive impact by making the Dublin Mountains more accessible to more people.

During operation, increase in parking provision on the site, combined with an on-site capacity for parking management, will reduce illegal parking on the R115 and associated safety risks for all road users. The provision of the pedestrian bridge over the R115 will reduce the number of pedestrians crossing the road, with further road safety benefits.

Cumulative Impacts

No other projects or plans have been identified which would result in significant negative cumulative impacts. Other initiatives to improve access to and appreciation of the Dublin Mountains landscape, natural and cultural heritage resources (e.g. those of the DMP, Coillte and SDCC) could increase use of the site by visitors, but this is intended and no significant negative impacts are predicted to arise as a result.

1.0 INTRODUCTION, SCREENING AND SCOPING

1.1 INTRODUCTION

This Environmental Impact Assessment Report (EIAR) has been prepared in respect of the proposed development of a Dublin Mountains Visitor Centre on a site of 152ha comprised of Coillte's Hell Fire and Massy's Wood forest properties in the townlands of Mountpelier, Killakee and Jamestown in South County Dublin.

The EIAR has been prepared by Cunnane Stratton Reynolds Ltd (CSR) on behalf of South Dublin County Council (SDCC) and its partners in the proposed development, Coillte and the Dublin Mountains Partnership (DMP)[1]. The EIAR is submitted in support of an application by SDCC to An Bord Pleanála for approval under Section 175(3) of the Planning and Development Act 2000 as amended (hereafter referred to as the Act).

The EIAR has been prepared with regard to the following legislation and guidance documents:

- EIA Directives 85/337/EEC, 2011/92/EU and 2014/52/EU;
- Planning and Development Act 2000, as amended;
- Planning and Development Regulations 2001, as amended;
- *Guidelines on the Information to be Contained in Environmental Impact Statements* 2002 (Environmental Protection Agency);
- *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* 2003 (Environmental Protection Agency);
- *Revised Guidelines on the Information to be Contained in Environmental Impact Statements* Draft September 2015 (Environmental Protection Agency);
- *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* Draft September 2015 (Environmental Protection Agency).

The new EIA Directive (2014/52/EU) was due to be transposed into Irish law by 16 May 2017. In May 2017 the Department of Housing, Planning and Local Government issued a Circular Letter (PL1/2017) providing advice on the administrative provisions regarding implementation of Directive 2014/52/EU. In the letter it was clarified that where screening for EIA had commenced prior to 16 May 2017 (as was the case for the subject project), that screening process should be carried out in accordance with Directive 2011/92/EU. Where it was determined through the screening process that EIA is required, and where the application for approval and accompanying EIAR would be submitted to a planning authority on or after 16 May 2017 (as is the case for the subject project), then it should be dealt with in accordance with Directive 2014/52/EU. The preparation of this EIAR has taken account of this advice.

1.2 ENVIRONMENTAL IMPACT ASSESSMENT SCREENING

The obligation to conduct EIA under Irish law arises under Section 172(1) of the Planning and Development Act (until it is amended to transpose Directive 2014/52/EU), which must be interpreted and

[1] The Dublin Mountains Partnership was set up in May 2008 with the aim of improving the recreational experience for users of the Dublin Mountains, whilst recognising the objectives and constraints of the various landowners. The partner organisations involved are Coillte, South Dublin County Council, Dun Laoghaire Rathdown County Council, Dublin City Council, National Parks and Wildlife Service and the Dublin Mountains Initiative, an umbrella group representing the recreation users of the Dublin Mountains.

applied in accordance with the Directive 2011/92/EU. The EIA screening process described below was carried out accordingly.

Section 172(1) of the Act provides for mandatory EIA where the particular threshold for the relevant class of development is exceeded. Section 172(1) also requires that EIA be carried out in respect of sub-threshold development where the planning authority or the Board determines that the development would be likely to have 'significant effects on the environment'. Section 172(1) provides as follows:

> *"(1) An environmental impact assessment shall be carried out by the planning authority or the Board, as the case may be, in respect of an application for consent for proposed development where either—*
>
> *(a) The proposed development would be of a class specified in—*
>
> *(i) Part 1 of Schedule 5 of the Planning and Development Regulations 2001, and either—*
>
> *(I) such development would exceed any relevant quantity, area or other limit specified in that Part, or*
>
> *(II) No quantity, area or other limit is specified in that Part in respect of the development concerned, or*
>
> *(ii) Part 2 of Schedule 5 of the Planning and Development Regulations 2001 and either—*
>
> *(I) such development would exceed any relevant quantity, area or other limit specified in that Part, or*
>
> *(II) No quantity, area or other limit is specified in that Part in respect of the development concerned, or*
>
> *(b)(i) the proposed development would be of a class specified in Part 2 of Schedule 5 of the Planning and Development Regulations 2001 but does not exceed the relevant quantity, area or other limit specified in that Part, and*
>
> *(ii) The planning authority or the Board, as the case may be, determines that the proposed development would be likely to have significant effects on the environment."*

The Planning and Development Regulations 2001, as amended (hereafter referred to as the Regulations) identify:

- the development classes which should be subject to mandatory EIA (Part 1 of Schedule 5);
- the classes of development which should be subject to EIA where they exceed a certain threshold of scale (Part 2 of Schedule 5);
- the classes of development which should be subject to EIA (Part 2 of Schedule 5) where the planning authority or the Board determines that they would be likely to have significant effects on the environment due to the characteristics of the proposed development, the location of the site, or the characteristics of the potential impacts (Part 2, Schedule 7).

The proposed development can be classed as 'Tourism and Leisure' development, the class of development identified in Article 12, Part 2, Schedule 5 of the Regulations. The proposed development does not comply explicitly with any of the particular development descriptions (a) to (e)[2] of Article 12.

[2] Article 12, Part 2, Schedule 5 of the Regulations*:*
"12. Tourism and leisure
(a) Ski-runs, ski-lifts and cable-cars where the length would exceed 500 metres and associated developments.
(b) Sea water marinas where the number of berths would exceed 300 and fresh water marinas where the number of berths would exceed 100.
(c) Holiday villages which would consist of more than 100 holiday homes outside built-up areas; hotel complexes outside built-up areas which would have an area of 20 hectares or more or an accommodation capacity exceeding 300 bedrooms.

Therefore it does not exceed any threshold defined in Article 12 and Section 172(1) (a) of the Act does not apply.

However, Section 172(1) (b) (ii) of the Act does apply in the case of the proposed development. The development is a 'Tourism and Leisure' development and therefore should be screened for EIA in accordance with Schedule 7 of the Regulations. Schedule 7 sets out the screening criteria for determining whether a development would or would not be likely to have significant effects on the environment. These criteria include:

> *"The environmental sensitivity of geographical areas likely to be affected by the proposed development, having regard in particular to:*
> *- The absorption capacity of the natural environment, paying particular attention to the following areas:*
> *(c) Mountain and forest areas,*
> *(h) Landscapes of historical, cultural or archaeological significance."*

The site of the proposed development is in a mountain and forest area. It is also a landscape of historical, cultural and archaeological significance.

In accordance with Article 120(3)(b) of the Regulations SDCC made a request to An Bord Pleanála in February 2017 for a determination as to whether the development would be likely to have significant effects on the environment, and therefore whether an EIS (or EIAR) should be prepared in respect of the development. On the 9th of May 2017 the Board directed that an EIAR be prepared, for the following reasons and considerations:

> *"Having regard to the scale and nature of the proposed development, to its location in a sensitive but highly frequented landscape south of the Dublin built up area, to the prevalence of artefacts of cultural, historical and archaeological heritage throughout the general area and to the ecology of the area the Board considered a full and proper consideration of all the possible significant effects on the environment of the proposed amenity development and the potential for mitigation of these required that an environmental impact assessment process be undertaken. Therefore, it is considered that the preparation of an environmental impact statement is required.*
>
> *"In deciding not to accept the Inspector's recommendation not to direct that an environmental impact statement be undertaken the Board noted the Inspector's view that the historical and archaeological features of the lands had proved to be resilient to date notwithstanding the numbers of visitors to the area. However, the Board considered that the proposed development is such that further significant additional numbers of visitors will be encouraged to use the facilities provided and it is deemed appropriate that the effect of these, and other, impacts be properly assessed."*

1.2.1 Directive 2014/52/EU (Amendment of Directive 2011/92/EU)

Directive 2014/52/EU, amending Directive 2011/92/EU *on the assessment of the effects of certain public and private projects on the environment* was adopted on 16 April 2014. A new definition of the EIA process is introduced under Article 1(2) (g):

(d) Permanent camp sites and caravan sites where the number of pitches would be greater than 100.
(e) Theme parks occupying an area greater than 5 hectares."

"Environmental impact assessment" means a process consisting of:
(i) The preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);
(ii) The carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;
(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;
(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and
(v) The integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a."

The term *Environmental Impact Assessment Report* (EIAR) is adopted in the 2014 Directive, with a revised definition of the content of an EIAR included in Article 5(1):

"Where an environmental impact assessment is required, the developer shall prepare and submit an environmental impact assessment report. The information to be provided by the developer shall include at least:
(a) A description of the project comprising information on the site, design, size and other relevant features of the project;
(b) A description of the likely significant effects of the project on the environment;
(c) A description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
(d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;
(e) A non-technical summary of the information referred to in points (a) to (d); and
(f) Any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected."

Annex IV of the 2014 Directive provides further information on what should be included in an EIAR:

ANNEX IV
INFORMATION REFERRED TO IN ARTICLE 5(1)
(INFORMATION FOR THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT)

1. *Description of the project, including in particular:*
2. *(a) a description of the location of the project;*
(b) a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;
(c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity)

used;
(d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases.

3. *A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.*

4. *A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.*

5. *A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydro morphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.*

6. *A description of the likely significant effects of the project on the environment resulting from, inter alia:*
(a) the construction and existence of the project, including, where relevant, demolition works;
(b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;
(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;
(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);
(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;
(f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;
(g) The technologies and the substances used.

The description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium- term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project.

7. *A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.*

8. *A description of the 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 (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.

9. *A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.*

10. *A non-technical summary of the information provided under points 1 to 8.*

11. *A reference list detailing the sources used for the descriptions and assessments included in the report.*

1.3 PLANNING PROCESS FOR THE PROPOSED DEVELOPMENT

Article 120(5) of the Regulations stipulates that where an EIAR is required to be prepared in respect of a proposed development by a local authority, the local authority shall apply to the An Bord Pleanála for approval of the development under Section 175(3) of the Act.

The planning process for development by a local authority, where EIA is required, is detailed in Part 10 of the Regulations, specifically Chapter 4 (Articles 118-123). Article 118 states as follows:

> *"118. When making an application for approval under section 175(3) of the Act, a local authority shall, subject to article 119, send to the Board–*
> *(a) 3 copies of the plans and particulars of the proposed development,*
> *(b) 3 copies of the EIS for the proposed development,*
> *(c) A copy of the notice published under section 175(4) (a) of the Act, and*
> *(d) A list of the bodies to which notice was sent under section 175(4) (b) of the Act, a copy of each notice and an indication of the date on which the notice was sent."*

This EIAR is submitted to inform the Board in carrying out its EIA and making its decision in respect of the SDCC's application for approval for the proposed development.

1.4 ENVIRONMENTAL IMPACT ASSESSMENT SCOPING

Scoping is the process of identifying what environmental topics should be assessed in an EIA, for a particular project and its receiving environment, and included in the EIA Report.

Scoping for the EIA was carried out by the EIA and design team in consultation with the applicant SDCC and the landowner Coillte and taking account of the consultation carried out with stakeholders (specifically local landowners) and the public, in which particular concerns were raised. These included impacts on roads, traffic and transportation, biodiversity, archaeology and cultural heritage, water and

hydrology, and population (particularly existing recreational users of the site, and neighbouring landowners/farmers).

The scoping was also informed by reference to the EPA's Advice Notes for Preparing Environmental Impact Statements (Draft, September 2015), particularly the advice regarding Project Type 28 which is considered most relevant to the proposed development.

A formal EIA scoping opinion request was not made to An Board Pleanála. However, the Board's decision, reasons and considerations, and the Inspector's Report prepared in response to the applicant's request for EIA screening opinion were taken into account. This suggested that particular attention should be paid to the operational impacts and mitigation measures with regard to archaeological and cultural-historic heritage, and ecology.

This EIA Report content reflects the outcomes of the scoping process.

1.5 ENVIRONMENTAL IMPACT ASSESSMENT TEAM

The preparation of the EIA Report has been coordinated by CSR. The EIA team and their responsibilities and competencies are as follows:

Table 1.1 Environmental Impact Assessment Team - Responsibilities and Competencies

Environmental Aspect / Topic	EIAR Chapter	Company	Individual(s)	Qualification
Introduction	1	Cunnane Stratton Reynolds	Eamonn Prenter; Richard Butler	BA (Hons) Geography, MSc Planning; BL Landscape, MSc Spatial Planning
Existing Environment	2	Cunnane Stratton Reynolds	Eamonn Prenter; Richard Butler	BA (Hons) Geography, MSc Planning; BL Landscape, MSc Spatial Planning
Proposed Development	3	Cunnane Stratton Reynolds / PKA	Eamonn Prenter; Richard Butler Paul Keogh	BA (Hons) Geography, MSc Planning; BL Landscape, MSc Spatial Planning B.Arch (Hons), MA RCA, FRIAI, RIBA
Consideration of Alternatives	4	Cunnane Stratton Reynolds / PKA	Eamonn Prenter; Richard Butler Paul Keogh	BA (Hons) Geography, MSc Planning; BL Landscape, MSc Spatial Planning B.Arch (Hons), MA RCA, FRIAI, RIBA
Population and Human Health	5	Cunnane Stratton Reynolds	Eamonn Prenter; Crystal Leiker; Elaine Edmonds	BA (Hons) Geography, MSc Planning; BA (Hons) Social Science, M.PLAN BA (Hons) Environmental Science, MSc Spatial Planning
Biodiversity	6	Roughan & O'Donovan	Patrick O'Shea Alan Lauder Paul Murphy Ryan Wilson-Parr Owen O'Keefe Kate Moore	BA (Hons) Natural Sciences, MSc Ecological Management and Conservation Biology; BSc Hons Ecology; Dip Aq Bio, MSc Environmental Science, CEnv; B.Sc. (Hons) Environmental Biology, M.Res Ecology & Environmental Biology, BSc Ecology; BSc Env. Biology.
Land	7	Roughan & O'Donovan	Seamus MacGearailt	BE CEng FIEI F.Cons.EI
Water/Hydrology	8	Roughan and O'Donovan	Seamus MacGearailt Andrew Thompson	BE CEng FIEI F.Cons.EI B.A., B.A.I., C.Eng. M.I.E.I., Chartered Engineer
Air Noise,	9	AWN	Stephen Smyth	BSc Mechanical Engineering, PhD

Vibration		Consulting		Accoustics
Landscape Visual Resources	10	Cunnane Stratton Reynolds	Declan O'Leary	B. Agr. Sc. Landscape Design / Horticulture, PGDip. Landscape Architecture
Archaeology Cultural Heritage	11	CCA	Julia Crimmins	BA Archaeology, HDip Archaeology, MA Urban and Building Conservation
Architectural Heritage	12	PKA/CCA	Julia Crimmins Cathal Crimmins Paul Keogh	BA Archaeology, MA Urban and Building Conservation; B.Arch, M. Arch Sc, Architecture and Conservation B.Arch (Hons), MA RCA, FRIAI, RIBA
Material Assets (Forestry)	13	Cunnane Stratton Reynolds, VEON	Richard Butler Joe Codd	BL Landscape, MSc Spatial Planning B.Agr.Sc.(For.), Dip.Sc.(For.)
(Roads, Traffic Transportation)	14	Roughan & O'Donovan	Seamus MacGearailt	BE CEng FIEI F.Cons.EI
Interactions	15	Cunnane Stratton Reynolds	Eamonn Prenter; Richard Butler	BA (Hons) Geography, MSc Planning; BL Landscape, MSc Spatial Planning

This EIAR screening assessment has been prepared by personnel with competency and experience in both the EIAR and screening processes and by those qualified in the relevant fields of technical expertise. The report / assessment has also had due regard to and is consistent with the Natura Impact Statement. A statement of competency / experience for each person involved in this EIAR, as identified in the table above, is presented below.

Eamonn Prenter, BA (Hons) Geography, MSc Planning; MRTPI MIPI, Director, Cunnane Stratton Reynolds

Eamonn is a chartered town planner with both public and private experience and over 30 years post qualification experience having undertaken a number of EISs, EIARs and screening reports. He has also carried out a number of SEAs (Strategic Environmental Assessments) for various planning policy documents including statutory local area and development plans.

Richard Butler, BL Landscape, MSc Spatial Planning Senior Planner and EIAR Coordinator Cunnane Stratton Reynolds

Richard has degrees in town planning and landscape architecture and is a member of the Irish Planning Institute and the Irish Landscape Institute. He has a diploma in project management and is IPMA Level D certified. Richard has 20 years' professional experience and manages the planning team in CSR's Dublin office, fulfilling the role of project manager on planning applications, strategic development studies, masterplans and environmental impact assessments (EIA).

Richard has extensive consultancy experience on renewable energy projects, roads and railways, water services, quarries, rural recreation/tourism trails, as well as residential and mixed use schemes in the urban context - contributing to projects from conception through site selection and feasibility assessment, design, EIA and the planning process, to construction.

Crystal Leiker, BA (Hons) Social Science, M.PLAN Executive Planner, Cunnane Stratton Reynolds

Crystal Leiker is a qualified town planner with both public and private sector experience. Crystal gained experience of the Irish Planning system through both private and public sector experience. Crystal joined Cunnane Stratton Reynolds in April, 2017. With CSR Crystal has experience in preparing Planning Applications, Appropriate Assessment Screenings, Planning Appraisals and Environmental Impact Assessment chapters.

Elaine Edmonds, *BA (Hons)* Environmental Science, *MSc* Spatial Planning, *MSc* Regeneration and Urban Development, *PG Dip* Urban Design; *ARTPI, MIPI*, Executive Planner, Cunnane Stratton Reynolds

Elaine is an environmental planner with 4 years post qualification experience. She has experience with inputs to EIAR from her roles as environmental scientist and planner.

Paul Keogh, B.Arch (Hons), MA RCA, FRIAI, RIBA, Director, Paul Keogh Architecture

Paul Keogh (B.Arch (Hons), MA RCA, FRIAI, RIBA) was born in Dublin and studied architecture at University College Dublin before obtaining a Masters in Environmental Design at the Royal College of Art, London. Prior to entering private practice, he worked for James Stirling, de Blacam and Meagher and the OPW. He has taught and lectured widely, in Ireland, the UK, Europe, America and Asia. He was elected president of the Royal Institute of Architects of Ireland for the 2010-2012 term.

Patrick O'Shea BA Hons, MSc. Ecological Management and Conservation Biology, Roughan and O'Donovan.

Patrick is an Ecologist with over seven years' experience in ecological assessment. He holds a degree in Botany from Trinity College Dublin and an MSc in Ecological Management and Conservation Biology from Queen's University Belfast. Patrick is an Associate member of the Chartered Institute of Ecological and Environmental Management and has a background in Ecological Impact Assessment and Appropriate Assessment including experience on recreation based projects.

Alan Lauder BSc Hons Ecology, Director, Alan Lauder Consulting.

Alan is a professional ornithologist, nature conservation and wildlife projects specialist with over 30 years' experience working across state and non-governmental wildlife and conservation organisations in the UK and Ireland. He has extensive experience of a wide range of ecological and ornithological research, survey and monitoring techniques, is a highly skilled field worker as well as being experienced in habitat, visitor/tourism and wildlife management projects. As a senior level leader and manager in a range of organisations he developed extensive skills and experience in project and team management, organisational and strategic development, communications and policy as well as in planning and development casework and in the designation of sites in the UK under both EU and domestic legislation. Alan's role in the project, in addition to coordinating the 2019 Merlin survey, was to peer review the EIAR Biodiversity Chapter.

Paul Murphy Dip Aq Bio, MSc Environmental Science, CEnv. Owner, EirEco Environmental Consultants.

Paul is a Chartered Environmentalist and holds an MSc in Environmental Science from Trinity College Dublin. He has been operating in the environmental field for over two and a half decades covering a broad range of projects in a variety of countries. He has expert knowledge of the various EU

Environmental Directives (Habitats Directive, Birds Directive, Water Framework Directive, Environmental Liability Directive, etc.) and the Natura 2000 network and has been involved in the preparation of management plans for designated areas and Natura 2000 sites. He has extensive experience in Environmental Impact Assessment and ecological mitigation design for numerous major infrastructural schemes (roads, bridges, power plants, wind farms, etc) including habitat translocation and restoration. He has also been involved in the development and implementation of a variety of survey methodologies focusing on rapid assessment techniques, and has co-authored a variety of guidance documents for best practice in relation to road developments and for the film industry. Paul's role in the Project was to peer review and assist in the design of the ecological survey methodologies which were used to inform Chapter 6 of this EIAR.

Ryan Wilson-Parr, BSc Env. Biology, MSc Ecology and Env. Biology, Roughan and O'Donovan

Ryan is an Ecological Consultant with 15 years' experience in ecological monitoring, impact assessment and conservation. Ryan has managed Ecological Impact Assessments on infrastructure projects, Environmental Impact Assessments and Appropriate Assessments in Scotland, Shetland Islands, Ireland, England and Wales. As a contracted Senior Ecologist, Ryan has worked on a number of high profile civil engineering projects impacting on particularly sensitive sites, notably one of the largest wind farm developments in the world, the 103 turbine Viking Project on Mainland Shetland; the single largest hydroelectric scheme in the UK, the Glendoe Reservoir, Invernesshire, Scotland; and, the Lydd Airport expansion in District of Shepway, Kent, UK. Ryan is an experienced ecological surveyor with a range of expertise, including Reptiles and Amphibians, Breeding, Wintering and Migrating Birds, Protected Mammals and Priority Habitats. Ryan holds a current Smooth Newt Disturbance licence for Northern Ireland and has been previous licensed agent for survey and exclusion works for Great Crested Newts in England. As a fully accredited member of the Chartered Institute of Ecology & Environmental Management and previous Irish Section Committee member, Ryan is passionate and committed to improving best practice standards within industry and has lectured at the University of the West of Scotland on Ecological Impact Assessment. Ryan is also a proficient user of statistical and spatial analysis tools in ArcGIS software and has a proven track record of producing authoritative and comprehensive technical reports and presentations.

Owen O'Keefe BSc Ecology, Roughan and O'Donovan

Having graduated from University College Cork in 2015, Owen joined the ROD Environmental team. Owen's academic and professional experience covers a broad range of topics, including environmental assessment, but with a focus on the aquatic aspect throughout. Since joining ROD, Owen has undertaken both field work and reporting. He has carried out extensive watercourse surveys, electric fishing and White-clawed Crayfish surveys and is certified to carry out standardised River Habitat Survey, as prescribed by the Environment Agency for England. He has also undertaken numerous ecological surveys (including habitats, invasive alien plant species, protected mammals etc.) and acted as Ecological Clerk of Works. Given his strong understanding of Article 6 of the Habitats Directive (92/43/EEC), Owen has prepared Appropriate Assessment Screening Reports for a large number of projects and plans and has produced Natura Impact Statements for projects such as the River Suir Sustainable Transport Bridge and Natura Impact Reports for land use plans such as the Planning Scheme for the North Quays (Waterford) Strategic Development Zone. Owen has also produced a number of Ecological Impact Assessments and Biodiversity chapters for Environmental Impact Assessment Reports. Owen also has training and experience in the use of ArcGIS.

Kate Moore , BSc Env. Biology, Roughan and O'Donovan

Kate joined the ROD Environmental team as a Field Ecologist in 2015. Kate's academic experience covers a broad range of ecology-related topics, including environmental impact assessment, biological invasions and field biology. Since joining ROD, Kate has carried out multidisciplinary walkover surveys for a number of projects including the Athy Distributor Road and the Waterford North Quays Strategic Development Zone. She also has experience in undertaking specialized surveys of wintering birds, red squirrel, badger, otter, newt, bat and invasive plant species. She has authored and contributed to numerous Environmental Impact Assessments, Strategic Environmental Assessment and Appropriate Assessment reports.

Seamus MacGearailt, BE CEng FIEI F.Cons.EI, Roughan and O'Donovan

Seamus is a Civil and Structural Engineer and holds a Bachelor of Engineering Degree from University College Dublin awarded in 1986. Seamus is a Chartered Engineer, a Fellow of Engineers Ireland, and a Fellow Professional Consulting Engineer (F.Cons.EI) with the Association of Consulting Engineers of Ireland (ACEI). Seamus is a Director of Roughan & O'Donovan Consulting Engineers. Over the past 30 years his relevant professional experience includes a very wide range of civil and structural engineering projects including transportation facilities and public buildings.

Andrew Thomson, B.A., B.A.I., C.Eng. M.I.E.I., Chartered Engineer, Roughan and O'Donovan

Andrew Thomson of Roughan & O'Donovan Consulting Engineers. Andrew is a highly qualified Chartered Engineer with over 15 years practical experience. Andrew has an Honours degree in Civil Engineering from Trinity College Dublin, as well as a degree in general engineering also. In 2001, Andrew completed a PhD in Structural Engineering. Andrew became a Chartered Member of the Institute of Engineers of Ireland in 2005. In 2009, Andrew completed a Higher Diploma in Project Management, obtaining a second class honours qualification

Stephen Smyth, BSc Mechanical Engineering, PhD Acoustics, AWN Consulting

The traffic noise impact assessment was carried by Stephen Smyth. Stephen is an Associate with AWN Consulting specialising in Architectural Acoustics, 3D Acoustic Modelling and Environmental Noise. Stephen holds a Bachelor's Degree and Doctorate in Mechanical Engineering and is a member of both Engineers Ireland (IEI) and the Institute of Acoustics (IoA). His Doctorate, funded by the Irish Research Council for Science, Engineering and Technology, was in the field of environmental acoustics and in particular was a study of the noise generated by friction between a rolling tyre and the road using Nearfield Acoustic Holography.

Declan O'Leary B.Agr.Sc. Landscape Horticulture, Post Graduate Diploma Landscape Architecture Chartered Landscape Architect, Director, Cunnane Stratton Reynolds

Declan has over 30 years' experience in development, landscape design, urban and environmental renewal. This includes masterplanning and design to implementation of a broad range of strategic environmental improvement schemes to industrial, highway and urban regeneration sites as well as reclamation, amenity, rural/countryside, educational and housing projects. He is experienced in working closely with developers, community organisations and statutory agencies to deliver local environmental, social and economic development.

Joe Codd, B.Agr.Sc.(For.), Dip.Sc.(For.), Director, VEON

Joe Codd has worked in forestry with VEON for over 12 years and has been responsible for the management, acquisition and development of the forestry assets. Joe currently sits on the board of the Society of Irish Foresters as a technical councillor and also the board of Forestry Careers Ireland.

Julia Crimmins, BA (Hons) Archaeology, MUBC, MSc Planning; MIAI MIPI, Heritage Consultant, Cathal Crimmins Architects.

Julia is an Archaeological and Built Heritage Consultant and has recently attained a planning qualification and accreditation. She has over 13 years post qualification experience on both public and private projects having undertaken a number of EIAR reports in addition to conservation and archaeological reports.

2.0 EXISTING ENVIRONMENT

The existing environmental conditions pertaining to each environmental factor are described in detail in the chapter dealing with that topic. This chapter provides an overview of the application site, the wider receiving environment, and the planning policy context.

2.1 THE APPLICATION SITE - OVERVIEW

The application site is comprised of Coillte's Hell Fire and Massy's Wood forest properties, and sections of the R115 and R113 regional roads between the existing Hell Fire property entrance and the South Dublin urban area. The two forest properties have a combined area of c.152 ha.

Fig 2.1 Coillte's Hell Fire and Massy's Wood forest properties in context (not to scale)

2.1.1 Hell Fire Forest Property

Coillte's Hell Fire forest property is 105 ha in extent and is an actively managed commercial coniferous forest. It is located on Montpelier Hill, one of the outlying northern hills of the Dublin and Wicklow Mountains. The forest property has a single access point, from the R115 Killakee Road which runs along its east boundary.

The property is characterised by its steeply sloping topography, rising from a level of approximately 250m at the entrance off the R115, to 383m at the summit of Montpelier Hill. Montpelier Hill has a conical landform which in combination with its position as one of the northernmost hills of the Dublin Mountains provides panoramic views over Dublin Bay to the east, the city to the north and east, and the Dublin and Wicklow Mountains extending in an arc to the south.

The property is managed primarily as a productive forest, with plantations of predominantly Douglas fir of various ages including areas recently clear-felled and replanted, areas of mature forest due for harvesting/clear-felling in the near future, and areas mid-growth. This defines the landscape character of the property, along with the topography which provides panoramic views, and the presence of the Hell Fire Club in a clearing at the top of the hill.

The property is also used as a recreation facility. A parking area with a capacity of c. 80 cars is provided on the lower eastern slope of the hill near the entrance. The network of forest roads and additional trails are used for walking and horse riding. It is estimated by Coillte that some 100,000 visitors use the site annually. On busy weekend days and holidays the parking area regularly overflows leading to uncontrolled parking outside of the property on the R115. This causes traffic congestion and safety issues on the R115.

Surveys of the property between 2016 and 2019 identified a range of rare and protected species at the site including red squirrel, pine marten, smooth newt and badger.
~~Survey of the property has shown that it provides habitat for species including the protected red squirrel, badger and bats. During survey red squirrel were sighted on the property and a drey (nest) was located. A disused badger sett was identified. Trees with bat potential were identified. Three ponds were identified on the site, supporting Common Frog and potentially Smooth Newt.~~

The property includes the Hell Fire Club building located at the top of Montpelier Hill. The building is a protected structure (South Dublin Record of Protected Structures ref. 388) constructed in 1725 and has iconic status in the cultural history of Dublin. It attracts visitors including locals, Dubliners, domestic and foreign tourists, school and special interest groups. There is occasional anti-social behaviour in and around the building at night, some which is damaging to the structure (e.g. graffiti on the internal walls, and fires being lit inside the building). The path directly up the east face of Montpelier Hill to the building is heavily used. This has caused erosion, and scarring of the landscape. A standing stone half way up the path has been overturned at some point in the past and its setting is compromised.

Alongside the Hell Fire Club building are the remains of two ancient tombs. A licensed dig in 2016 (as part of the Hell Fire Club Archaeological Project) revealed that one of these is a Neolithic passage tomb featuring megalithic art and still containing – despite historic disturbance – other archaeological features. It is thought that stone from the cairn of the tomb was used in the construction of the Hell Fire Club building. This is the subject of ongoing investigation. It is also thought that some stone may have been taken from the cairn for the construction of the Military Road which runs through Massy's Wood.

The archaeologist carrying out the 2016 dig (Neil Jackman, Abarta) believes that Montpelier Hill is rich in archaeology. Using an aerial photograph from before the hill's afforestation he has identified numerous topographic features that may be indicative of archaeological remains. Any or most such remains would have been heavily disturbed by subsequent forestry activity.

2.1.2 Massy's Wood Forest Property

The Massy's Wood property is 47 ha in extent and located to the east of Montpelier Hill and the R115 Killakee Road.

The property is accessed by an entrance off the R115 along its western boundary. This is used as a pedestrian access point and a vehicular entrance for forest management operations only; there is no public parking provided on the site. Visitors use the Hell Fire forest parking area and cross the R115 on foot, or park on the R115. There are also pedestrian entrances along the eastern boundary at the end of Cruagh Lane (a road in private ownership), and at the southern extent of the property off Cruagh Road where the Dublin Mountains Way passes the site.

The lands of the property slope steeply (although less steeply than the Hell Fire property) to the north east. A small, fast-flowing river – the Cruagh or Glendoo Brook, a tributary of the Owendoher River - flows south to north through the property inside its eastern boundary.

Commercial forestry operations have been scaled back on the property and it is now managed as a mixed woodsland predominantly for recreation amenity. It is covered in broadleaved woodland of beech and oak, ash, fir, larch and spruce. There are some areas of coniferous plantations, and specimen trees from the original Killakee demesne, including species such as Giant Sequoia, Monkey Puzzle, and West Himalayan spruce, Monterey Pine, and Western red cedar. In places exotic invasive species such as Cherry laurel and Rhododendron have a strong hold and are being cleared and reduced. Whilst predominantly a recreational forest with high biodiversity value, woodland management works are ongoing with areas of beech wood thinned in 2016.

The landscape character of Massy's Wood contrasts with that of the Hell Fire property. Whereas the Hell Fire lands are exposed due to their elevation and slope, Massy's Wood is enclosed due to its lower elevation and the narrow valley of the Glendoo Brook, and the permanent broadleaved woodland cover. The property is extensively used for walking and to a lesser extent cycling and horse riding.

Survey of the property has shown that it provides habitat for species including the protected badger, bats and otter. A disused badger sett was identified. Otter spraint (faeces) was identified. A number of trees with bat potential were identified. The Glendoo Brook provides habitat for otter and also for fish including salmonids, and birds including the kingfisher.

Massy's Wood is rich in cultural heritage features. Most notable is the large, multi-roomed walled garden, the walls of which are predominantly intact. The garden is overgrown with scrub. Other architectural features of the property include a gate lodge, an ice house, and the ruins of a cottage on the river bank, a stone well and numerous bridges over the river. These are collectively a protected structure (South Dublin Record of Protected Structures ref. 384). A 750m section of the Military Road (RPS ref. 385) traverses the property inside the western boundary. This is the last remaining un-paved section of the original Military Road.

2.2 THE RECEIVING ENVIRONMENT - OVERVIEW

The receiving environment is described in more detail in the chapters covering individual environmental topics. The following is an overview of the site context.

The application site is located in the Dublin Mountains High Amenity zoned area of South Dublin. The forest properties are integral to the forested upland landscape of South Dublin and have a significant concentration of landscape and visual amenity resources, cultural and natural heritage, and recreational use between them.

There is a concentration of rural houses and enterprises in the vicinity of the site, mostly to the north of the site, along the R115. The businesses include Timbertrove, a timber products manufacturing and resale enterprise which has an attached homeware shop and café, and the Killakee Livery Yard. Immediately adjacent the site to the north is the Steward's House and attached stables, belfry and gate (protected structures, RPS ref. 380). The house operated as a bar/restaurant for 30 years in the late 20th century, and is currently in use as a residence. The property has been the subject of several planning applications for small scale (three units) tourism accommodation development in the last number of years. Permission was granted in 2010 but not implemented and has now expired. In addition to these properties there are several houses fronting the R115 to the north and south of the site, forming a distinct concentration of rural development. These properties and their occupants are sensitive receptors to the potential environmental effects of development at the site.

In the wider environment, there is a concentration of rural (though partly urban-generated) housing in the Jamestown area to the east of Massy's Wood, and along the Cruagh Road, in the valley of the Owendoher River between Montpelier Hill and Cruagh Mountain. These houses are within 1-1.5km to the east of the Hell Fire forest property. The occupants would be sensitive especially to landscape and visual effects of development at the site.

A short distance further to the north east there are the more urbanised areas of Rockbrook and Mountvenus, which lie outside of the M50 (which passes some 2km to the north east of the site), somewhat removed from the city to the north. The relationship of these areas to the Dublin Mountains landscape is less direct (than the communities in the immediate vicinity of the site and in Jamestown and Cruagh Road), but residents would be among the existing users of the site for recreation, and enjoy views of the site in places (e.g. at Mountvenus cemetery). Further to the north on the edge of the city are the recently developed suburban areas of Ballycullen, Woodstown and Killinniny. There are existing users and numerous potential users of recreation facilities on the site in these areas.

Piperstown Road and Mountain Road pass to the west of the Hell Fire forest property and Montpelier Hill, on the side of the Glenasmole River Valley, somewhat removed from where the proposed development is concentrated near the R115. These roads have a relatively dense concentration of housing dispersed along them, but are separated from the Hell Fire Club and Massy's by the bulk of Montpelier Hill and the extensive coniferous forest on its west flank.

These concentrations of settlement in the site environs are effectively the southern outlying areas of urban generated development beyond the edge of Dublin city.

Spread in an arc to the south of Montpelier Hill and the site lie the taller and more remote Dublin and Wicklow Mountains including Fairy Castle, Cruagh and Glendoo, Kippure, Seefingan and Seefin, and Corrig. The transport and settlement patterns in this area are sparse. Forestry generally stops beneath the 500m contour so the mountains are covered predominantly in moorland and bog. There are large

areas designated as Special Area of Conservation (SAC) and Special Protection Area (SPA) at these upper elevations. The Glenasmole Valley to the west of Montpelier Hill is also a designated SAC and proposed Natural Heritage Area (pNHA).

Thus, the site is situated on the threshold between the city and the rural environs. Development at the site has the potential to affect both of these environments and environmental receptors.

2.3 PLANNING POLICY CONTEXT

The relevant planning policy at national, regional and county level – as it pertains to the proposed development and the receiving environment – is quoted below.

2.3.1 National Policy

2.3.1.1 National Spatial Strategy 2002-2020 – Environment and Tourism

In Section 3.3 Consolidating the Greater Dublin Area, the NSS states: *"The continuing health of the Dublin is critically dependent on* [among a range of objectives]…

"Protecting Dublin's outstanding natural setting – Dublin Bay, the Dublin and Wicklow Mountains, surrounding rural hinterlands, river valleys like the Boyne and Liffey, and physical amenities such as parks…"

In Section 5.5 Environmental Quality, the NSS states: *"Ireland's national aims for achieving sustainable development point to three policy issues relating to the environment:*

- *"an international responsibility to present and future generations which combines the concepts of sustainability and good stewardship;*
- *the role of the environment in economic development;*
- *The role of the environment in contributing to the quality of life of people."*

"International responsibility recognises that Ireland's natural and cultural environment is part of a shared European and world inheritance. The various components of that environment have to be safeguarded for their own intrinsic values…

> *"In economic development, the environment provides a resource base that supports a wide range of activities that includes agriculture, forestry, fishing, aquaculture, mineral use, energy use, industry, services and tourism. For these activities, the aim should be to ensure that the resources are used in sustainable ways that put as much emphasis as possible on their renewability.*
>
> *More generally, the environment also has an economic role in adding to the attractions of the country, and of different places within the country, for enterprise and people. This is part of the social role through which the environment contributes to the quality of life of people. There are different spatial dimensions to this — from the immediate surroundings of a home to the wider settings of neighbourhood and town, to countryside and coast. The benefits can vary from active recreational uses to passive use in terms of viewing scenic landscapes. These benefits depend on appropriate accessibility for people to the different experiences offered by the environment."*

Box 5.1 of the NSS identifies the following among its strategic tourism opportunities:

- *"Heritage and Natural Landscapes – Opportunities to realise the potential contained in the landscape, habitats and culture of some of the least developed tourism areas through facilitating better access and developing appropriate interest activities;*
- *Urban Generated Rural Recreation – Opportunities related to the presence of attractive landscapes close to urban areas such as Dublin where weekend leisure activity could become a significant driver of year round tourism activity."*

2.3.1.2 National Planning Framework - Ireland 2040 Our Plan Issues and Choices

In Section 5.4 Heritage and Landscape it is stated:

> *"Ireland has a rich vein of heritage ranging from the iconic historic buildings and sites within our towns and cities, to the natural heritage of our countryside. The NPF is an opportunity to refocus on the sustainable and adaptive reuse of our existing and historic assets, regenerate existing areas and reduce pressure for unsustainable expansion on the edges of our settlements. There is also recognition of the value of our natural heritage not only for biodiversity but also for recreation, tourism and scientific purposes."*

In Section 5.5 Green Infrastructure and Biodiversity it is stated:

> *"Green infrastructure (GI) is where natural and/or managed landscape features such as a watercourse and/or parkland is managed and enhanced as a multifunctional resource capable of delivering a wide range of economic, environmental and quality of life benefits, known as 'ecosystem services'…*
>
> *"These benefits can include creating an attractive environment to encourage businesses and inward investment; more places for people to access nature, outdoor recreation or social interaction or physical activity by providing quality, linked green or 'blue' (water-related) spaces for walking, cycling and other physical activity and creating a sense of place and local distinctiveness. They also generally include a holistic approach to developing the landscape inclusive of other influences, such as ecological development, improving air, water and soil quality and flood protection."*

2.3.2 Regional Policy - Regional Planning Guidelines for the Greater Dublin Area 2010-2022

2.3.2.1 Green Infrastructure

The Dublin Mountains are identified as a Key Regional Asset:

> *"In examining G.I. development at a regional level, it is important to acknowledge a number of unique assets, which contribute to the diverse richness of the Greater Dublin Area. Notably, the Dublin/Wicklow Mountains, Bru Na Boinne, Liffey Valley and Dublin Bay exemplify this uniqueness."*
>
> *"These areas:*
> - *support nationally and regionally unique habitats, biodiversity, and fragile ecosystems;*
> - *have important recreational, tourism and cultural roles;*
> - *provide or support forestry, crop production, agriculture and energy development;*

- *provide green buffers/green wedges between built up areas;*
- *Improve air quality".*

Regarding Access Management the RPGs state:

> *"Access to green corridors and natural heritage is complex, involving issues such as private ownership of lands or physical difficulties in accessing some of those sites which are within public ownership. It is recommended that local authorities identify strategic access points within public ownership lands and enhance and improve linkages between publicly owned sites. Furthermore, the local authorities should utilise mechanisms within the planning system where the opportunity exists, to enlarge public ownership of lands within corridors…. It is important for a number of environmentally sensitive locations that access does not result in unlimited access, but rather 'managed access' where appropriate. This should also be supported by transport modes such as secure and direct pedestrian and cycle routes and public transport provision."*

Strategic Recommendation GIP6 states:

> *"To ensure the protection, enhancement and maintenance of the natural environment and recognise the health benefits as well as the economic, social, environmental and physical value of green spaces through the development of and integration of Green Infrastructure (GI) planning and development in the planning process."*

2.3.2.2 Social Infrastructure and Sustainable Communities

> *"Informal recreation, particularly walking and cycling, should be promoted through the development and expansion of a network of safe cycle and walking routes through and across towns, accessing parkland, in the built up area and into and through rural areas. Such routes can link in with existing way marked trails, sli na slainte walks and parts of the Green Infrastructure network … and other local resources such as existing or new rights of way. Supporting facilities such as access points and signage or web information for example play a role encouraging outdoor activity and good health."*

Strategic Recommendation SIR11 states:

> *"The importance of managing and enhancing recreational facilities, including publicly owned lands associated with regionally important assets (such as the Dublin Mountains) is recognised and should be supported by the relevant bodies in line with environmental compatibilities in association with plans and/or measures to protect important habitats within or proximate to these locations."*

2.3.2.3 Rural Development and Tourism

> *"Peri-urban areas and green belt zoned lands across the fringe of metropolitan Dublin represent a particular type of rural area which can exploit markets through offerings in specialised green oriented activities, rural tourism and leisure for both international and local markets alongside more traditional rural activities capitalising on strong connectivity to urban populations and markets."*

> *"Rural tourism can play a strong role in stimulating rural economies. Rural development policies should accommodate rural tourism needs through development of walks, water*

based activities, tourism infrastructure (such as, amongst other activities, eco, agri and equestrian related tourism, open farms, pet farms and farmhouse accommodation) and rural led activities. These actions will stimulate local and wider markets, spreading the benefits and increasing citizen awareness and appreciation of their natural environment. Alongside this it is critical to ensure that increasing pressures of commercialisation and development do not serve to undermine rural ecosystems, landscapes and conservation areas thus losing what makes such destinations attractive and special places to visit."

Strategic Recommendation RR5 states:

"Needs of leisure and rural tourism to be addressed in a multi-disciplinary manner in high pressure locations, taking into account natural, economic, social and cultural policy objectives and plans. Balance is required between the need to preserve the natural environment; the needs of modern farming and also making the countryside and natural areas accessible to those who wish to avail of it. Feasibility studies and best scientific evidence can be utilised to ensure that this balance is achieved."

2.3.2.4 Built Heritage

Strategic Policy GIP1 states:

"To ensure that all aspects of the built heritage including archaeological, industrial, and architectural heritage, and those building which are home to protected species are suitably protected, enhanced, sensitively reused/ integrated into new development works and incorporated in development plans, records of protected structures, heritage plans and site specific projects & developments."

Strategic Recommendation GIR11 states:

"To protect the intrinsic natural, built and cultural heritage of the GDA whilst ensuring that any future development of tourist and recreational uses are facilitated in a manner which complements and protects the intrinsic heritage features of the region."

2.3.2.5 Natural Heritage

"Biodiversity is not just contained within specifically designated sites. Areas such as parkland, graveyards, and back gardens, hedgerows, farming land, river corridors and mountain lands support a range of species and play an important role individually and in supporting and linking habitats. Protecting these areas through legislation is not appropriate, however it is important to preserve ecological infrastructure across the GDA and within each Council. For this reason the RPGs are recommending the development of a Green Infrastructure network for the GDA."

Strategic Policy GIP2 states:

"To protect and conserve the natural environment, in particular nationally important and EU designated sites such as Special Protection Areas, Candidate Special Areas of Conservation and proposed Natural Heritage Areas, protected habitats and species, and habitats and species of local biodiversity value."

Strategic Recommendation GIR15 states: *"Continued use of policies to protect views and prospects in the Development Plan and local area plan process to facilitate passive enjoyment of the heritage of the landscape."*

2.3.3 County Policy – South Dublin County Development Plan 2016-2022

2.3.3.1 Zoning Objective

The majority of the application site, including the entire Hell Fire property and the south and western part of Massy's Wood, falls into the area zoned 'HA – DM' High Amenity Dublin Mountains, with the objective:

"To protect and enhance the outstanding natural character of the Dublin Mountains Area."
The remainder of the Massy's Wood property is zoned 'RU' Rural and Agriculture, with the objective: *"To protect and improve rural amenity and to provide for the development of agriculture".*

Table 11.12: **Zoning Objective 'HA - DM': 'To protect and enhance the outstanding natural character of the Dublin Mountains Area'***

USE CLASSES RELATED TO ZONING OBJECTIVE	
Permitted in Principle	Agriculture, Car park[d,h], Open Space.
Open for Consideration	Bed & Breakfast[a], Cemetery[d], Childcare Facilities[a], Community Centre[a], Cultural Usej, Doctor/Dentist[a,d], Education[b], Garden Centre[a,d], Guest House[a,d], Health Centre[a,b], Home Based Economic Activities[a,d], Hotel/Hostel[a,d], Industry-Extractive[a,d], Place of Worship[a,d], Public House[a,d], Public Services, Recreational Facilityj, Residential[c,d], Restaurant/Café[a,d], Rural Industry-Food[a,d], Sports Club/ Facility[d], Shop-Local[a,d], Veterinary Surgery[a,d].
Not Permitted	Abattoir, Advertisements and Advertising Structures, Aerodrome/ Airfield, Allotments, Betting Office, Boarding Kennels, Camp Site, Caravan Park-Residential, Concrete/Asphalt Plant in or adjacent to a quarry, Conference Centre, Crematorium, Embassy, Enterprise Centre, Fuel Depot, Funeral Home, Heavy Vehicle Park, Hospital, Housing for Older People, Industry-General, Industry-Light, Industry-Special, Live-Work Units, Motor Sales Outlet, Nightclub, Nursing Home, Office-Based Industry, Offices less than 100 sq.m, Offices 100 sq.m-1,000 sq.m, Offices over 1,000 sq.m, Off-Licence, Outdoor Entertainment Park, Petrol Station, Primary Health Care Centre, Recycling Facility, Refuse Landfill/ Tip, Refuse Transfer Station, Residential Institution, Retail Warehouse, Retirement Home, Science and Technology Based Enterprise, Scrap Yard, Service Garage, Shop-Major Sales Outlet, Shop-Neighbourhood, Social Club, Stadium, Transport Depot, Traveller Accommodation, Warehousing, Wholesale Outlet, Wind Farm.

a In existing premises
b In Villages to serve local needs
c In accordance with Council policy for residential development in rural areas
d Not permitted above 350m contour
h For small-scale amenity or recreational purposes only
j Directly linked to the heritage and amenity value of the Dublin Mountains
*Note: The Division between the 'HA-DM' and 'HA-DV' zones occurs at Fort Bridge, Bohernabreena.

The following is relevant from the table above:

- Car parking is permitted in principle, provided it is below the 350m contour and is for small-scale amenity, or recreational purposes.

- Cultural use is open for consideration if 'directly linked to the heritage and amenity value of the Dublin Mountains'.
- Recreation facilities are open for consideration if 'directly linked to the heritage and amenity value of the Dublin Mountains'.
- Restaurant/Café use is open for consideration if 'in existing premises' and not above the 350m contour.
- Shop-local is open for consideration if in existing premises and not above the 350m contour.

2.3.3.2 Dublin Mountains

Section 9.2.2:

> *"The Dublin Mountains and associated uplands occupy the southern side of the County and extend into the adjoining counties of Dun Laoghaire-Rathdown and Wicklow. The diverse topography and land cover of the Dublin Mountains includes areas of natural beauty and ecological importance (including 3 of the County's Natura 2000 Sites) and is a key element of the County's Green Infrastructure network. The mountains also offer significant recreational and amenity value, with popular orienteering courses, climbing areas and walking, running, hiking and mountain bike trails.*
>
> *"The Landscape Character Assessment of South Dublin County (2015) highlights the high value and sensitivity of the Mountain Area. The protection of this landscape and its environment is a priority of this Plan."*

HERITAGE, CONSERVATION AND LANDSCAPES (HCL) Policy 9 Dublin Mountains:

> *"It is the policy of the Council to protect and enhance the visual, recreational, environmental, ecological, geological, and archaeological and amenity value of the Dublin Mountains, as a key element of the County's Green Infrastructure network."*

HCL9 Objective 1: *"To restrict development within areas designated with Zoning Objective 'HA – DM' (To protect and enhance the outstanding natural character of the Dublin Mountains Area) and to ensure that new development is related to the area's amenity potential or to its use for agriculture, mountain or hill farming and is designed and sited to minimise environmental and visual impacts."*

HCL9 Objective 2: *"To ensure that development above the 350 metre contour in the Dublin Mountains will seek to protect the open natural character of mountain heath, gorse lands and mountain bogs."*

HCL9 Objective 3: *"To ensure that development within the Dublin Mountains will not prejudice the future expansion and development of a National Park, the County's Green Infrastructure Network and local and regional networks of walking and cycling routes."*

HCL9 Objective 4: *"To ensure that development proposals within the Dublin Mountains maximise the opportunities for enhancement of existing ecological and geological features and archaeological landscapes."*

HCL9 Objective 5: *"To support the re-routing of the Dublin Mountains Way from public roads and to improve access to publicly owned lands in the upland area."*

2.3.3.3 Community Infrastructure

C Policy 12 Open Space: "*It is the policy of the Council that a hierarchical network of high quality open space is available to those who live, work and visit the County, providing for both passive and active recreation, and that the resource offered by public open spaces, parks and playing fields is maximised though effective management."*

C12 Objective 1: "*To support a hierarchy of open space and recreational facilities based on settlement size and catchment."*

C12 Objective 3: "*To develop parks and open/green spaces that cater for the diverse needs of the County's population, in particular different age groups and abilities, through the facilitation of both active and passive recreational activities and universal access."*

C12 Objective 8: "*To retain lands with established recreational uses as open space unless proximate alternatives can be agreed by the Council."*

2.3.3.4 Economic and Tourism Development

It is stated in Section 4.1.0: *"The County's natural, cultural and built heritage assets are an integral part of Dublin's tourism and leisure offer and there is potential to grow this sector of the County's economy."*

Section 4.5.0 Tourism and Leisure:

> *"Dublin is Ireland's primary tourism destination. In 2013 the Dublin Region received 60% of Ireland's international tourists (almost 4 million) and over 40% of their expenditure. Dublin is also a main destination for domestic tourists. Tourism is a significant economic driver and is considered a key growth sector of the Irish economy. It supports job creation across a diverse range of sectors and skill levels. It has wide ranging social and environmental benefits for host communities, with tourism initiatives often making key assets more accessible, supporting environmental improvements and sustaining services and events that would not otherwise be viable.*
>
> *"South Dublin County has a range of natural, cultural and built heritage resources of outstanding merit and the South Dublin Tourism Strategy 2015 identifies a range of actions to develop and present these assets to the market. Through the boost provided by Destination Dublin: A Collective Strategy for Tourism Growth to 2020 (Growth Dublin Taskforce), and by collaborating with other parts of Dublin, South Dublin can develop a distinctive range of tourism products that will complement those of other parts of Dublin and generate substantial socio-economic benefits for the County."*

ECONOMIC AND TOURISM (ET) Policy 5 Tourism Infrastructure:

> *"It is the policy of the Council to support the development of a sustainable tourism industry that maximises the recreational and tourism potential of the County, through the implementation of the South Dublin Tourism Strategy 2015."*

ET5 Objective 1: *"To support the development of tourism infrastructure, attractions, activities and facilities at appropriate locations subject to sensitive design and environmental safeguards."*

ET5 Objective 2: *"To direct tourist facilities into established centres, in particular town and village centres, where they can contribute to the wider economic vitality of urban centres."*

ET5 Objective 3: *"To support the development of a visitor facility in or adjacent to the High Amenity – Dublin Mountains zone (HA-DM), subject to an appropriate scale of development having regard to the pertaining environmental conditions and sensitivities, scenic amenity and availability of services."*

ET5 Objective 4: *"To support the development of an outdoor pursuits centre in or adjacent to lands designated with Zoning Objective High Amenity – Dublin Mountains (HA-DM), subject to an appropriate scale of development having regard to the pertaining environmental conditions and sensitivities, scenic amenity and availability of services."*

ET7 Objective 1: "*To promote the active use of managed forests for tourism and leisure related activities subject to an appropriate scale of development having regard to the pertaining environmental conditions and sensitivities, scenic amenity and availability of services."*

ET Policy 8 states: *"It is the policy of the Council to support the development of heritage, cultural and events tourism."*

ET8 Objective 1: "*To support the sensitive restoration of heritage buildings and sites and operate flexibility with regard to the use of converted buildings to facilitate heritage tourism."*

ET8 Objective 2: "*To support tourism projects that seek to showcase and promote the County's geological heritage and cultural heritage."*

ET Policy 9 states: *"It is the policy of the Council to support sustainable rural enterprises whilst protecting the rural character of the countryside and minimising environmental impacts."*

ET9 Objective 4: "*To support sustainable forestry development at suitable locations in the County, subject to the protection of the rural environment, sensitive areas and landscapes."*

2.3.3.4 Green Infrastructure Network

Section 8.0:

> *"The environmental and heritage resources of the County can be described as the County's 'Green Infrastructure', a vital resource for our future.*
>
> *The term Green Infrastructure is used to describe an interconnected network of waterways, wetlands, Woodlands, wildlife habitats, greenways, parks and conservation lands, forests and other open spaces that adjoin and are threaded through urban areas. The Green Infrastructure network supports native plant and animal species and provides corridors for their movement, maintains natural ecological processes and biodiversity, sustains air and water quality and provides vital amenity and recreational spaces for communities, thereby contributing to the health and quality of life of residents and visitors to the County.*
>
> *The advantages of a sustainable and integrated approach to Green Infrastructure management in both urban and rural areas are wide reaching and are proven to include:*

- *Improved habitats for wildlife;*
- *Cleaner air and water;*
- *Improved surface water management;*
- *'Greener' and more attractive cities;*
- *Tourism and recreational opportunities and improved human health and wellbeing."*

GREEN INFRASTRUCTURE (G) Policy 1 Overarching:

> *"It is the policy of the Council to protect, enhance and further develop a multifunctional Green Infrastructure network by building an interconnected network of parks, open spaces, hedgerows, grasslands, protected areas, and rivers and streams that provide a shared space for amenity and recreation, biodiversity protection, flood management and adaptation to climate change."*

G1 Objective 1: *"To establish a coherent, integrated and evolving Green Infrastructure network across South Dublin County with parks, open spaces, hedgerows, grasslands, protected areas, and rivers and streams forming the strategic links and to integrate the objectives of the Green Infrastructure Strategy throughout all relevant Council plans, such as Local Area Plans and other approved plans."*

GREEN INFRASTRUCTURE (G) Policy 2:

> *"It is the policy of the Council to promote and develop a coherent, integrated and evolving Green Infrastructure network in South Dublin County that can connect to the regional network, secure and enhance biodiversity, provide readily accessible parks, open spaces and recreational facilities."*

G2 Objective 2: "*To protect and enhance the biodiversity value and ecological function of the Green Infrastructure network."*

G2 Objective 3: *"To restrict development that would fragment or prejudice the Green Infrastructure network".*

G2 Objective 4: *"To repair habitat fragmentation and provide for regeneration of flora and fauna where weaknesses are identified in the network."*

G2 Objective 7: *"To incorporate items of historical or heritage importance in situ within the Green Infrastructure network as amenity features."*

G2 Objective 9: *"To preserve, protect and augment trees, groups of trees, Woodlands and hedgerows within the County by increasing tree canopy coverage using locally native species and by incorporating them within design proposals and supporting their integration into the Green Infrastructure network."*

G2 Objective 10: *"To promote a network of paths and cycle tracks to enhance accessibility to the Green Infrastructure network, while ensuring that the design and operation of the routes responds to the ecological needs of each site."*

2.3.3.5 Public Open Space Hierarchy and Landscape Setting

Section 8.3.0:

> *"Open spaces and parks are fundamental in contributing to a high quality of life for those living, working and visiting the County. They provide habitats for ecological processes, a focal point for active and passive recreation, promote community interaction and help mitigate the impacts of climate change. Open spaces and parks can range in size from a hectare to in excess of 100 hectares and have the potential to strengthen the County's Green Infrastructure network."*

GREEN INFRASTRUCTURE (G) Policy 4 Public Open Space and Landscape Setting: *"It is the policy of the Council to provide a hierarchy of high quality and multi-functional public parks and open spaces."*

G4 Objective 1: "*To support and facilitate the provision of a network of high quality, well located and multifunctional public parks and open spaces throughout the County and to protect and enhance the environmental capacity and ecological function of these spaces."*

G4 Objective 2: *"To connect parks and areas of open space with ecological and recreational corridors to aid the movement of biodiversity and people and to strengthen the overall Green Infrastructure network."*

G4 Objective 3: *"To enhance and diversify the outdoor recreational potential of public open spaces and parks, subject to the protection of the natural environment. "*

G4 Objective 4: *"To minimise the environmental impact of external lighting at sensitive locations within the Green Infrastructure network to achieve a sustainable balance between the recreational needs of an area, the safety of walking and cycling routes and the protection of light sensitive species such as bats."*

G4 Objective 5: *"To promote the planting of Woodlands, forestry, community gardens, allotments and parkland meadows within the County's open spaces and parks."*

2.3.3.6 Natural Heritage – Non-Designated Areas

In Section 9.3.4 it is stated:

> *"The County supports a range of plant, animal and bird species that are deemed to be rare and threatened under European and Irish legislation and which are known to exist outside of designated sites such as Natura 2000 sites or proposed Natural Heritage Areas. This includes nationally rare plants, plants listed in the Red Data Lists of Irish Plants, the Flora Protection Order, 1999 (or other such Orders) and their habitats and animals and birds listed in the Wildlife Act 1976 (amended 2000) and subsequent statutory instruments.*
>
> *"A number of habitats and species listed in Annex I and Annex 2 of the Habitats Directive are known to occur at locations in the County which are situated outside of protected sites. Under the EU Habitats Directive, protection is afforded to these species and habitats where they occur."*

HERITAGE, CONSERVATION AND LANDSCAPES (HCL) Policy 15 Non-Designated Areas:

> *"It is the policy of the Council to protect and promote the conservation of biodiversity outside of designated areas and to ensure that species and habitats that are protected under the Wildlife Acts 1976 and 2000, the Birds Directive 1979 and the Habitats Directive 1992 are adequately protected."*

HCL15 Objective 1: *"To ensure that development does not have a significant adverse impact on rare and threatened species, including those protected under the Wildlife Acts 1976 and 2000, the Birds Directive 1979 and the Habitats Directive 1992."*

HCL15 Objective 2: *"To ensure that, where evidence of species that are protected under the Wildlife Acts 1976 and 2000, the Birds Directive 1979 and the Habitats Directive 1992 exists, appropriate avoidance and mitigation measures are incorporated into development proposals as part of any ecological impact assessment."*

HCL15 Objective 3: *"To protect existing trees, hedgerows, and Woodlands which are of amenity or biodiversity value and/ or contribute to landscape character and ensure that proper provision is made for their protection and management in accordance with Living with Trees: South Dublin County Council's Tree Management Policy 2015-2020."*

2.3.3.7 Heritage, Conservation and Landscape

HERITAGE, CONSERVATION AND LANDSCAPES (HCL) Policy 16 Public Rights of Way and Permissive Access Routes:

> *"It is the policy of the Council to continue to promote and improve access to high amenity, scenic, and recreational lands throughout the County and within adjoining counties, including places of natural beauty or utility, for the purposes of outdoor recreation, while avoiding environmental damage, landscape damage and impacts to Natura 2000 sites."*

HCL16 Objective 1: *"To promote the preservation of public rights of way that give access to mountain, lakeshore, riverbank or other places of natural beauty or recreational utility such as parklands, geological and geo-morphical features of heritage value and to identify and map such public rights of way as they come to the attention of the Council."*

HCL16 Objective 2: *"To promote and facilitate the creation of Permissive Access Routes and heritage trails that will provide access to high amenity, scenic and recreational lands including rural areas, forests, Woodlands, waterways, upland/mountain areas, the Grand Canal, the Dodder Valley, the Liffey Valley and between historic villages (utilising modern technology), in partnership with adjoining local authorities, private landowners, semi-state and other public bodies such as Coillte and the Forest Service. Permissive Access Routes should not compromise environmentally sensitive sites."*

HCL16 Objective 3: *"To promote and facilitate the continued development of the Dublin Mountains Way and the Wicklow Way in association with the Dublin Mountains Partnership, particularly Permissive Access Routes that provide access to regional and local networks of walking, running, hiking and mountain bike trails and other recreational facilities. The routing of new trails and rerouting of existing trails off public roads is encouraged."*

HCL16 Objective 4: *"To promote and improve access, in partnership with the relevant landowners, to all the historic sites in the County and seek to maximise their tourism potential in partnership with the relevant landowners."*

HCL16 Objective 5: *"To bring mountain amenities closer to residential communities by promoting the establishment of a network of formal footpaths, off-road paths and cycle ways that facilitate casual walkers and cyclists."*

2.3.3.8 Heritage, Culture and Landscape

HCL Policy 1: *"It is the policy of the Council to protect, conserve and enhance natural, built and cultural heritage features, and to support the objectives and actions of the County Heritage Plan."*

HCL1 Objective 1: *To protect, conserve and enhance natural, built and cultural heritage features and restrict development that would have a significant negative impact on these assets.*

HCL2 Objective 3: *To protect and enhance sites listed in the* Record of Monuments and *Places and ensure that development in the vicinity of a Recorded Monument or Area of Archaeological Potential does not detract from the setting of the site, monument, feature or object and is sited and designed appropriately.*

HCL3 Objective 3: *To address dereliction and encourage the rehabilitation, renovation, appropriate use and re-use of* Protected Structures.

2.3.3.9 Watercourses Network

GREEN INFRASTRUCTURE (G) Policy 3 Watercourses Network:

> *"It is the policy of the Council to promote the natural, historical and amenity value of the County's watercourses; to address the long term management and protection of these corridors and to strengthen links at a regional level."*

G3 Objective 1: *"To promote the natural, historical and amenity value of the County's watercourses and address the long term management and protection of these corridors in the South Dublin Green Infrastructure Strategy."*

G3 Objective 2: *"To maintain a biodiversity protection zone of not less than 10 metres from the top of the bank of all watercourses in the County, with the full extent of the protection zone to be determined on a case by case basis by the Planning Authority, based on site specific characteristics and sensitivities. Strategic Green Routes and Trails identified in the South Dublin Tourism Strategy, 2015; the Greater Dublin Area Strategic Cycle Network; and other government plans or programmes will be open for consideration within the biodiversity protection zone, subject to appropriate safeguards and assessments, as these routes increase the accessibility of the Green Infrastructure network."*

G3 Objective 5: *"To restrict the encroachment of development on watercourses, and provide for protection measures to watercourses and their banks, including but not limited to: the prevention of pollution of the watercourse, the protection of the river bank from erosion, the retention and/or provision of wildlife corridors and the protection from light spill in sensitive locations, including during construction of permitted development.*"

2.3.3.10 Views and Prospects

In Section 9.2.1 it is stated:

> *"The County contains many scenic views and prospects (distant objects) of places of natural beauty or interest that are located in the County and in adjoining counties. These include localised views and panoramic prospects of rural, mountain, hill, coastal and urban landscapes such as Dublin City and environs, Dublin Bay, the Liffey Valley and the Dublin and Wicklow Hills and Mountains including the Glenasmole Valley. Views of places of natural beauty or interest are not confined to those that are visible from scenic places but also from and to existing built up areas."*

Montpelier Hill is identified in Table 9.2 as a Prospect to be Preserved and Protected.

HERITAGE, CONSERVATION AND LANDSCAPES (HCL) Policy 8 Views and Prospects: *"It is the policy of the Council to preserve Views and Prospects and the amenities of places and features of natural beauty or interest including those located within and outside the County."*

HCL8 Objective 1: *"To protect, preserve and improve Views and Prospects of special amenity, historic or cultural value or interest including rural, river valley, mountain, hill, coastal, upland and urban views and prospects that are visible from prominent public places."*

2.3.3.11 Landscape

HERITAGE, CONSERVATION AND LANDSCAPES (HCL) Policy 7 Landscapes:

> *"It is the policy of the Council to preserve and enhance the character of the County's landscapes particularly areas that have been deemed to have a medium to high Landscape Value or medium to high Landscape Sensitivity and to ensure that landscape considerations are an important factor in the management of development."*

HCL7 Objective 1: *"To protect and enhance the landscape character of the County by ensuring that development retains, protects and, where necessary, enhances the appearance and character of the landscape, taking full cognisance of the Landscape Character Assessment of South Dublin County (2015)."*

HCL7 Objective 2: *"To ensure that development is assessed against Landscape Character, Landscape Values and Landscape Sensitivity as identified in the Landscape Character Assessment for South Dublin County (2015) in accordance with Government guidance on Landscape Character Assessment and the National Landscape Strategy."*

3.0 PROPOSED DEVELOPMENT

3.1 DEVELOPMENT OBJECTIVES

The motivation for the proposed development is explained in the Design Report. The specific characteristics of the project have been informed by the following objectives of the applicant SDCC and its partners Coillte and the DMP:

- **To formalise and facilitate improved access to recreation facilities in the Dublin Mountains in SDCC's functional area – specifically to Coillte's properties where public access is already permitted**:

  It is policy from national to local level to encourage access to open space/green infrastructure and specifically the Dublin Mountains and the mountains' natural and cultural heritage resources, to enhance the quality of life of local communities and broaden the tourism offer of Dublin. Recreational use of Coillte's properties is growing rapidly across its entire portfolio, most particularly at sites close to urban areas. Currently, one quarter of people accessing the Dublin Mountains for outdoor recreation do so at Coillte's Hell Fire and Massy's Wood properties. These properties have not been designed and are not managed to accommodate the existing and anticipated future usage. The parking area at the Hell Fire Club regularly overflows onto the R115, causing traffic congestion and unsafe conditions on the road for cars and pedestrians. The effects of unmanaged visitor access are also evident in erosion on certain trails, in occasional conflicts between recreational users and Coillte's forest operations, and in visitor behaviour affecting neighbouring properties (e.g. trespass and littering). The project seeks to improve access and management of the Hell Fire and Massy's Wood properties for recreation.

- **To provide improved facilities, catering for a wider range of users and enhancing their experience of the Dublin Mountains forest landscape**:

  The Coillte properties were not historically developed for the purpose of recreational use. As demand for access increased, Coillte's response was typically to provide additional public parking, and allow visitors to use the existing forest roads to access the forest landscape by foot, bicycle and horseback, while retaining the forests in commercial operation. Such, limited, provision for visitors is no longer considered sufficient to cater for the diverse demands of different user groups including local, South Dublin and city residents, domestic and international tourists. It is SDCC's objective to provide - in addition to improved access - improved trails, interpretation of the heritage assets, information on available activities, and supporting services such as food and beverages, toilets, etc. Because of the established, evolving and anticipated future demand any single facility developed should have multiple functions:

  - A local and neighbourhood park, for locals and residents of the nearby suburbs to access on foot, by bicycle, car or horse (from local stables), primarily to use site for walking, horse-riding and appreciation of the landscape and heritage resources;

  - A city park, fitting into the hierarchy of open spaces serving South Dublin and the city as a whole (serving a similar role to parks such as Marley Park, Phoenix Park, St. Anne's Park, Malahide Park, etc.), accessed typically by car, coach or public transport (shuttle), for a visit of several hours or more. Such facilities typically provide, in addition to access to open space/the landscape and heritage, a food and beverage offer and toilets;

- A tourist destination providing for the above as well as orientation and interpretation facilities, visitor information and possibly seasonal services such as guided tours/walks, etc. As a destination the facility should have a 'wow factor', for example through its siting and views, architecture and association with a recognised feature of the Dublin Mountains.

- **To establish a recognised hub or gateway for recreational activities in the Dublin Mountains, thereby developing the South Dublin tourism economy and the economy of the county as a whole**:

  The South Dublin Tourism Strategy (2015), in line with the "Dublin – A Breath of Fresh Air" marketing campaign, which seeks to diversify the offer of Dublin to include its natural assets – the bay and the mountains, states: *"The County's principal resource with potential for development for tourism are the Dublin Mountains…"* Accordingly, it proposed the development of a 'Dublin Mountains Orientation and Interpretation Centre'[3], which would be located to provide views particularly over Dublin Bay.

- **To reveal, interpret and protect the Dublin Mountains landscape, natural, cultural and archaeological heritage assets**:

  In line with the objective to improve visitors' amenities it is considered that more can be done to reveal to visitors the natural, cultural and archaeological heritage assets in the Dublin Mountains, to attract visitors and enhance their experience. This requires that the landscape and heritage assets be appropriately protected and/or improved where necessary so that the assets are not damaged or altered significantly in character by visitor access, and so that the Dublin Mountains can be defined as a heritage landscape/attraction. Any measures for heritage interpretation and protection must take into account the wide range of potential visitors, including the local community, the wider Dublin population, domestic and foreign tourists, corporate visitors, school children and interest groups, etc.

These objectives informed the selection of the application site for development, and the concept and characteristics of the proposed development.

[3] South Dublin Tourism Strategy, 3.1.1:

"The Dublin Mountains Orientation and Interpretation Centre – Flagship Project
Consistent with the recommendation in the 2007 study, this Centre will present the Dublin Mountains Story. It will be targeted at visitors seeking to learn about the geology, history, archaeology, nature and future of the Mountains, what to do in the Mountains, and how best to enjoy the Mountains while maintaining the quality of the environment. It could also provide facilities such as parking, food and beverage, toilets etc. and offer visitor information on guided walks, maps/orientation to other attractions in the mountains - Dublin Mountains Way, Zip It, Tibradden etc., - as well as on other tourist attractions and activities in South Dublin. The project will be required to be subject to careful environmental, visual, landscape, and traffic assessments, so as not to diminish the attractiveness of the Dublin Mountains as a tourism and recreation destination, or to degrade the area's biodiversity and heritage value…

"The ideal location should be selected with excellent panoramic views over Dublin Bay, through elevated viewing locations. Potential sites could include locations at Killakee Mountain or Montpelier Hill or another suitable location."

3.2 DEVELOPMENT DESCRIPTION - OVERVIEW

The proposed development involves (a) changes to the landscape of the site including the trails; (b) conservation works to the architectural heritage features and interpretation of the heritage resources; (c) development of visitor facilities, parking, and services for the facilities, and (d) changes to the roads accessing the site, and provision of a shuttle service to the site. In addition to these physical developments, an operational management plan is proposed to facilitate the envisaged increase in visitor access/usage of the site.

3.3 LANDSCAPE DEVELOPMENT

A 26 ha area of the Hell Fire forest property is the subject of a Memorandum of Understanding between Coillte and SDCC, allowing – subject to ABP's approval of the proposed development - for the removal of this area from Coillte's commercial forest operation and its re-development for amenity use. This is the eastern face of Montpelier Hill between the property boundary along the R115 and the Hell Fire Club at the top of the hill, and extending over the hilltop to include a conifer plantation behind (to the south and west of) the Hell Fire building. The remainder of the Hell Fire property would remain in commercial forest use, with some improvements to the trails in this area to facilitate continued recreational use. The Massy's Wood property is already managed by Coillte primarily as an amenity Woodland and minimal interventions in the landscape are proposed.

3.3.1 Hell Fire Forest Property - Conversion of Commercial Conifer Forest to Permanent Mixed Woodland

Parts of the 26 ha area have recently been felled as part of Coillte's ongoing management of the plantations. Some of the plantations are in mid-growth, and some of the area has mature plantations ready for felling. It is proposed to replace the felled and existing conifer plantations with permanent, mixed (predominantly deciduous) Woodland managed for amenity and biodiversity purposes, incorporating the access and visitor facilities described below as well as pockets of green open space for amenity use.

The existing conifer plantations would be converted to mix Woodland by means of continuous cover forestry, whereby the conifers are progressively thinned and inter-planted with deciduous species over time. In those areas within the Woodland identified for high usage amenity use, existing tree stumps will initially be removed or ground down to ground level.

It is proposed that the coniferous forest to the south and west of the Hell Fire Club building, as well as being replaced by mixed Woodland over time, be cut back from the hilltop (with cleared areas replaced by meadow) so that the building will no longer be seen against a backdrop of vegetation and will return to its original prominence in views from Dublin.

It is proposed to retain the hilltop surrounding the Hell Fire Club in grassland to allow for continued amenity use of the space. It is proposed to develop a number of additional amenity areas within the new permanent mixed Woodland, including one on the hillside above and one below the visitor centre. In these areas the Woodland would be thinned and meadow grassland maintained for uses such as picnicking and informal play (no formal playgrounds are proposed).

3.3.2 Massy's Wood Property

No significant interventions in the landscape of Massy's Wood are proposed other than (a) the restoration of the area disturbed by construction of the pedestrian bridge, (b) the conservation

measures for the walled garden, (c) works associated with the improvement of the trails – particularly the Glendoo Brook trail, and (d) installation of interpretation signage.

3.3.3 Landscaping Associated with Drainage Features

It is proposed to use a system of swales and ponds to capture surface water run-off on the Hell Fire property (existing run-off and the increase in run-off volume from the proposed new facilities). These drainage features will be landscaped using naturalistic treatments so as not to appear excessively engineered and to allow for amenity usage when not inundated.

3.3.4 Boundary Treatments

It is proposed to install a 2m palisade security fence (or alternative design, e.g. timber fence or wall, subject to agreement with the neighbouring landowners) along the shared boundaries of the residential properties immediately to the north east and to the south east of the Hell Fire property.

Some neighbouring landowners expressed concern during consultation that their lands are illegally accessed by visitors to Coillte's Hell Fire and Massy's properties, with people crossing boundaries to take short cuts. Consultees also reported litter on their properties near the shared boundaries.

It is considered by the applicant that the wider Hell Fire and Massy's property boundary is too long to erect a fence along its entire length and that a fence of sufficient specification to function as a barrier would detract from the landscape. It is intended that the proposed improvements to the walking trails and provision of improved directional signage and other information will contribute to reduced incidences of trespass and littering on neighbouring properties. The following measures are proposed:

- To install signage on the shared boundaries wherever trespass onto neighbouring property has historically taken place, and where the trail network approaches close to the site boundary, requesting visitors not to cross onto the neighbouring private lands;
- Engaging with the neighbouring landowners if problems of trespass or litter arise, and taking measures to prevent them if necessary.

3.4 TRAILS INCLUDING TREE CANOPY WALK/BRIDGE

The proposed development of the trails network on the site is described below in three sub-sections, addressing walking trails, the tree canopy walk/bridge, and equestrian trails.

It is not proposed to provide cycle trails on the site. However cycle access to the site would be facilitated by the modifications to the public road accessing the site and the provision of cycle parking at the site.

3.4.1 Walking Trails

It is proposed to provide a suite of trails of various length, degree of accessibility and difficulty class (accessible, easy, moderate or strenuous) and character, by retaining and upgrading existing roads and paths and developing new sections in places. The trails will be designed in accordance with the standards of the *Classification and Grading of Recreational Trails* published by the National Trails Office. Notable elements of the trails proposals include:

- A 'feature stairway' to the Hell Fire Club. The existing direct route up Montpelier Hill, which is severely eroded in places, is proposed to be improved with the addition of stairs in places;
- A circular trail around the Hell Fire Club and the two adjacent passage tombs. This is the most significant intervention in the landscape around the Hell Fire building and the archaeological sites;
- Glendoo Brook Trail. Modifications are proposed to the alignment of the trails along the river corridor, to reduce the access of users to the river banks. Habitat enhancement measures are proposed in the river corridor in parallel with the trail modifications.

3.4.1 Tree Canopy Walk/Bridge

It is proposed to develop a pedestrian bridge – or 'tree canopy walk' - over the R115, to provide a pedestrian link between the Hell Fire and Massy's Wood properties and an attraction for visitors.

The bridge is 330m long, following a winding route, and has a fall of 1:20 from ground level on Hell Fire at 273.0m to ground level on Massy's at 256.5m. It crosses the R115 with a clearance of 6.24m over the road level.

The structure of the bridge is intended to be 'light' in profile and appearance to sit unobtrusively in the Woodland setting. The width of the deck is 2.5m. The balustrades are 1.2m high with a hardwoods handrail and balusters of Corten (rust coloured steel).

The bridge support columns have a diameter of 250mm and are of Corten steel. They are spaced clusters of two or three columns at approximately 10m centres, and variously angled (vertical and inclined) to look like groups of small tree trunks. The columns would be set in small concrete foundations below ground amongst the retained trees. The foundations will be located in consultation with an arborist so as to minimise damage to tree roots during construction.

3.4.3 Equestrian Trails

It is proposed to cater for the existing use of the site for horse riding by the development of dedicated equestrian trails. These are mostly located around (inside) the perimeter of the Hell Fire and Massy's properties, and are predominantly surfaced in grass.

3.5 HERITAGE INTERPRETATION

It is proposed to provide interpretation of the site's cultural and natural heritage resources and the external environment (Dublin City and Bay, other mountains visible from the site, etc.).

An interpretation and signage strategy and design will be commissioned in the event of development consent, complimentary to the audio-visual and exhibition materials in the visitor centre. It is envisaged that interpretation material will take the form of signage at points along the trails. The signage will be limited - in number and physical presence - so as not to intrude on the walker's experience of the landscape, but to be available at points of potential interest. The signage will be discreet but robust and of fitting materials and character to the site/development. Additional functionality to signage, such as bar codes or similar to launch audio/audio-visual applications on smart phones will be considered.

3.6 CONSERVATION WORKS TO PROTECTED STRUCTURES

A suite of conservation works are proposed to various architectural and archaeological heritage features on the site. These are intended to (a) improve the condition of the structures and ensure their physical integrity and (b) to facilitate improved access to and appreciation of the structures for visitors.

It is proposed that a cultural heritage monitoring regime be implemented during operation, managed by the steering group, to identify any need for further measures to conserve the cultural heritage features on site.

3.6.1 The Hell Fire Club Building

It is proposed to conserve the building as a ruin, with minimal interventions to protect the structure and replace certain recent insensitive works and improve visitor safety. The proposed interventions include:

- Replacement of iron handrails to the stairs and balconies (modern interventions by Coillte which are insensitive in design and have deteriorated, presenting a hazard). The handrails will be reversible interventions.
- The addition of one step to the existing large step down into the ‘card room’ on the half landing, to make the flight safer. The new step will be a reversible intervention.
- The sealing or blockage of the chimney flues to prevent people from climbing up the flues onto the roof. The sealing will be a reversible intervention.
- Removal of pigeon droppings from the interior.
- Removal of modern graffiti from the walls. It is proposed that any historic graffiti identified will be retained.
- Repairs to the roof to prevent water intrusion (some dampness and water were noted during survey, as well as lime leaching and some biological colonisation in the form of green mould and lichens). The roof repair will be informed by detailed survey of the roof structure.
- Investigation of the nature and condition of the earth flooring that exists currently on the interior of the Hell Fire Club is to be investigated, subject to the necessary ministerial and planning consents associated with national monuments and protected structures. Where stone floors survive they are to be revealed and repairs carried out as necessary. Where earthen flooring is identified, it is to be overlaid with a more suitable durable material, such as stone flags, if deemed appropriate. It is intended that this will protect underlying archaeological features. A similar reversible approach was adopted in the crypt of Christ Church Cathedral in Dublin.
- The installation of discreet lighting inside the building where level changes or low lintels occur presenting hazards.
- A detailed survey by non-invasive techniques (LiDAR or laser scanners) to identify megalithic art, if this exists, on the Masonry within the building. The discovery of Neolithic art during the course of the recent excavation of the adjoining passage tomb, suggests that art may be present as is suspected that stone from the adjacent passage tombs was used in the construction of the building. If such Neolithic artwork is discovered measures will be taken to ensure that it is not obscured by any recent or proposed interventions, and that it is suitably interpreted.
- Monitoring, repair and visitor access management of the Hell Fire Club building. Currently maintenance and conservation of the structure is piecemeal and visitor access is unchecked. It is proposed that as part of the management regime of the site the building will be formally inspected annually by a conservation architect to establish if repair works

are required, to monitor the effects of increased visitor access and propose management measures if necessary.

It is not proposed to restrict access to the building. The building has proved resilient to visitor access in the past.

No other significant physical interventions are proposed for any architectural or archaeological features on the Hell Fire property.

It is not proposed to return the fallen standing stone to an upright position.

The landscape development proposals for the Hell Fire property have been prepared with consideration of the known and possible archaeological features of the site.

3.6.2 Massy's Walled Garden and Other Protected Structures

It is proposed to conserve the walled garden as a ruin, with minimal interventions to protect the integrity of the structure and reveal the structure and spaces to visitors. The proposed interventions include:

- Removal of trees threatening the structure of the walled garden. A number of trees have taken root close to the external walls and the internal structural elements of the walled garden (notably the steps and the conservatory structure). These trees have caused, or have the potential to cause, the masonry to shift, and will continue to undermine the integrity of the structure if allowed to remain and grow. It is generally proposed that they be removed, under the guidance of a conservation architect to ensure that they do not further damage the structure, and that any damage already done is repaired;
- Retention of certain trees in the walled garden. It is considered that a certain number of the trees growing in the walled garden - notably one tree in the steps near the southern wall of the largest of the walled gardens, and several trees in the conservatory – (a) do not pose a threat to the integrity of the main structure, and (b) have significant amenity value. It is proposed that these trees (which have been individually identified) be retained and the masonry re-set where necessary, and that the effect of the trees on the structures be monitored annually as part of the architectural heritage monitoring and management programme;
- Clearance of scrub from the walled garden. It appears that the walled garden was used as a nursery in places (in the recent past) but abandoned; there are areas where numerous trees are growing close together. Elsewhere the garden has been colonised by scrub. As a result of the dense internal vegetation the interior of the walled garden is not legible. It is proposed to clear the vegetation (excluding trees with amenity value) to reveal the structure, spaces and level changes to visitors;
- Maintenance of a meadow grassland within the walled garden. It is proposed to establish and maintain meadow grassland in the walled garden;
- Access and interpretation. It is proposed as part of the trail network and interpretation plan that the trail through the walled garden will be improved where necessary to meet the required quality and safety standards, and that signage will be provided for interpretation.

No other significant physical interventions are proposed affecting the architectural and archaeological features of the Massy's Estate. It is proposed to widen the R115 in places for a section of approximately 100m along the Massy's Wood boundary, requiring the realignment of

the existing boundary wall. This includes works in the immediate vicinity of the gothic gate lodge near the Massy's Wood property entrance, but no physical changes are proposed to the building itself.

With the exception of the Military Road the various structures within Massy's are protected under a single listing in both the Record of Protected Structures and the National Inventory of Architectural Heritage (RPS#: 384, NIAH#: 11221018). They are described in the RPS listing as follows: 'Buildings and features associated with the former Killakee House, including former gardens, bridges and walls'. These have been individually identified and inspected to inform the proposed development and the EIA (refer to Chapter 12 of the EIAR).

Should the proposed development be consented it is proposed that a monitoring and management programme be implemented for the entire suite of structures comprising the Massy's Estate Protected Structure listing. This will comprise:

- Detailed survey and repair of the Massy's Estate Protected Structures. Initially each structure will be surveyed and recorded and any necessary repairs will be carried out to ensure its structural integrity;
- Annual inspection and repair. An annual inspection will be carried out by a conservation architect to establish the condition of each structure and specify and supervise any necessary repair work;
- Management measures in the case of deterioration. It is likely (subject to an interpretation plan in the event of development consent) that each visible feature will be interpreted on site with signage. This will identify the feature and request visitors' assistance in conserving the structures. Should it be found that increased visitor access (or any other cause) is resulting in a deterioration of the structure, measures will be taken to further protect the structure. Such measures might include additional signage/information requesting visitors' cooperation, re-routing of trails away from the structure, and/or hiding the structure with vegetation to reduce its exposure.

3.7 VISITOR CENTRE

3.7.1 Siting and Design of Buildings

It is proposed to construct two buildings side-by-side (buildings 'A' to the front/east and 'B' to the rear/west, together comprising the visitor centre) on the Hell Fire site at a level of approximately 300m ASL, adjacent and to the east of the existing forest road.

The buildings are partially set into the hill. The buildings are positioned one behind the other to limit their spread across the face of Montpelier Hill in views from the east. The buildings have linear, rectangular plan form and flat roofs to minimise their footprint and height. Building B is single volume. Building A is double-volume, the lower floor being set into the slope of the hill. There are gathering/entrance spaces, courtyards and terraces around the buildings.

The buildings are clad in a combination of stone and timber, with green roofs. The natural materials are intended to reflect the site/development character and minimise the buildings' obtrusiveness. Building A has a broad window (36m x 2.3m) across its east façade on the upper level. The buildings are surrounded by new mixed woodland planting. The planting is thinned in front of Building A to allow views from the visitor centre across the surrounding landscape.

3.7.2 Building Uses and Floor Areas

The visitor centre facilities can be divided into three main components:

a) Basic facilities for walkers and casual visitors. The facilities include shelter/resting place, toilets, food and beverage service, and access to information. They are located on the lower level of Building A, opening onto the terrace in front of the building. The facilities are intended to be available for quick, casual access, particularly for walkers;
b) Seated café. The café has seating for 75 no. patrons, with counter service providing breakfast, brunch, lunch and tea options. It is located on the upper level of Building A, with a panoramic window affording a view across Massy's Wood towards Dublin Bay;
c) Interpretation, exhibition and education facilities. The facilities include an audio-visual and exhibition room and an education room. The facilities are intended to cater for tourists (domestic and international), school groups, special interest groups and corporate groups.

The buildings contain the following accommodation (described in three parts: Building A lower level, Table 3.1; Building A upper level, Table 3.2; Building B, Table 3.3):

Table 3.1 Building a Lower Level (gross floor area 316 sq. m)

Room no.	Function/Name	Gross Floor Area	Description
001	Kiosk	27 sq. m	A kiosk with sheltered counter service, providing take-away hot and cold (non-alcoholic) drinks and basic food (sandwiches, snacks, fruit, etc.). This is intended to cater for walkers and visitors using the (south) terrace and to take away on walks.
002	Circulation	14 sq. m	Stairs to upper level.
003	Staff toilet	5 sq. m	-
005-008	Public Toilets	22 sq. m	4 no. toilets (2 no. fully wheelchair accessible and with baby changing facilities) for use by the public.
09	Site Manager's Office	12 sq. m	Office space for site manager. This will include facilities such as CCTV monitors, etc.
010	Office (Coillte)	15 sq. m	Office space for Coillte personnel.
011	Dublin Mountains Partnership DMP Office	18 sq. m	Office room for the use of the DMP volunteer rangers. The room is located adjacent to the Ramblers' Lounge in order that the volunteers are accessible to visitors.
012	Retail space	45 sq. m	A small shop providing goods of relevance to walking and heritage focussed visitors, e.g. equipment (ponchos, umbrellas, walking sticks, etc.), maps, books, souvenirs.
013	'Ramblers' Lounge'	43 sq. m	A rustic lounge-type room with stone flag flooring, bench seating around the walls, and a stove, opening onto the terrace to the front (east) and side (north) of the building. This room is intended to provide a resting and meeting place for walkers, and information on the site facilities, services and heritage, and the recreation facilities, services and heritage of the wider Dublin Mountains area.
015	Storage room	4 sq. m	Storage room for the shop and Ramblers' Lounge.
016	Plant room	57 sq. m	-
Building A Lower Level Gross Floor Area			**316 sq. m**

Table 3.2 Building A Upper Level (gross floor area 394 sq. m)

Room no.	Function/Name	Gross Floor Area	Description
101	Café seating area	175 sq. m	A linear rectangular space aligned for maximum exposure to the panoramic window and the view east, with tables and seating for 80 patrons.
102	Servery	36 sq. m	A servery equipped food display cabinets, fridges, coffee machines, warming ovens, etc. providing counter service to café patrons.
103	Kitchen	60 sq. m	A kitchen with storage space, all necessary equipment for food preparation and post-preparation storage, scullery, etc. for on-site preparation of food.
104	Dry Good Store	3 sq. m	Dry good store adjacent to kitchen.
105-107	Toilets	30 sq. m	Male, female and wheelchair accessible toilet facilities. Baby-changing to be provided within accessible toilet.
108	Cleaner's Store	2 sq. m	Cleaner's store area
109	Café Manager's Office	10 sq. m	Office space for café manager.
110	Bin store	10 sq. m	A space for storage of bins for waste generated by the entire visitor centre.
11-113	Circulation	44 sq. m	Internal circulation and stairs to lower level.
Building A Upper Level Gross Floor Area			**392 sq. m**

Table 3.3 Building B (gross floor area 256 sq. m)

Room no.	Function/Name	Gross Floor Area	Description
114	Entrance foyer	60 sq. m	Entrance foyer to audio-visual/exhibition facility, including reception desk for information and sale of tickets and a small selection of maps, books and souvenirs.
115	Exhibition room	101 sq. m	A large space sub-divided into an audio-visual theatre-style room and a separate exhibition space.
116	Education room	55 sq. m	A room equipped with tables and seating for groups of up to 54 persons, allowing for flexible use by various user groups.
117-118	Toilets	9 sq. m	One wheelchair accessible and one general toilet.
119	Circulation	40 sq. m	Circulation space including wide corridor with full length glazing intended as informal social / exhibition space.
Building B Gross Floor Area			**272 sq. m**

Table 3.4 Total Gross Floor Area of Buildings A and B

Building A Lower Level Gross Floor Area	**316 sq. m**
Building A Upper Level Gross Floor Area	**392 sq. m**
Building B Gross Floor Area	**272 sq. m**
Total Gross Floor Area	**980 sq. m**

3.8 EXPANSION OF HELL FIRE CLUB PARKING AREA

It is proposed to increase the capacity of the Hell Fire forest parking area from c.80 car spaces to 275 no. car spaces (of which 14 no. are disabled spaces) and five coach spaces.

The proposed parking area is comprised of three parallel tiers of parking, the lowest of which is approximately in the position (alignment and level) of the existing road and parking area, with the two

upper tiers stepping up the hillside. The tiers are separated by retaining walls and strips of screening vegetation. The roads are proposed to be tarmac and top-dressed with a coloured aggregate. The parking spaces will be surfaced in 'Grasscrete' or similar permeable structured grass product.

Footpaths from the parking area lead: (i) directly up the east face of Montpelier Hill; (ii) towards the visitor centre, (iii) towards the pedestrian bridge over the R115 to Massy's Wood.

It is proposed to provide low level lighting (bollard-type and directional) in the parking area. The lights will be turned off every night when the gates are locked.

It is proposed to install a permanent electronic car park monitoring system to record the occupancy rate in the car park. This will link to Variable Message Signs (VMS) to the north on the two main approach routes from the city and M50 directions. At unusually busy periods the VMS signs will alert drivers to the lack of parking spaces at Hell Fire and will instead direct them to the Park & Ride site (refer to 3.17 below).

3.9 DRAINAGE

Measures have been proposed to minimise the increase in surface water run-off generated by new hard surfaces on the site, including green roofs on the visitor centre buildings and permeable paving in the parking area.

A series of interconnected swales and ponds is proposed for surface run-off attenuation on the lower eastern slope of Montpelier Hill around the new built facilities. Any overflow from the ponds will be channelled into a proposed new culvert beneath the R115 and into an existing drainage channel on Massy's Wood feeding into the Glendoo Brook.

3.10 SERVICES

3.10.1 Water Supply

A new water main line will be required to serve the development. The closest existing public water main is located at the intersection of the R115 (Old Military Road/Killakee Road) and the R113 (Gunny Hill).

A new connection will be required into this 4 inch UPVC pipe and approximately 1260m of new water main pipe will be required along the R115 and up the eastern face of Montpelier Hill to bring the water main supply to the proposed visitor centre.

3.10.2 Foul Water Treatment

Site investigations determined that bedrock on the Hell Fire property is too shallow to allow for on-site treatment of foul water. It is proposed that the site be connected to the public sewer by the installation of a new 150mm diameter sewage pipe from the site to the existing sewer network in the urban area to the north.

3.10.3 Electricity Supply

It is proposed to supply the development's energy requirement by electricity; there is existing electricity infrastructure in close proximity to the site. No gas supply is proposed. An on-site electricity substation and LV switch room is proposed. This will be a stand-alone building of 7m x

4m and 3m high (28 sqm), located off the main forest road some 65m south of the visitor centre. It will be screened by earth mounds and planting.

It is proposed to heat the visitor centre buildings with underfloor heating powered by air-to-water heat pumps located behind Building B. The buildings will be ventilated by a combination of natural and mechanical ventilation.

3.11 MODIFICATIONS TO R115 AND R113

It is proposed to modify the roads connecting the site to the South Dublin urban area. The proposals affect the following sections of road:

- the R115 Stocking Lane between its junction with Stocking Avenue and its junction with the R113 Mount Venus Road;
- the R113 Mount Venus Road between its junction with Stocking Avenue and the R115 Stocking Lane/Killakee Road;
- The R115 Killakee Road between its junction with the R113 Mount Venus Road and the Hell Fire site entrance.

These stretches of road in combination constitute the direct road connections between the site and the South Dublin urban area. The proposed modifications to the roads include:

a) the provision of a footpath on one side of the road, of 1.5m width or wider (depending on the distance between the adjacent property boundaries) separated from the carriageway by a kerb;
b) the provision of an advisory cycle lane on one side of the road (generally the opposite side to the footpath), of 1.5m width, indicated by road markings on the carriageway;
c) The provision of two-way carriageway of 5-6m width for the majority of the road, and the provision of single lane carriageway for one stretch of c. 90m where a single lane traffic shuttle would operate governed by yield signs at each end.

It is not proposed to widen the existing road into adjacent privately owned properties. For one stretch of the road (c.100m) it is proposed to widen the road by up to 1.2m in places, encroaching into the Massy's Wood property (Coillte owned) east of the road.

3.12 R115 ROAD FRONTAGE MODIFICATIONS

The proposed widening of the R115 along the frontage of the Massy's Wood property would require the localised removal of the existing boundary wall along that stretch. Where this occurs it is proposed to rebuild the wall, using the same materials, along the newly aligned boundary.

It is proposed to modify the existing entrance to the Hell Fire property to provide the required sightlines and turning radius for vehicles exiting the site, to achieve the required gradient on the internal road, and to provide dedicated pedestrian and equestrian entrance points.

3.13 MANAGEMENT AND MAINTENANCE OF FACILITIES

3.13.1 South Dublin County Council, Coillte and Dublin Mountains Partnership Management Steering Group

It is proposed to establish a permanent management steering group comprised of SDCC, Coillte and the DMP. This steering group would have responsibility for:

a) managing the contract, lease or license (refer to 3.13.1.1 below) of the private operator of the facilities;

b) management and maintenance of the Hell Fire and Massy's Wood properties, including:
- maintenance of all areas outside of the responsibility of the private operator;
- conducting or arranging to have carried out annual inspections of (a) the trails, (b) the archaeological and architectural heritage features, (c) identified Key Ecological Receptors (species and habitats)[4], and implementing any repair, improvement or protection works required;
- carrying out an annual programme of works for the conversion of existing conifer plantations to permanent native mixed Woodland on the 26 ha portion of the Hell Fire property the subject of the MoU between Coillte and SDCC, until the conversion is completed;
- coordination of all forest operations to ensure minimal conflicts with recreational use of the site and vice versa;
- Liaison with the neighbouring landowners, residents and other stakeholders, facilitated through the consultation forum of the DMP.

c) Responding to any issues raised by the operator to do with the area outside of the operator's area of responsibility (e.g. issues that might be brought to the operator's attention by users, such as issues with the trails).

3.13.2 Private Operator of the Parking Area, Visitor Centre and Pedestrian Bridge

It is envisioned that the core visitor facilities, i.e. the parking area, the visitor centre and the pedestrian bridge will be managed by a private operator with commercial experience in the leisure/tourism sector.

3.14 STAFFING

The staffing of the facilities will ultimately be determined by the private operator. The Business Plan prepared by CHL estimates a staff complement of 22 people, as follows:

Table 3.4 Estimated Staffing of Visitor Centre

Role	Number of Staff	Weeks per Annum
Centre manager	1	52
Café chef	1	52
Sous chef	1	52
Commis chef	3	52
Kitchen porter	3	52
Counter/serving staff	3	52
Administration	1	52
Marketing executive	1	52

[4] KER1: Red Squirrel
KER2: Badger
KER3: Otter
KER4: Bats (all Irish species except Lesser Horseshoe Bat *Rhinolophus hipposideros*)
KER5: Ponds
KER 6: Invasive Alien Plant Species (IAPS)
KER7: Glendoo Brook

Reception/shop staff	4	52
Seasonal staff	4	22

It is proposed that the visitor centre building will include a base for the DMP's volunteer rangers. It is intended that the rangers will provide additional management and maintenance capacity for certain aspects of the development's operation.

3.15 OPENING HOURS

It is proposed that the facilities will operate approximately during daylight hours.

3.15.1 Parking Area

- April to September: 7am to 10pm;
- October to March: 8am to 6pm.

There will be an emergency phone number provided at the entrance for any walkers returning to their cars after closing time, and a call-out/opening charge will be payable.

3.15.2 Visitor Centre

- April to September: 8am to 8pm.
- October to March: 9am to 5pm.

3.15.3 Special Events

It is anticipated that there may be opportunities to host special events on the site occasionally, e.g. sporting or cultural events, which may require opening of the facilities outside of the normal opening hours. It is proposed that such occasional events usage would be facilitated by means of the normal outdoor events licensing procedures operated by SDCC, with input from the facility management steering group and the private operator.

3.16 VISITOR NUMBERS

The Business Plan prepared by CHL estimates that over a five year period after opening, the facility could achieve annual visitor numbers of 225,000 (made up of 'domestic amenity' i.e. local visitors, domestic tourists, international tourists, schools and corporate groups), with this number possibly growing further to 300,000 over the subsequent five year period.

It is estimated that weekend usage of the facilities would double (from existing usage). It is also anticipated that there would be a greater spread of usage across the week due to the growth of tourist visits, and that the duration of visits would increase with the expanded range of facilities.

3.17 PROPOSED SHUTTLE BUS FROM TALLAGHT

It is proposed to operate a shuttle bus service to the site from Tallaght LUAS stop and Public Transport Hub at Tallaght Town Centre, via a proposed Park & Ride facility at Tallaght Stadium. The proposed route is 7.5km long via Oldbawn and Ballycullen. At Woodstown Village the shuttle bus could interchange with the No.15/15B Dublin Bus route.

The proposed shuttle bus service will operate seven days a week year round, with a frequency of 15 to 30 minutes according to varying seasonal and daily demand. The potential demand for the bus service has been determined as part of the overall transport demand assessment.

3.18 CONSTRUCTION PHASE

An Outline Construction and Traffic Management Plan has been prepared and submitted with the application under separate cover. The following items from the Plan are notable:

- A construction programme of 15 months is estimated;
- The Plan identifies two possible locations for a Site Construction Compound;
- The existing public parking provision of c. 80 spaces will be maintained on the site throughout the construction phase and this capacity will not be available for use by Contractor staff and other personnel associated with the works;
- Construction works and deliveries on weekdays will be restricted to between 07:00 and 19:00 subject to planning approval. Construction works and deliveries on Saturdays will be restricted to between 08:00 and 13:00 subject to planning approval. No works or deliveries will take place on Sundays or Bank/Public Holidays without prior written approval from the Employers Representative;
- Two way traffic on public roads (the R113 and R115) will be maintained throughout the construction phase through the use of shuttles, temporary lights and any other required temporary traffic management measures. The traffic management measures will comply with the Department of the Environment Traffic Signs Manual – Chapter 8 Temporary Traffic Measures and Signs for Road Works, and the Department's Guidance for the Control and Management of Traffic at Road Works. The traffic management measures will be subject to a Traffic Management Road Safety Audit by an independent party.

4.0 CONSIDERATION OF ALTERNATIVES

The EIA Directive 2014 requires an EIAR to contain:

> *"A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects."*

4.1 ALTERNATIVE DEVELOPMENT LOCATIONS

A Feasibility Study for a Dublin Mountains tourism facility in South Dublin County Council's area of jurisdiction was carried out 2015. This resulted in the selection of the Hell Fire and Massy's Wood site. The Feasibility Study focussed on six possible development sites (and combinations of sites), which were assessed in terms of their potential to achieve the development objectives (refer to Section 3.1 above), comply with planning policy (refer to Section 2.3 above), and their environmental characteristics and potential for environmental effects.

The six site options considered in the 2015 Feasibility Study were as follows:

- Hell Fire Wood;
- Massy's Estate;
- Combination of Hell Fire Wood and Massy's Estate;
- Steward's House;
- Featherbed;
- Cruagh.

These alternative sites are individually discussed below in 4.4.1-6. The 'do nothing' alternative is also discussed, in 4.1.7. A summary comparison of the environmental effects of development on the alternative sites is provided in 4.1.8.

Sometime after the completion of the 2015 Feasibility Study which led to the selection of the Hell Fire and Massy's Wood site for the development, the nearby Orlagh House was put on the market for sale by the Augustinian order. The property was examined for its potential for development as an alternative, or in addition to the Hell Fire and Massy's Wood site. A report was produced by Paul Keogh Architects entitled *Assessment of Potential of Orlagh House for Flagship Tourism Project*. This is discussed in 4.1.9 below.

4.1.1 Hell Fire Forest Property

Refer to Section 2.1.1 above for an overview description of the Hell Fire forest property.

4.1.2 Massy's Wood Forest Property

Refer to Section 2.1.2 above for an overview description of the Massy's Wood forest property.

4.1.3 Hell Fire and Massy's Wood Forest Properties Combined

The combined area of the Hell Fire and Massy's Wood forest properties is 152 ha. The two properties are divided by the R115. Both are used extensively for recreation, individually and in combination. It is estimated that one quarter of all people accessing the Dublin Mountains for recreation do so at the Hell Fire and Massy's properties. Access is provided by the car park for 80 cars on the Hell Fire property, although informal parking along the R115 between the properties also occurs when the carpark overflows.

The properties have a number of significant architectural and archaeological heritage features of significance including the Hell Fire Club building and two adjacent passage tombs, a section of the Military Road, and the Massy's walled garden and other features of the Killakee House demesne.

Massy's Wood is traversed by the Glendoo Brook, a fast-flowing stream which provides habitat for otter, salmonids and kingfisher. Stretches of the river corridor, as well as other parts of Massy's, have been colonised by invasive alien plant species. The forests of both properties host red squirrel, badger, bats and birds.

4.1.3.1 Indication of Main Reasons for Selecting This Alternative

- The properties are in the ownership of Coillte;
- The two properties are used extensively for recreation. The properties are thus established as destinations for outdoor recreation, and have recognition in the minds of users;
- The two properties are located at the point of transition between the urban environment of Dublin and the rural environment of the Dublin Mountains, closest (among the alternative options) to the urban area and the majority of existing and potential users, and potentially accessible on foot and by bicycle;
- The proximity of the properties to the urban area makes them more accessible (than Featherbed and Cruagh) by road, and for walkers and cyclists;
- The proximity of the properties to the urban area makes them easier to service with water supply, foul drainage, electricity and gas;
- The two properties and the immediate environment are subject to environmental impacts from the existing recreational use, and occasional conflicts between the recreational use and forest operations. By selecting the combined site for development, opportunities are created for improved provision of facilities and management to mitigate those impacts and protect the heritage resources;
- The two properties (particularly Hell Fire) have a 'forested upland' character but development would not encroach significantly into the Dublin Mountains High Amenity (HA – DM) zoned area;
- The properties include substantial areas below the 350m contour (a key consideration in planning policy – refer to Section 2.3.3.2);
- The properties (Hell Fire specifically) have areas, including areas below 350m, that provide panoramic views over Dublin Bay and the city, which was a key objective of the development;
- The properties in combination provide a wide range of landscape types (e.g. forested valley and river corridor on Massy's; forested hillside and open, un-vegetated hilltop on Hell Fire) and natural and cultural heritage resources. This concentration of resources is considered to be representative of the Dublin Mountains High Amenity area and to have significant existing and potential visitor interest value.

- Development on the properties – more so than the alternative options - has the potential to fulfil/be compliant with relevant planning policy, including:

  SDCDP

  - HCL9 Objectives 1 to 3 (refer to Section 2.3.3.1 above) and particularly Objective 4, which requires that opportunities be maximised to enhance existing ecological and archaeological landscapes and resources. The site's concentration of cultural and archaeological resources and habitats provides an opportunity to enhance those resources through improved management;
  - G2 Objectives 4, 7 and 9 (refer to Section 2.3.3.4), which encourage regeneration of flora and fauna, incorporation of items of historical or heritage importance as amenity features within the Green Infrastructure network, and increased tree canopy coverage using native species;
  - G4 Objective 2 (refer to Section 2.3.3.5), which requires parks and areas of open space to be connected with ecological and recreational corridors. The application site has the greatest potential for connectivity with the overall Green Infrastructure network;
  - HCL16 Objective 4 (refer to Section 2.3.3.7 above), which seeks to promote and improve access to historic sites and seek to maximise their tourism potential;
  - HCL16 Objective 5 (refer to Section 2.3.3.7), which seeks to bring mountain amenities closer to residential communities by promoting the establishment of a network of formal footpaths, off-road paths and cycle ways that facilitate casual walkers and cyclists;
  - G3 Objective 1 (refer to Section 2.3.3.8 above), which seeks to promote the natural, historical and amenity value of watercourses and their long term management as part of the Green Infrastructure network;
  - G3 Objectives 2 and 5 (refer to Section 2.3.3.8 above);
  - The zoning objective for HA – DM, which allows for the various uses of the proposal but significantly restricts them to below the 350m contour.

- The zoning objective excludes '*Restaurant/Café'* and '*Shop-Local'* uses from the HA – DM area unless they are in existing premises. However, Policy ET5 Objective 3 specifically supports the development of a visitor facility (which equates to the '*Recreational Facility*' land use, which is not limited to existing premises) in or adjacent to the HA-DM area. The proposed café and shop are ancillary to the visitor facilities.

4.1.4 Steward's House

Steward's House is in private ownership but was considered in the original Feasibility Study as it was available for purchase at the time, it is centrally located adjacent to two established recreation sites - the Hell Fire and Massy's Wood forest properties, it has a cultural heritage association with Massy's Wood/Killakee House, it has buildings of cultural heritage value, and it has historic use as a restaurant and a now expired planning permission for holiday accommodation.

The property is 0.36 ha. It is occupied by a two-storey house, built c. 1765, with extensions, and an attached belfry and stables (derelict but with stone facades intact), arranged around a courtyard. The property is listed as No. 380 on the South Dublin Record of Protected Structures, described as 'Stables, Tower and Gates'. The house was previously used as a restaurant but is

currently used as a dwelling. There is a hard standing area to the rear of the house and stables. The buildings most likely contain bat roosts.

The property was effectively considered as the possible site of a visitor centre building attached to the wider improved facilities (parking, trails, etc.) to be developed on the adjacent Hell Fire and Massy's Wood properties.

4.1.4.1 Indication of Main Reasons for Not Selecting This Alternative

- The property was not in the ownership of SDCC or Coillte and would have required a speculative purchase with public funds;
- Not all of the development objectives of the applicant could be met by this site. In particular, Steward's House provides no view, which was a key objective (and site selection criterion) for the visitor centre facility. Additionally it was considered that this option would not achieve the 'wow factor' required for a new tourist destination of national status;
- The property is occupied by protected structures, which would present an opportunity for good practice in refurbishment and re-use, but also a constraint to the scale and form of any facility;
- Therefore, while the use of Steward's House for the visitor centre would avoid the impact of the proposed visitor centre (a new building), it was considered unsuitable in terms of the development objectives;
- The property is constrained in size and in terms of road access from the R115. It would have required that Coillte lands on the Hell Fire property be attached to the property and access and parking provided on those lands, with access to the facility from the rear;
- The proposed development is intended in part to act as a catalyst for private sector amenity and tourism related development in the Dublin Mountains. Steward's House has a history of such use (as a restaurant) and had planning permission for such use (holiday accommodation) which expired in 2016. It was considered that an opportunity for related private sector development would be taken away by use of Steward's House for the proposed facility.

4.1.5 Featherbed

The Coillte owned Featherbed property is 108 ha in extent. It is located to the north of Killakee Mountain, at an elevation above 350m, on a hill that is distinct by its relatively flat, domed (as opposed to conical) topography compared to the surrounding uplands.

The property is almost entirely covered with conifer plantations of various age, with some areas of peat. There are no natural drainage features on the property. The property borders on the Wicklow Mountains SAC to the south. There is one cultural heritage feature – an 'enclosure' - on the northern boundary of the property. In character the property relates more to the mountains to the south than the city and bay to the north and east. It provides views of the taller mountains to the south and west, but has limited views north beyond the tree line (due in part to the topography).

The site has frontage to the R115. There is space for two cars to park at the site entrance outside the barrier. The Dublin Mountains Way traverses the property.

4.1.5.1 Indication of Main Reasons for Not Selecting This Alternative

- The property contains no archaeological or architectural heritage features, and less variety in habitats and landscape character (than Hell Fire and Massy's). This reduces its potential visitor appeal and thus the potential to achieve key development objectives. This also limits opportunities for realising a number of SDCDP policy objectives to (a) improve access by incorporating heritage resources into the Green Infrastructure and parks network, and (b) to enhance those resources;
- The property borders on the Wicklow Mountains SAC. The proximity to a designated area requires a greater level of sensitivity to habitats and species;
- The property is located mostly above the 350m contour line above which the zoning objective precludes certain key proposed facilities including the uses *'Car Park, 'Restaurant/Café'* and *'Shop-Local';*
- The views of Dublin Bay and the city are less impressive than those from the Hell Fire property (and Cruagh);
- The property is further from the urban area (than Hell Fire, Massy's and Steward's House) and at substantially higher elevation. This makes it less accessible by car and particularly for walkers and cyclists approaching from the urban area;
- The relative distance from the urban area (compared to Hell Fire, Massy's and Steward's House) means the property is less easily serviced by water supply, foul drainage, electricity and gas;
- Due to the property's relative remoteness the baseline air quality and surface water quality are such that relatively greater impact on these factors would result from development at the site. The longer travel distance by vehicle, and the associated lower likelihood of the development being accessed by foot or bicycle, would also result in higher greenhouse gas emissions from vehicles.
- The existing adverse environmental impacts of un-managed access to the Hell Fire and Massy's Wood properties would not be mitigated, including deterioration and/or ad-hoc protection of the architectural heritage, and traffic impacts on the R115;

4.1.6 Cruagh

The Coillte owned Cruagh property is 133 ha in extent. It is located on the northern slope of Cruagh Mountain which itself lies to the north of Killakee and Glendoo Mountains, at an elevation above 350m (most of the property). The site is almost entirely covered with conifer plantations (predominantly Sitka spruce and some European larch) of various age.

The property has no known cultural heritage features. Part of the property is designated SPA, as part of the Wicklow Mountains SPA, and the property borders on the Wicklow Mountains SAC to the south.

The site has frontage to Cruagh Road between the R115 and the R116. There is a parking area with capacity for 35 cars, and there are picnic tables provided at the car park. There are several waymarked trails on the property including a Sli na Slainte walk and a section of the Dublin Mountains Way linking to Tibradden Wood to the east and via Cruagh Road to Featherbed to the west.

The property provides views north over the city and a part of Dublin Bay, but particularly at lower elevations (e.g. at the existing car park) the width of the panorama to the east is limited by Tibradden Mountain and by forestry on neighbouring properties (some in private ownership).

4.1.6.1 Indication of Main Reasons for Not Selecting This Alternative

- The property contains no archaeological or architectural heritage features, and less variety in habitats and landscape character (than Hell Fire and Massy's). This reduces its potential visitor appeal and thus the potential to achieve key development objectives. This also limits opportunities for realising a number of SDCDP policy objectives to (a) improve access by incorporating heritage resources into the Green Infrastructure and parks network, and (b) to enhance those resources;
- The Wicklow Mountains SPA designation extends into the southern portion of the property and the property borders on the Wicklow Mountains SAC. The proximity to these designated areas requires a greater level of sensitivity to habitats and species;
- The property is located mostly above the 350m contour line above which the zoning objective precludes certain key proposed facilities including the uses *'Car Park, 'Restaurant/Café'* and *'Shop-Local'*;
- The views of Dublin Bay and the city are less impressive than those from the Hell Fire property;
- The property is further from the urban area (than Hell Fire, Massy's and Steward's House) and at substantially higher elevation. This makes it less accessible by car and particularly for walkers and cyclists approaching from the urban area;
- The relative distance from the urban area (compared to Hell Fire, Massy's and Steward's House) means the property is less easily serviced by water supply, foul drainage, electricity and gas;
- Due to the property's relative remoteness the baseline air quality and surface water quality are such that relatively greater impact on these factors would result from development at the site. The longer travel distance by vehicle, and the associated lower likelihood of the development being accessed by foot or bicycle, would also result in higher greenhouse gas emissions from vehicles;
- The existing adverse environmental impacts of un-managed access to the Hell Fire and Massy's Wood properties would not be mitigated, including deterioration and/or ad-hoc protection of the architectural heritage, and traffic impacts on the R115.

4.1.7 'Do Nothing' Scenario

It is an option to 'do nothing' to avoid any significant adverse environmental impacts of development.

Indication of Main Reasons for Not Selecting This Alternative

- None of the development objectives of the applicant would not be met;
- The existing adverse environmental impacts of un-managed access to the Hell Fire and Massy's Wood properties would not be mitigated, including deterioration and/or ad-hoc protection of the architectural heritage, and traffic impacts on the R115;
- The potential beneficial environmental impacts of improved access and visitor management would not be realised, including improved protection of the architectural heritage, enhanced habitat and improved habitat management.

4.1.8 Comparison of Potential Environmental Effects of Alternative Site Options

Table 4.1 overleaf provides a summary comparison of the potential environmental effects of the above alternative site options considered.

Table 4.1 Comparison of Potential Environmental Effects of Alternative Site Options

	Alternative Sites			
	Hellfire & Massey's	**Steward's House**	**Featherbed**	**Cruagh**
Population & Human Health	• More local environmental receptors (dwellings and businesses) than Featherbed and Cruagh – therefore more potential for negative effects from visual disturbance, noise, dust, etc. on residents; • Closer to settlement areas – therefore more accessible by all modes and more likely to have positive human health effects; • Most established as a recreation/heritage/tourism attraction – therefore most likely to succeed (established recognition/interest) and have positive human health effects; • Greatest combination of landscape, natural and cultural heritage assets – therefore most likely to succeed as an attraction and have positive human health effects; • Greatest potential for development of a visitor centre with 'wow factor' views from an elevation below 350m – therefore most likely to succeed and have positive human health and tourism/economic effects.	• More local environmental receptors (dwellings and businesses) than Featherbed and Cruagh – therefore more potential for negative effects from visual disturbance, noise, dust, etc. on residents;; • Closer to settlement areas – therefore more accessible by all modes and more likely to have positive human health effects; • Not established as a recreation/heritage/tourism attraction – but adjacent to one and could benefit from that proximity to succeed and have positive human health effects; • Could 'borrow' landscape, natural and cultural heritage assets from Hell Fire/Massy's – but not the 'wow factor' view from a visitor centre – therefore less likely to succeed and have positive human health and tourism/economic effects.	• Least local receptors (dwellings and businesses) therefore less potential for negative effects from visual disturbance, noise, dust, etc. on residents; • Furthest from settlement areas – therefore least accessible by all modes and less likely to have positive human health effects; • Not established as a recreation/heritage/tourism attraction – therefore least likely to succeed and have positive human health effects; • Least endowed with landscape, natural and cultural heritage assets – therefore least likely to succeed as an attraction and have positive human health effects.	• Fewer local receptors than Hell Fire/Massy's and Steward's House – therefore less potential for negative effects from visual disturbance, noise, dust, etc. on residents; • Further from settlement areas than Hell Fire/Massy's and Steward's House – therefore less accessible by various modes and less likely to have positive human health effects; • Less established as a recreation/heritage/tourism attraction than Hell Fire/Massy's – therefore less likely to succeed and have positive human health effects; • Lesser combination of landscape, natural and cultural heritage assets than Hell Fire/Massy's – therefore less likely to succeed as an attraction and have positive human health effects.
Bio-diversity	• Further from Natura 2000 sites than Featherbed and Cruagh – therefore less likely to impact on the integrity of designated sites; • Greatest diversity of habitats and species – therefore most potential for impacts on ecology;	• Same as Hell Fire/Massy's.	• Borders on Wicklow Mountains SAC – therefore more likely to impact on integrity of designated sites. • Less diversity of habitats and species than Hell Fire/Massy's – therefore less potential for impacts on ecology;	• Part of site designated Wicklow Mountains SPA and borders Wicklow Mountains SAC – therefore more likely to impact on integrity of designated sites. • Less diversity of habitats and species than Hell Fire/Massy's – therefore less potential for impacts on ecology;

	Alternative Sites			
	Hellfire & Massey's	**Steward's House**	**Featherbed**	**Cruagh**
	• Greatest diversity of habitats – therefore most potential for enhancement of ecology/Green Infrastructure through improved management.		• Less diversity of habitats than Hell Fire/Massy's – therefore less potential for enhancement of ecology/Green Infrastructure through improved management.	• Less diversity of habitats than Hell Fire/Massy's – therefore less potential for enhancement of ecology/Green Infrastructure through improved management.
Soils, Geology & Hydro-geology	• New building and parking area require excavation – therefore localised impact on soils, geology but none expected on hydrogeology; • Closest to urban area and available services, therefore least amount of construction for water supply, foul drainage, etc.	• No construction of new building - therefore less excavation than Hell Fire/Massy's, although would require parking area on Hell Fire/Massy's in same location as proposed; • Closest to urban area and available services, therefore least amount of excavation/construction for water supply, foul drainage, etc.	• Cannot be ascertained without site investigation and design - likely to be similar to Hell Fire/Massy's; • No existing trails network and limited vehicular access therefore greater requirement for excavation/construction of new infrastructure with soils and geology effects; • Furthest from urban area and available services, therefore most amount of excavation/construction for water supply, foul drainage, etc.	• Cannot be ascertained without site investigation and design - likely to be similar to Hell Fire/Massy's; • Further from urban area and available services than Hell Fire/Massy's and Steward's House, therefore more excavation/construction for water supply, foul drainage, etc.
Water & Hydrology	• Site traversed by a river – therefore more potential for negative impact on watercourse from pollution, and for impacts on river banks; • Presence of river – therefore potential for surface water drainage discharge; • Presence of river – therefore most potential positive impacts on watercourse through environmental enhancement/management.	• Same as Hell Fire/Massy's.	• No natural drainage feature – therefore less potential for negative impact on watercourse from pollution than Hell Fire/Massy's; • Less potential for surface water drainage discharge to watercourse; • No potential for positive impacts on watercourse through environmental enhancement/management.	• No natural drainage feature – therefore less potential for negative impact on watercourse from pollution than Hell Fire/Massy's; • Less potential for surface water drainage discharge to watercourse; • No potential for positive impacts on watercourse through environmental enhancement/management.
Air Quality & Climate	• Closer to settlement areas and at lower elevation than Featherbed and Cruagh – therefore shorter trips by	• Same as Hell Fire/Massy's.	• Further from settlement areas and at higher elevation than Hell Fire/Massy's and Steward's House – therefore longer trips by	• Further from settlement areas and at higher elevation than Hell Fire/Massy's and Steward's House – therefore longer trips by

	Alternative Sites			
	Hellfire & Massey's	**Steward's House**	**Featherbed**	**Cruagh**
	vehicles, with less emissions; • Closer to settlement – therefore more likely to be accessed by non-motorised transport modes with no emissions; • Less sensitive air quality environment than Featherbed and Cruagh.		vehicles, with more emissions; • Least likely to be accessed by non-motorised transport modes – therefore most emissions; • More sensitive air quality environment than Hell Fire/Massy's and Steward's House.	vehicles, with more emissions; • Least likely to be accessed by non-motorised transport modes – therefore most emissions; • More sensitive air quality environment than Hell Fire/Massy's and Steward's House.
Noise & Vibration	• More local environmental receptors - therefore more potential for negative noise effects; • More developed local receiving environment – therefore less sensitive noise environment than Featherbed and Cruagh.	• Same as Hell Fire/Massy's.	• Least local environmental receptors - therefore least potential for negative noise effects; • Less developed local receiving environment – therefore more sensitive (as result of lower baseline) noise environment.	• Less local environmental receptors than Hellfire/Massy's and Steward's House - therefore less potential for negative noise effects; • Less developed local receiving environment – therefore more sensitive (as result of lower baseline) noise environment.
Land-scape & Visual Resources	• No existing building for visitor centre – therefore potential for landscape and visual impact of new building; • Site has panoramic views of Dublin City and Bay from areas below 350m – therefore less potential than Featherbed and Cruagh for visual impact of new building; • Most variety in landscape character and cultural heritage features – therefore most potential for landscape and visual enhancement of existing resources (e.g. restoring profile of Hell Fire Club on top of Montpelier Hill, existing trails/erosion improvement.	• Existing building for visitor centre – therefore potential for landscape and visual impact of new building (but with no views of surrounding landscape); • If 'borrowing Hell Fire/Massy's landscape character and cultural heritage features – equal potential for landscape and visual enhancement of existing resources e.g. restoring profile of Hell Fire Club on top of Montpelier Hill, existing trails/erosion improvement, etc.).	• No existing building for visitor centre – therefore potential for landscape and visual impact of new building; • Site has less impressive views of Dublin City and Bay than Hall Fire/Massy's, and only from areas above 350m; • Least variety in landscape character and cultural heritage features – therefore least potential for landscape and visual enhancement of existing resources.	• No existing building for visitor centre – therefore potential for landscape and visual impact of new building; • Site has less impressive views of Dublin City and Bay than Hell Fire/Massy's, and only from areas above 350m; • Less variety in landscape character and cultural heritage features than Hell Fire/Massy's – therefore less potential for landscape and visual enhancement of existing resources.

	Alternative Sites			
	Hellfire & Massey's	**Steward's House**	**Featherbed**	**Cruagh**
Archaeology & Cultural Heritage	• Most archaeology and cultural heritage – therefore most potential for enhancement of heritage features, provision of access to and interpretation of heritage; • Most potential for negative impacts on archaeological features from unmanaged access.	• If 'borrowing' from Hell Fire/Massy's, most archaeology and cultural heritage – therefore most potential for enhancement of heritage features, provision of access to and interpretation of heritage; • Most potential for negative impacts on archaeological features from unmanaged access.	• Limited archaeology and cultural heritage (only one enclosure on boundary) – therefore limited potential for enhancement of heritage features, provision of access to and interpretation of heritage; • Limited potential for negative impacts on archaeological features from unmanaged access.	• No archaeological heritage on site – therefore no potential for impacts on architectural heritage from unmanaged visitor access;
Architectural Heritage	• Wide variety of architectural heritage (e.g. Hell Fire Club, Massy's walled garden and other protected structures) – high potential for enhancement of heritage features, provision of access to and interpretation of heritage; • High potential for negative impacts on architectural heritage from unmanaged visitor access.	• If 'borrowing from Hell Fire/Massy's, wide variety of architectural heritage (e.g. Hell Fire Club, Massy's walled garden and other protected structures) - high potential for enhancement of heritage features, provision of access to and interpretation of heritage; • High potential for negative impacts on architectural heritage from unmanaged visitor access; • Steward's House has associated protected structures – therefore additional (and most) potential for refurbishment/re-use and provision of access to architectural heritage.	• No architectural heritage on site – therefore no potential for enhancement of heritage features, provision of access to and interpretation of heritage; • No potential for negative impacts on architectural heritage from unmanaged visitor access.	• No architectural heritage on site – therefore no potential for enhancement of heritage features, provision of access to and interpretation of heritage; • No potential for negative impacts on architectural heritage from unmanaged visitor access.
Material Assets - Forestry	• Site already features large areas of high amenity value woodland used for recreation (Massy's Wood) – therefore less requirement for conversion of coniferous forest to generate a high amenity forest park; • Site already well used for recreation, therefore less impact on forest	• Same as Hell Fire/Massy's.	• Site almost entirely forested with conifers, with limited existing amenity value and limited recreational use – therefore most requirement for conversion/loss of productive forest to generate a high amenity forest park.	• Site largely forested with conifers. Site is used for recreation but far less than Hell Fire/Massy's – therefore more requirement for conversion/loss of productive forest to generate a high amenity forest park.

	Alternative Sites			
	Hellfire & Massey's	**Steward's House**	**Featherbed**	**Cruagh**
	operations from increased visitor access.			
Roads Traffic & Transport-ation	• Closer to settlement areas, with existing vehicular access and parking – therefore most potential for access by all modes of transport with least roads and transportation development requirement; • Existing parking capacity regularly exceeded, with expectation of demand growth – therefore a requirement and opportunity for traffic (and related safety and environmental) improvement.	• Same as Hell Fire/Massy's.	• Furthest from settlement areas, and no existing vehicular access and parking – therefore greatest requirement for roads and transportation development to provide access for all modes of transport; • Distance from urban area, elevation and gradient of roads all limit the degree to which walking and cycling would be used to access the site.	• Further from settlement areas than Hell Fire/Massy's and Steward's House – therefore more requirement for roads and transportation development to provide access for all modes of transport; • Distance from urban area, elevation and gradient of roads all limit the degree to which walking and cycling would be used to access the site.

The above summary comparison of potential environmental effects of development on the alternative sites reflects the analysis carried out during the 2015 Feasibility Study. Potential environmental effects were one of several areas of consideration in selecting the site. The other issues considered were:

- The development objectives of SDCC, Coillte and the DMP;
- Tourism and economic development policy at national, regional (Dublin city-region) and local level;
- Relevant planning policy at national, regional and local level;
- Existing patterns of access to and use of the Dublin Mountains for recreation.

The result of the process was the selection of the combined Hell Fire and Massy's Wood site. It was considered to present the greatest potential for the achievement of the development objectives, alignment with planning and tourism/economic development policy, and enhanced environmental stewardship of (and minimal negative environmental impact on) publicly owned lands in the Dublin Mountains.

4.1.9 Orlagh House

Some time after the completion of the 2015 Feasibility Study the nearby Orlagh House was put on the market for sale by the Augustinian order. The property was examined for its potential for development as an alternative, or in addition to the Hell Fire and Massy's Wood site. A report was produced by Paul Keogh Architects (PKA) entitled *Assessment of Potential of Orlagh House for Flagship Tourism Project*.

Orlagh House was constructed in 1790 and extended several times over the next two centuries. It is set in 40 ha of parkland grounds on the lower northern slope of Montpelier Hill, accessed off the R113. The building is a Protected Structure and included on the National Inventory of Architectural Heritage. It has a floor area of 1608 sq. m. The property has been in the ownership of Order of St Augustine since 1872 and was used as a novitiate and more recently a retreat centre, which closed in early 2016.

The PKA report found that the Orlagh House property has potential to support and consolidate the tourism offer in the vicinity of the Dublin Mountains. It could provide a high quality, highly accessible park to the growing local population, and a prestigious historic Irish House experience. The building and grounds have potential to host entertainment and corporate events, and/or a range of outdoor activities that could compliment the facilities of the proposed visitor centre at Hell Fire.

However, the property presents a different project opportunity to that envisaged by SDCC and its partners, and its purchase and development into a facility for public use would involve expenditure on aspects that are not a priority for the project partners currently. Furthermore, some of the key development objectives could not be met.

The property has since been purchased by a private consortium.

Indication of Main Reasons for Not Selecting This Alternative

- The property was not in the ownership of SDCC or Coillte and would have required a substantial, speculative purchase with public funds;
- The purchase, refurbishment and maintenance costs of a Protected Structure of such scale and condition were considered excessive given that some of the development

objectives could also not be met. Expenditure would be needed on accessibility, fire safety compliance, structural repairs, roof repairs, insulation, new windows, new electricity, plumbing/sanitary and heating systems. Recent extensions would also be required to be demolished;

- The building is a protected structure, which would present an opportunity for good practice in refurbishment and re-use, but also a constraint to development in terms of its scale and facility character;
- Not all of the development objectives of the applicant could be met by this site. In particular, the property is not of the '*forested mountain'* character envisaged by SDCC and its partners. The property does not border on the Hell Fire or any other Coillte (or other publicly owned) property, so there is no connection (without further land purchase) to any other off-site heritage attractions including the Hell Fire Club building and the features on Massy's Wood;
- Therefore, while the use of Orlagh House for the visitor centre would avoid the impact of the proposed visitor centre (a new building), it was considered unsuitable in terms of the development objectives;
- The proposed development is intended in part to act as a catalyst for private sector amenity and tourism related development in the Dublin Mountains. Orlagh House is considered to have significant potential in this regard, and the property's purchase by a private buyer indicates that this is recognised by others. It was considered that an opportunity for related private sector development would be taken away by use of Orlagh House for the proposed facility.

4.2 DESIGN/LAYOUT AND ACTIVITY ALTERNATIVES CONSIDERED FOR THE PROPOSED DEVELOPMENT

The 2015 Feasibility Study concluded, following the selection of the Hell Fire and Massy's Wood site, with an 'emerging masterplan' and 'concept' for development of the site. This formed the starting point for the design process which led to the proposals the subject of this EIAR.

The design process was an iterative process. It was informed initially by a review of the emerging masterplan and concept, and then by the process of EIA and by consultation with stakeholders and the public[5]. In that process the characteristics of the proposals have evolved and reduced, with numerous

[5] Consultation during the design process included:

- One-on-one meetings between the landowner Coillte and neighbouring landowners;
- Two landowners' meetings where emerging/evolving development proposals were presented to the neighbouring landowners and they were given the opportunity to ask questions, make proposals and raise concerns about the environmental impacts of the development among other concerns;
- Two presentations two South Dublin County Councillors, where emerging/evolving development proposals were presented and the Councillors were given the opportunity to ask questions, make proposals and raise concerns about the environmental impacts of the development among other concerns;
- One presentation to local Oireachtas representatives (attended by one TD; all were invited);
- A two-day public open day event, where emerging/evolving development proposals were displayed and members of the project team of the applicant SDCC and its partners Coillte and the DMP and design and EIA team members were available to answer questions and discuss potential environmental impacts among other issues;
- Communication by email and through SDCC's project web page: http://www.sdcc.ie/services/parks-and-recreation/dublin-mountains-project.

decisions taken including decisions to reduce, avoid or mitigate environmental impacts. The following lists some of the key alternatives considered – and decisions taken - in that process.

4.2.1 Access

- Various alternative layout options for the parking area were considered. These included layouts more organic in form. The proposed parking layout was ultimately selected as it achieved close to the 300 space target with the smallest possible footprint and with least encroachment up the hill to minimise visual impact;
- The provision of a satellite overflow parking area was considered, allowing for park-and-walk and/or a park-and-shuttle service. The parking area was to be located at an SDCC property on Stocking Lane some 2.5km from the site. This alternative was rejected in favour of a shuttle service from Tallaght Stadium. The selected alternative is considered to be more encouraging of the use of public transport to access the facility;
- It was recommended by a number of County Councillors that the option of a cable car connection from Tallaght Stadium to the site be considered. The project engineers Roughan & O'Donovan prepared a feasibility study on the cable car and it was rejected on the basis of cost as well as environmental issues.

4.2.2 Visitor Centre Building

- The visitor centre building/s was reduced in the design process from a gross floor area of in excess of 2000 sq. m to less than 1000 sq. m. The larger alternative building was rejected in favour of a building with a smaller footprint to reduce its environmental impact - particularly the visual impact on receptors in the middle distance to the east which were identified as a sensitive environmental receptor;
- Also in consideration of views from the east, the rear building (building B) was shifted behind the front building (Building A), to reduce the span of the building across the face of Montpelier Hill;
- The reduction in the scale of the building reflects changes that were made to the uses originally envisaged for the building. These include the change in concept from a restaurant with a fine dining offer, open also at night, to a café operating effectively daylight hours. This reflects a decision that the facility should cater for outdoor amenity and education users primarily, as opposed to a wider clientele;
- Alternative uses were considered for Building B. In the Feasibility Study a larger exhibition/show or corporate events space had been included. In the design process the building was reduced to include a combined audio-visual and exhibition space, and a smaller room for education;
- Alternative opening hours for the visitor centre were considered. The opening of the facility at night, e.g. for corporate events, meetings, private parties, etc. would enhance its economic operation. However, late night opening would result in possible environmental impacts, for example light spill from the building and parking area (with visual and ecological implications), and possibly noise in the quiet receiving environment. For this reason it was decided that the facility should operate principally in daylight hours, with lighting only sufficient to allow for safe access for facility staff arriving and leaving in darkness.

4.2.3 Foul and Surface Water Drainage

- Alternative foul water treatment options were considered, including on-site treatment. Trial holes were excavated on the Hell Fire property which revealed that the soil is shallow over the bedrock and filtration treatment would be inadequate. It was decided to avoid any potential for pollution of surface or groundwater by connecting the site to the public sewage system by laying a pipe beneath the R115;

- So as not to generate any unnecessary capacity, it was decided to install a 150mm diameter sewage pipe as opposed to the alternative 225mm pipe generally preferred by SDCC and Irish Water;
- Alternative methods of dealing with surface water runoff on the site were considered. It was decided to deal with as much surface water as possible by the use of permeable surfaces where possible (e.g. Grasscrete or similar in the parking spaces) and other SUDS measures such as swales and attenuation ponds – with overflow (which would be limited) into the Glendoo Brook via a new culvert beneath the R115 (the Glendoo Brook is the natural drainage channel for the eastern slopes of Montpelier Hill including the site).

4.2.4 Activities

- Alternative recreation activities such as cycling and other more active pursuits were considered, partly due to the SDCDP policy for development of an 'outdoor pursuits' centre in the Dublin Mountains in addition to a 'visitor facility'. It was considered that the facility should rather focus on improving facilities for the existing pursuits, walking, horse riding and heritage appreciation. This decision was made in consideration of existing users (to avoid any potential conflicts with existing uses), potential environmental impacts, and so as not to draw existing and potential users/customers from established activity centres elsewhere in the mountains such as Zipit in Tibradden Wood and Coillte's cycling facility at Ticknock.

4.2.5 Architectural Conservation and Interpretation

- Various alternative degrees of restoration and protection of the Hell Fire Club building were considered, for example restoration of a timber roof structure, and closure of the building except during core visitor periods or for accompanied tours. It was considered that minimal physical interventions and improved monitoring and management of the effects of visitors on the structure and setting are more appropriate. The maintenance of the existing character of the site is the principal objective along with protection of the building from any further deterioration;
- Various alternative degrees of restoration and re-use of the Massy's walled garden were considered. These included returning the garden to a formal garden, and the construction of a café or similar facility within the walls. The alternatives were rejected in favour of minimal works including clearance of vegetation (and long term maintenance of wildflower meadow within the walls) to protect the structure and reveal the spaces;
- A 'wedge' structure at the top of the Montpelier Hill in the forest behind the Hell Fire Club building was envisaged in the Feasibility Study, where interpretation material would be displayed. It was considered that built interventions should rather be minimised in the vicinity of the Hell Fire building and the passage tombs, and that interpretation material should be more subtly displayed in the landscape;

  The above decisions (and those following) were all informed by a guiding principle of maintaining the forested upland character of the site, rather than introducing new built elements that might dilute that character.

4.2.6 Landscape Development

- Various alternative approaches to development of the 26 ha area of the Hell Fire forest property were considered, including retention of the coniferous forest cover, and the development of a more open landscape of 'parkland' character. Historic research indicated the presence of a significant cover of Woodland on much of the hill and this is evident on site in a number of veteran Beech and other trees that predate the conifer plantations. These woods, remnant features of the Killakee demesne, coupled with the potential for enhanced habitat, inspired a

broadleaved woodland restoration approach to the landscape of the hill. Existing clear felled areas would be replanted with native broadleaved woodland species and remaining young and mature conifer plantations would be managed over time through thinning and inter-planting to become predominantly native broadleaved woodland. This approach would maintain continuous tree cover and see the evolution of the landscape character from coniferous monoculture to a diverse species rich and permanent woodland similar to Massy's Wood in the valley below, avoiding sudden landscape change;

- The provision of playgrounds within the forest was considered and it was decided to rather allow for informal play using the topography, forest and retained fallen trees from the site.

5.0 POPULATION AND HUMAN HEALTH

5.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report has been prepared by Cunnane Stratton Reynolds. It provides an assessment of the socio-economic context of the receiving environment and an assessment of the potential impacts on amenity, accommodation, employment, health and safety, and traffic congestion. These topics are addressed as they are identified as potentially relevant for Project Type 28[6] as outlined in the EPA's Advice Notes for Preparing Environmental Impact Statements (Draft September 2015) and updated as per the EPA Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports (Draft August 2017).

5.2 ASSESSMENT METHODOLOGY

The assessment involved a desk study of demographic information from the CSO, tourism figures from Fáilte Ireland, and the relevant EIAR chapters. Based on the desktop study, it was possible to consider the presence, importance and sensitivity of the population and the potential likely significant impacts on both the local and wider community. A profile of the receiving environment is presented under the following headings:

- Land Use and Settlement Patterns;
- Population and Socio-economic Profile;
- Tourism;
- Movement and Transportation.

Additional information was identified as follows:

- Address points from the GeoDirectory were analysed according to NACE code (the CSO's Standard Classification of Industrial Activity) to determine the number of businesses, schools and residential addresses within a 2 km radius of the proposed development. This information, combined with CSO information was utilised to determine the local population and land use patterns in the vicinity of the site.
- CSO data from Census 2011 and 2016 were compared to calculate the population increase and any other significant changes within the 9 electoral divisions (ED's) in or immediately adjacent to the site.
- Tourism statistics from Fáilte Ireland were analysed to determine the demand for outdoor recreation from a domestic and international context in relation to the proposed development.
- Findings from the CSO and Fáilte Ireland research and relevant chapters of the EIAR informed the process of impact assessment for human impacts. Mitigation measures were then considered where necessary, informed by the EIAR chapters.
- Residual and cumulative impacts were determined after the mitigation measures were factored in context to the impact.

The EPA Guidelines and Advice Notes (as amended) identify sensitive receptors as neighbouring landowners, local communities and other parties which are likely to be directly affected by the project. In particular homes, hospitals, hotels and holiday accommodation, schools and rehabilitation workshops and

[6] Project Type 28 includes construction of car parks, holiday villages, hotel complexes, permanent campsites and caravan parks, and theme parks. It is considered the most applicable project type to the proposed development.

commercial premises are noted. Regard is also given to transient populations including drivers, tourists and walkers.

5.3 RECEIVING ENVIRONMENT

5.3.1 Study Area Overview

The subject site is lies at the threshold between the urban area of South Dublin (and the wider city) and the Dublin Mountains. Ireland's largest and most concentrated urban population lies directly to the north, with the urban edge only 2km from the site.

Figure 5.1: Site location in city-regional context

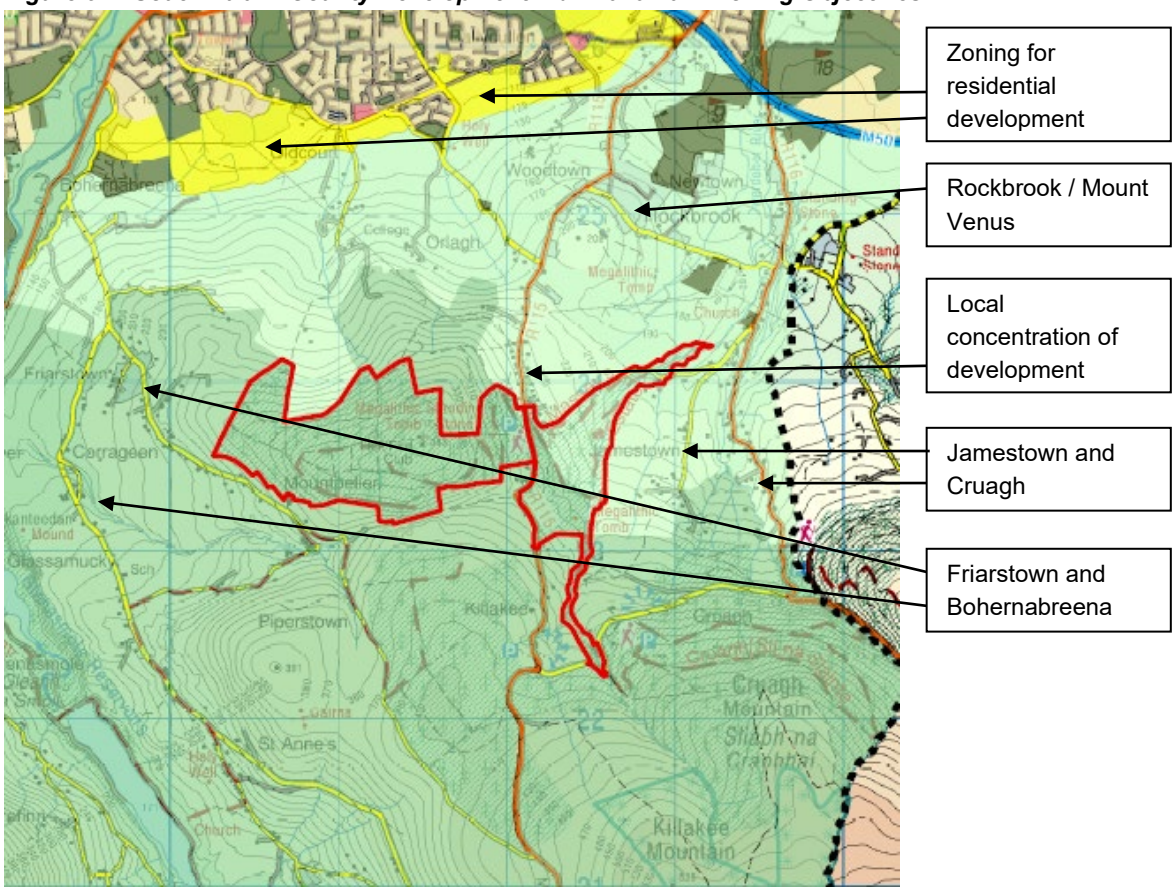
5.3.2 Land Use and Settlement Patterns

Substantial areas around the southern edge of the city are zoned for further residential development (refer to Figure 5.2 below); the South Dublin urban fringe including Tallaght has a relatively fast growing population.

Between the urban edge and the site the land use zoning objective is RU - "*To protect and improve rural amenity and to provide for the development of agriculture.*" This area includes an outlying suburban neighbourhood comprised of Rockbrook/Mount Venus and Newtown, approximately 1km to the north of the site. There is also dispersed development along the R115 between the site and the urban area, with a particular concentration of houses and rural enterprise in a linear formation just north of the site, and a small cluster of houses to the south. There is a significant concentration of rural housing in the Jamestown area to the east of Massy's Wood, and along Cruagh Road.

To the south and west of the site the land use zoning objective is HA: "*To protect and enhance the outstanding natural character and amenity of the Liffey Valley, Dodder Valley and Dublin Mountain areas.*" There is a concentration of rural housing and enterprise in Friarstown and Bohernabreena to the west of Montpelier Hill. To the south of the site the higher elevations of the Dublin and Wicklow Mountains are very sparsely populated. Overall, the receiving environment of the site/development is sparsely populated.

Figure 5.2: South Dublin County Development Plan 2016-2022 Zoning Objectives

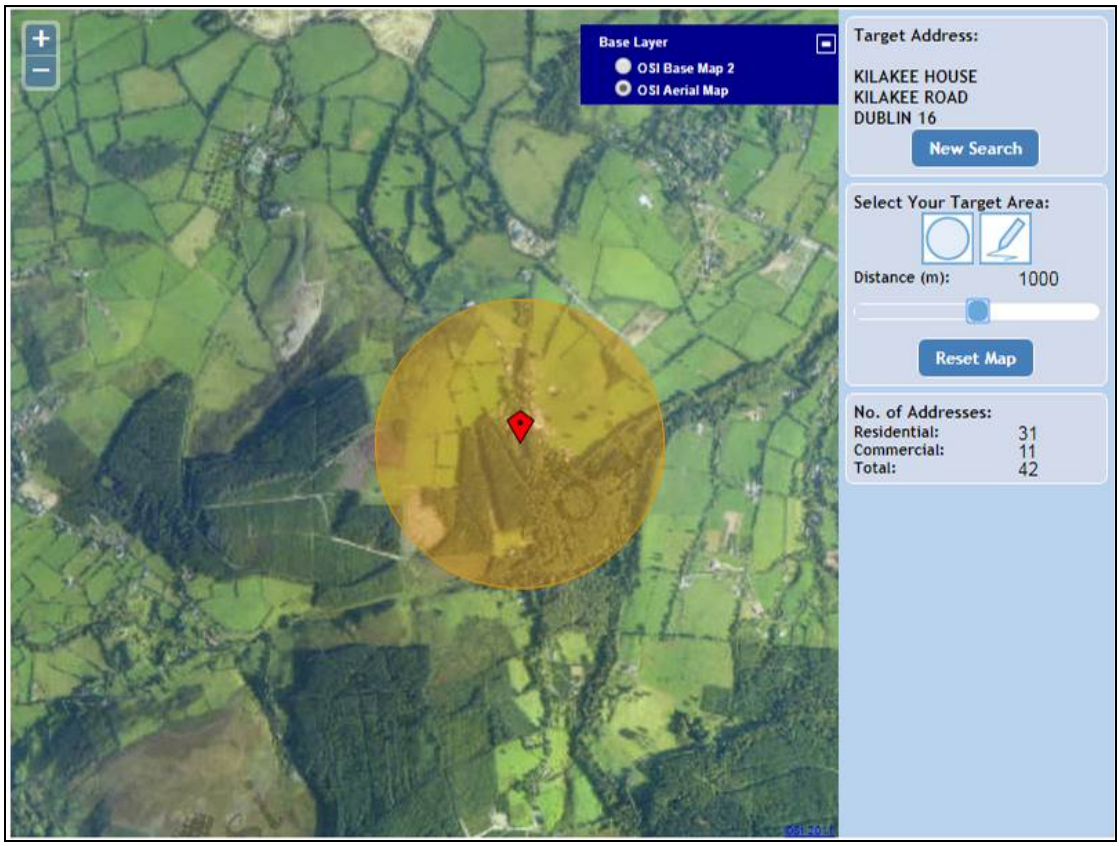


5.3.1.1 Potential Local Receptors

Immediate receptors were identified utilising the GeoDirectory to determine the number of residential and commercial addresses within a 1km radius of Steward's (Killakee) House - the closest address point to the proposed development (see Figure 5.3 below). This identified 31 residential addresses and 11 commercial addresses (which include farms). The addresses include:

- Three houses directly to the south of the Hell Fire property west of the R115, and another house a short distance further south;
- Steward's House immediately to the north of the Hell Fire property west of the R115. This was previously in use as a restaurant but is now used as a residence;
- A linear cluster of houses extending north from Steward's House along the R115 west of the road, two of which are located up the hillside behind the roadside houses, backing onto the Hell Fire property;
- A farm/large agricultural enterprise (and houses) north of these houses;
- A cluster of five houses directly north of Massy's Wood east of the R115, between the site and the Timbertrove property;
- Timbertrove, an extensive timber products manufacturing and resale enterprise which has an attached homeware shop and café;
- A row of houses and rural enterprises including farms and a livery yard north Timbertrove east of the R115.

Figure 5.3 Addresses within 1km of proposed development - Source: GeoDirectory



The adjacent and local farms are also potential environmental receptors, not merely as local residents but also as land uses/economic enterprises which can be impacted by recreational use in the rural environment (e.g. by trespass on property, disturbance of animals, etc.).

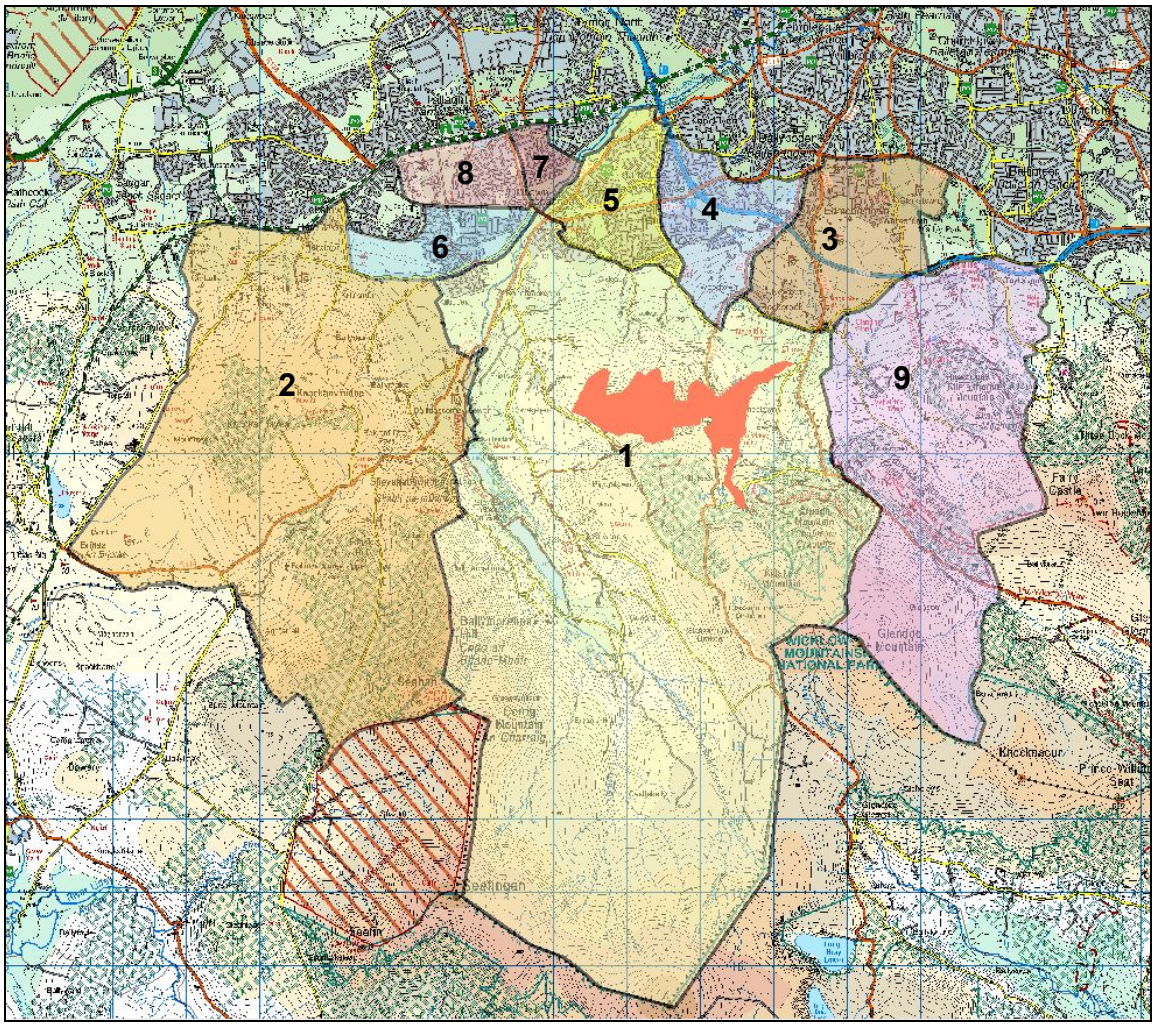
Another significant group of potential receptors is the existing recreation users of the site. These include local people who might walk (or drive) to the site to walk off road, horse riders accessing the site along the road from nearby stables, users from the wider Dublin area who might drive or cycle to the site, and domestic and international tourists some of whom arrive by coach. Additionally, the site is well used by school groups accessing the archaeological and cultural heritage features of the site.

5.3.3 Population and Socio-economic Profile

For the purposes of CSO data analysis a study area was identified including the Bohernabreena electoral division (ED) in which the site is located and eight adjacent EDs to the north, west and east (refer to Figure 5.4 below, and Map 5.1 in Volume 2 of the EIAR).

1. Bohernabreena (03003);
2. Ballinascorney (03001);
3. Edmondstown (03011);
4. Firhouse-Ballycullen (03012);
5. Firhouse Village (03035);
6. Tallaght-Kiltipper (03035);
7. Tallaght-Millbrook (03037);
8. Tallaght-Oldbawn (03038);
9. Tibradden (05069).

Figure 5.4: Surrounding Electoral Divisions - Source: CSO



The following are notable points from the census 2006-2016 data contained in Table 5.1 below:

- The total population of the nine EDs in 2016 was 50,338;
- Bohenrabreena, the ED in which the site is located, is the only ED that experienced population decline between 2011 and 2016;
- The majority of the population and the greatest population growth was concentrated in the EDs extending into the urban area to the north;
- The largest percentage change in population between Census 2011 and 2016 was found in Tibradden to the east of the site; this is attributable to an originally low base and new development adjacent to the M50 which traverses the ED in the north;

The South Dublin County Development Plan Core Strategy (SDCDP Table 1.5) includes two forecasts for population growth over the period 2016-2022. These are the Dublin Region RPG Population Target and the CSO Population Forecast. Both suggest an increase in South Dublin's population of approximately 7.4% in that period. With the residential zoning around the southern edge of the urban area, a significant portion of this growth is likely to occur within 2km from the site (refer to Figure 5.2 above).

Table 5.1 Population Change from 2006-2016, by Electoral Division. Source: CSO

	Electoral Division	Populat-ion 2006	Populat-ion 2011	Actual change 2006-2011	% Change 2006-2011	Populat-ion 2016	Actual Change 2011-2016	% Change 2011-2016
1	Bohernabreena (03003) (S. Dublin)	4272	4592	320	7%	4496	-96	-2.10%
2	Ballinascorney (03001) (S. Dublin)	742	804	62	8%	921	117	14.60
3	Edmondstown (03011) (S. Dublin)	5656	5712	56	1%	5757	45	0.80%
4	Firhouse-Ballycullen (03012) (S .Dublin)	6610	7773	1163	18%	8230	457	5.90%
5	Firhouse Village (03014) (S. Dublin)	10751	11648	897	8%	12214	566	4.90%
6	Tallaght-Kiltipper (03035) (S. Dublin)	6426	8068	1642	26%	8478	410	5.10%
7	Tallaght-Millbrook (03037) (S. Dublin)	3551	3290	-261	-7%	3386	96	2.90%
8	Tallaght-Oldbawn (03038) (S. Dublin)	4367	4527	160	4%	5749	52	1.10%
9	Tilbradden (05069) (DLR)	827	786	-41	-5%	1111	325	41.30%

Further census data on the relevant EDs is provided in Table 5.2 below, with the following information of note:

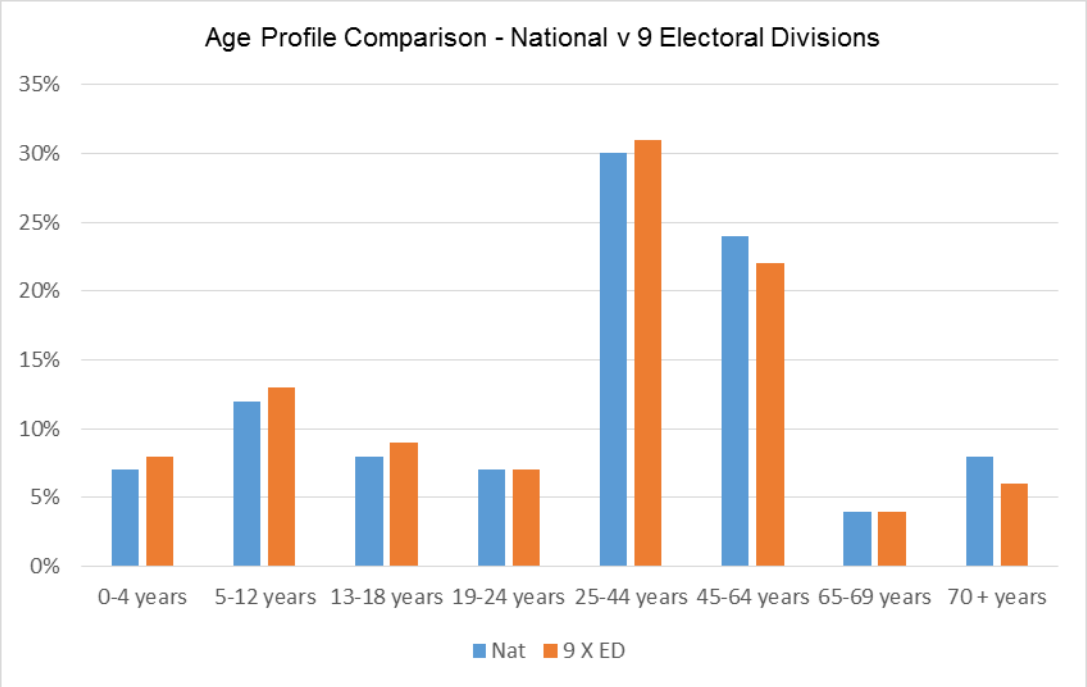
- In 2011, there were 11,518 family households identified within the Study Area (2016 data unavailable);
- There are significant numbers of young people (under 15 years old). Map 5.4, Volume 2 shows the location of schools within 5km of the site;
- The average age in seven of the nine EDs is lower than the national average of 37.4 – in some significantly lower;
- In all but one of the EDs a greater percentage than the national average of 87% classify themselves as being in 'good health'.

Table 5.2 Socio-Economics by Electoral Division (CSO 2011 and CSO 2016)

ED	# Families	Most Common HH Size	#HH	% of Pop Employed	Still in Edu	Commuters Utilising Motorised Transport	Walkers/ Cyclists	Health (report "good" health)	Average Age
Tallaght-Kiltipper	1049	2-3 per HH	2721	53%	585	3786	1228	91%	30.7
Bohernabreena	1207	2-4 per HH	1402	51%	317	2393	294	88%	35.1
Tallaght-Oldbawn	1256	2-3 per HH	1575	50%	373	1932	734	89%	40.2
Tallaght-Millbrook	990	2 per HH	1238	43%	207	1304	366	84%	43.1
Firhouse Village	3068	2 per HH	3834	61%	1012	6816	1338	92%	32.9
Firhouse Ballycullen	2066	2-4 per HH	2466	63%	906	5610	1086	94%	32.9
Edmondstown	1493	1-3 per HH	1887	52%	520	3109	576	89%	36.5
Tilbradden	178	2 per HH	232	47%	65	384	51	92%	37
Ballinascorney	211	2-3 per HH	272	49%	64	386	65	89%	34
TOTAL	**11518**		**15627**	**52% average**	**4049**	**2572**	**5738**	**90% average**	**35.8 average**

The graph, Figure 1 below, shows the difference in the proportion of various age cohorts between the nine EDs combined (i.e. the site's defined receiving environment) and the national population.

Figure 5.1 Age profile comparison – national average versus the site's receiving environment



In summary, the receiving environment of the site/proposed development is characterised by a growing population with a higher proportion of younger age cohorts than the national average, and in better health. It can be surmised that this population has a high demand for active outdoor recreation options.

5.3.4 Tourism

Although the Dublin Mountains area does attract domestic and international tourists, as well as local visitors (with approximately one quarter of all visitors estimated to access the Dublin Mountains at the site), South Dublin generally underperforms in terms of tourism by comparison with the other Dublin local authority areas.

Tourism Figures for 2015 and 2016 from Fáilte Ireland indicate the following relevant information to consider when discussing the potential impacts of the proposed development:

- International tourism figures indicate there were over 10 million visitors to Ireland in 2015. Domestic tourism figures indicate that over 9 million people (accounting for multiple holidays) chose to holiday at home;
- Eight of the top thirty two tourism attractions are outdoor oriented parks (by tourism visitor figures), which account for 1.7 million total visitors in 2015 (Regional Tourism Performance in 2015 (RTP2015);
- In 2015 and 2016, the top three tourist activities engaged in by international tourists were hiking/cross country walking, followed by cycling and golf;
- In 2015 and 2016, hiking/hillwalking, houses/castles and national parks have been the top three holiday related activities domestically;
- The Government earned an estimated revenue of €1.8 billion through tourism taxation, of which, €1.3 billion was from foreign tourism;
- Tourism in 2015 was a €7.7 billion industry for the State.

Table 5.3 provides information on domestic tourism activities in 2015 and 2016.

It is noteworthy that the three activities (highlighted in the table) that showed the greatest growth in participation by domestic tourists between 2015 and 2016 were hiking/hillwalking, heritage/interpretive centres, and monuments. These are all features of the site and proposed development.

Table 5.3 Activities engaged in by domestic holidaymakers Source: Fáilte Ireland Tourism Facts 2016 (preliminary)

Activities engaged in by domestic holidaymakers	(%) 2015	(%) 2016
Hiking/Hillwalking	**23%**	**25%**
Houses/Castles	26%	24%
National Parks	22%	23%
Visits to Spas	20%	20%
Heritage/Interpretive Centres	**18%**	**20%**
Gardens	21%	19%
Watersports (excluding swimming)	18%	19%
Monuments	**16%**	**18%**
Museums/Art Galleries	15%	14%
Cycling	7%	8%
Golf	7%	6%
Angling	4%	3%
Attending Horse Racing	3%	3%

5.3.5 Movement and Transport

The site is located on the R115 Stocking Lane / Killakee Road / Military Road route that extends from Ballyboden at the southern edge of the Dublin suburban area into County Wicklow at Glencree, and continues onward through the heart of the Dublin and Wicklow Mountains to Laragh and Glendalough.

This regional road is fairly narrow, typically 5m to 6m wide, and carries moderate levels of traffic consisting of both local access traffic and visitors entering the mountains from the north. Traffic speeds are reasonably low in response to the narrow and winding road alignment, and there is a 60 km/h speed limit. This is one of the primary access routes into the mountains and is generally suitable to cater for a modest increase in traffic.

However, there is no footpath along the road, which makes it unattractive and potentially unsafe for people to walk on, and to access the mountains on foot from the city. While there are no cycling facilities along the road, it is a popular recreational cycle route with cyclists sharing the road with vehicular traffic and on occasion pedestrians and horse riders.

There is no bus service along the road. The nearest services are the no. 15 Dublin Bus service which serves Ballycullen Road, and the no. 15B which serves Stocking Avenue, in Woodstown, some 2.5km from the site. These cross city routes also serve the city centre. The lack of a footpath along the R113 and R115 between Woodstown and the site makes these services effectively inaccessible to the site at present. Tallaght LUAS stop is approximately 7.5 km by road from the site.

5.4 POTENTIAL IMPACTS OF PROPOSED DEVELOPMENT

5.4.1 Construction Phase

5.4.1.1 Local Residents and Businesses (Including Farms)

Potential impacts on local residents and businesses during construction include:

- Disturbance to residential amenity in the vicinity of the site, resulting from construction activity and traffic movements which may be visible and audible from nearby homes and farms (potentially affecting animals).
- Certain construction activities (e.g. vegetation clearance, excavation and earth shaping) and erection of new structures, e.g. the parking area and the visitor centre, will be visible during and after construction from a small number of houses, notably the clusters of houses directly to the north and south of the Hellfire property west of the R115.
- Possible dust emissions from the construction activity may affect air quality locally.
- There will be impacts on traffic flow on the R115 as a result of construction traffic and as a result of construction works to the road corridor, although two way traffic will be maintained throughout.

The significance of these effects is considered to be minor-moderate, and adverse.

5.4.1.2 Existing Recreational Users of the Site (Including Tourists)

Potential impacts on existing recreational users during construction include:

- Construction activities (e.g. vegetation clearance, excavation and earth shaping) and erection of new structures – the parking area, the visitor centre, the tree canopy walk/pedestrian bridge, new trails and interpretation signage installation) – will be visible during construction from within the site.
- Construction activities will be audible on the site.
- Dust emissions will result from the construction activities.

- The existing parking area will be occupied for a period by the construction of a new replacement car park, although the construction will be phased so as to maintain the existing parking capacity on the site throughout the construction period (refer to the Outline Construction and Management Plan prepared by Roughan and O'Donovan and submitted under separate cover with the application).
- Access to existing trails on the site may be temporarily, locally restricted during upgrade of the trails and construction of new sections of trail.
- These impacts will affect people's experience of the site and may affect horses, potentially causing users to avoid using the site.

The significance of these effects is considered to be moderate, and adverse. The contractor will be required to produce and implement a Construction Management Plan that ensures best practice in site works management to reduce potential construction impacts as much as possible and to within reasonable levels.

5.4.2 Operational Phase

5.4.2.1 Local Residents and Businesses (Including Farms)

Potential impacts on local residents and businesses during operation include:

- A minor increase in traffic to the site along the R115 will result from the development. However the proposed improvements to the R115 will improve the safety of all road users, including cars but particularly for walkers and cyclists. The road has adequate capacity for the predicted increase in traffic (refer to Chapter 14).
- The increased parking capacity on the site (and on-site management/marshalling capacity) will have the effect of reducing illegal parking on the R115 outside of the site, improving traffic flow and safety for all road users including cars, walkers and cyclists.
- The pedestrian bridge over the R115 will reduce the number of pedestrians crossing the R115, improving road safety for all users.
- The visitor centre buildings will be visible from a number of houses nearby to the south, and from further away to the east of the site (Jamestown and Cruagh areas). Elements of the parking area, including the prior removal of mature trees, will be visible from a small number of houses nearby to the north of the Hell Fire property (Steward's House and the neighbouring houses). The presence of the structures will reduce and soften over time as new vegetation matures around the structures and in the screening belts inside the site boundary.
- The conversion of a large area of coniferous forest on the east face of Montpelier Hill to permanent mixed deciduous woodland will be visible from the surroundings, with beneficial visual effect - although the establishment of the woodland will take time.
- The clearance of coniferous forest from behind the Hell Fire Club building will return the building to its original prominence on the hilltop in views from the north and east, with beneficial visual effect.
- It is possible that increased usage of the site will result in an increase in nuisance and impacts to neighbouring land owners/farms, e.g. trespass and littering on their properties, and disturbance of animals. However, it is not considered that the formalisation and improvement of visitor facilities will attract nuisance-causing users; it will more likely attract more responsible/considerate types of uses. The increase in usage and a presence of permanent staff on the site with management responsibility for parts of the site, will provide passive surveillance and discourage nuisance behaviour. Improved information (on signage, maps available at the visitor centre, online, etc.) will also

encourage responsible/considerate behaviour. Litter bins will also be provided and a litter management plan implemented should An Bord Pléanala so wish (the Operational Management Plan includes proposals for waste management on site).

- The establishment of a management steering group for the site, comprised of SDCC, Coillte and the DMP, and the presence of an operator and the DMP volunteer rangers on site, will generally provide channels of communication and improved management/response capacity for any issues that arise as a result of increased usage or nuisance-causing activity.

The appearance, condition and management of the site will be improved overall and it is considered that this will have a minor to moderate positive impact on local residents and business including farms.

5.4.2.2 Existing Recreational Users of the Site (Including Tourists)

Potential impacts on existing recreational users during operation include:

- The development would result in the realisation of numerous policy objectives contained in national, regional and local policy documents, including policies relating to (a) cultural heritage, (b) economic development including tourism, (c) movement strategies and human health, (d) environmental quality including green infrastructure, (d) heritage, conservation and landscape. The contribution to the realisation of these policies would have positive impacts on population and human health. Refer to 2.3 above for the relevant policies and objectives.
- Access to the site (the landscape, natural and cultural heritage resources) will be significantly improved by the improvement to the roads accessing the site including the provision of a footpath and cycle lane, and by the increased parking capacity on site. The shuttle bus service from Tallaght, along with the footpath and cycle lane, will improve access and provide more sustainable means of access to the site (compared to the current situation where car is the predominant mode of transport).
- The new visitor facilities such as improved trails, heritage interpretation and education room, food, beverage and information, toilets and shelter, would enhance the majority of visitors' experience of the site – if they choose to avail of them. The amenities will widen the appeal of the site, making it suitable for people of all ages and physical abilities including the elderly, families and children. The proposed development provides an education facility which would benefit school groups and special interest groups.
- The facilities are sufficiently modest in scale, in the context of the 152 ha forested/woodland site, to be avoided by users if they choose to do so. Those users wishing to arrive on site and follow a trail directly into the forested mountain landscape of the Hell Fire property, or Massy's Wood in which only minor interventions are proposed, without accessing the visitor centre, will have that option.
- There will be more significant health benefits accruing from an enhanced facility and improved amenities with potential links to other trails, walks and amenities in the area. The provision of additional and improved recreational facilities will encourage recreational activity in this location to the benefit of the health and wellbeing of the local population and the Dublin region.
- Health and safety will also be enhanced with improved signage and way finding, improved access for emergency vehicles, improved walking and trekking information, shelter from the elements, and facility for provision of first aid equipment such as defibrillators, blankets etc. The provision of a pedestrian bridge will reduce the potential for accidents on the R115 as will the provision of a designated cycle lane and a footpath.

- A distinct tourist attraction and activity hub in the Dublin Mountains will be created. This will generate employment on the site itself, with an estimate of 14 full time equivalent positions to be created – skilled and unskilled. The local population and businesses may benefit from employment in the construction phase, and in providing services during operation. It is possible – and it is the intention of the applicant - that the development it will act as a catalyst for heritage-based tourism enterprise in the wider Dublin Mountains and South Dublin.

The suite of facilities and amenities, the appearance, condition and management of the site will be improved overall and it is considered that this will have a moderate positive impact on recreational users and tourists – existing and new.

However,

- The development will be considered by some as the spoiling of a landscape (and its natural and cultural heritage assets) highly valued in its current condition.
- It is possible that increased usage of the site will be perceived as a nuisance by some existing users.

The degree of significance of these effects will vary depending on the particular receptor. Some will experience the effects as highly significant and adverse.

5.4.3 'Do Nothing' Scenario

If the proposed development does not proceed, the current use and management regime of the site will continue. The Hell Fire forest property will remain a commercial coniferous plantation – with cycles of felling, replanting and growth - also used for recreation amenity but as a secondary function with no active management. Massy's Wood will remain a mixed deciduous woodland used and managed predominantly for recreation.

If the proposed development does not proceed, it can be expected that recreational usage of the site will continue to grow, and private car will be remain predominant mode transport for accessing the site. There will be no parallel increase in the capacity of the facilities to accommodate greater numbers or a greater variety of visitors/users, and no increase in management capacity to control visitors and monitor and manage impacts of increased usage on natural and cultural heritage assets. The archaeological and architectural heritage assets of the site will not be routinely monitored and repaired where needed, and access and interpretation of the assets will not be improved. The problem of illegal parking on the R115 will continue with further negative effects on traffic flow and road safety for all users. Numerous policies and objectives at national, regional and local level promoting development such as that proposed for the benefit of the local population and domestic and international tourists, and human health, will not be realised.

5.5 REMEDIAL AND MITIGATION MEASURES

Mitigation measures follow the principles of avoidance, reduction and remedy. The most effective impact avoidance and mitigation occurs during the site selection and design stage. In Chapter 4 above the considerations and reasons for the selection of the site are explained in the context of alternatives considered. The design/layout and activity alternatives and decisions are also discussed.

As a general approach the sensitive environmental factors were identified at an early stage and the physical elements of the proposed development designed to avoid significant impacts. Operational management measures for the development were considered and prepared in parallel with the design to further reduce environmental impacts, and where possible to result in positive impacts.

5.5.1 Construction Phase

An outline Construction and Traffic Management Plan has been prepared by Roughan and O'Donovan, the project engineers, and provided under separate cover. This document provides the outline/framework for the establishment of detailed construction management practices to be agreed by the contractor, SDCC, Coillte and other stakeholders in the event of development approval.

5.5.2 Operational Phase

An Operational Management Plan has been prepared and submitted under separate cover. This document sets out the envisaged structure and responsibilities for management of the proposed development during operation.

The measures include the establishment of a permanent management steering group comprised of SDCC, Coillte and the DMP with responsibility for:

(a) management and maintenance of the development overall, and specifically the facilities outside of the direct responsibility of the private operator;
(b) management of the contract, lease or license of the private operator of the facilities;
(c) liaison with neighbouring landowners, residents and stakeholders, facilitated through the consultation forum of the Dublin Mountains Partnership;
(d) coordination of forest operations ongoing in the western part of the Hell Fire forest property (the area largely unaffected by the proposed development), and
(e) monitoring and management programmes for:
- the trails network;
- archaeological and architectural heritage features, and
- ecology (specifically the Key Ecological Receptors identified in the EIA process).

The Operational Management Plan also identifies access and parking management measures including:

(d) car park monitoring and variable message signs to prevent queuing and overspill parking;
(e) the proposed shuttle bus from Tallaght;
(f) the proposed park and ride facility at Tallaght Stadium.

5.6 PREDICTED AND RESIDUAL IMPACTS OF THE PROPOSED DEVELOPMENT

5.6.1 Construction Phase

While best practice in construction and traffic management can reduce construction impacts affecting population and human health, such as noise, dust, visual impact and traffic congestion, the effects of these cannot be entirely avoided or remedied. Nonetheless there are no significant negative impacts predicted to arise during construction, and those impacts that do arise will be temporary.

5.6.2 Operational Phase

It is considered that the measures outlined in 5.5.2 would improve the operation and quality/condition of the site as a recreation and heritage appreciation facility, improve access to the site, and improve the management and condition of cultural and natural heritage resources on the site despite increased visitor usage – all with moderate positive impact on local receptors (residents, businesses and landowners) and recreational users including tourists – existing and new.

However, the development including its operational management will be considered by some as the spoiling, and over-use, of a landscape highly valued in its current condition. The degree of significance of these effects, perceived/experienced as negative, will vary depending on the particular receptor.

5.6.3 'Do Nothing' Scenario

Refer to 5.4.3 above.

5.7 CUMULATIVE IMPACTS

No other projects or plans have been identified which would result in significant negative cumulative impacts on population and human health. Other initiatives to improve access to and appreciation of the Dublin Mountains landscape, natural and cultural heritage resources (e.g. those of the DMP, Coillte and SDCC) could increase use of the site by visitors, but this is intended and no significant negative impacts are predicted to arise as a result.

5.8 MAJOR ACCIDENTS AND DISASTERS

It is considered unlikely that the proposed development will result in an increased risk of major accidents or disasters. The risk of significant effects to Population or Human Health arising from major accident or natural disaster at the site are considered highly unlikely and indeterminable.

6.0 BIODIVERSITY

THIS CHAPTER REPLACES THE PREVIOUSLY SUBMITTED CHAPTER ON BIODIVERSITY

6.1 INTRODUCTION

This chapter examines the ecology of the receiving environment within and surrounding the proposed Dublin Mountains Visitor Centre ("the proposed development") and assesses the potential impacts of the proposed development on Biodiversity. This updated chapter follows a request from An Bord Pleanála ("the Board") who, in a letter dated 6th February 2019, wrote to the applicant stating:

"*With regard to biodiversity, the Board was not satisfied that adequate baseline surveys and monitoring had been carried out, particularly in relation to the potential impacts of increased visitor numbers and the elements of the proposed development in Massy's wood, and could therefore not be satisfied that there would not be a significant negative impact on the ecology, biodiversity and flora and fauna of the area.*

The applicant is requested to address the above comments and undertake additional surveys/monitoring during recognised optimal conditions, inter alia, of vegetation and habitats, protected species including bats and otter, and chemical substances and freshwater invertebrates upstream and downstream of the surface water discharge point in Glendoo Brook. The applicant shall update the relevant sections of the EIAR to incorporate the results of these surveys and any mitigation measures that are required to address the likely significant impacts from the proposed development".

The methods employed to establish the ecological baseline within and around the proposed development are described, together with the process followed to determine the nature conservation importance of the ecological features present. The ways in which habitats, species and ecosystems are likely to be affected by the proposed development are explained and the magnitude of the likely effects predicted, taking into account the conservation condition[7] of the habitats and species under consideration. Mitigation and enhancement measures are also proposed, and any residual effects are assessed, taking into account the mitigation and enhancement measures proposed.

6.1.1 Biodiversity Conservation Legislation and Planning Policy

The European Communities (Birds and Natural Habitats) Regulations, 2011, as amended (the 'Habitats Regulations'), transpose into Irish law Directive 2009/147/EC (the 'Birds Directive') and Council Directive 92/43/EEC (the 'Habitats Directive'), which list priority habitats and species of international (European Union) conservation importance which require protection. This protection is afforded in part through the designation of Natura 2000 sites - areas that represent significant populations of listed species within a European context. Areas designated for bird species are classed as Special Protection Areas (SPAs), while those designated for other protected species and/or habitats are classed as Special Areas of Conservation (SACs). Wild bird species in SPAs, and habitats and species in SACs that are listed on Annexes I and II (respectively) of the Habitats Directive, are legally protected. Additionally, species listed on Annex IV of the Habitats Directive are strictly protected wherever they occur, whether inside or outside the Natura 2000 network. This protection is afforded to animal and plant species by Sections 51 and 52, respectively, of the Habitats Regulations. Annex I habitats outside of SACs are still considered of national and international importance and, under Section 27(4)(b) of the Habitats Regulations, public

[7] Based upon the definitions of favourable conservation status in Article 1 of Council Directive 92/43/EEC (the Habitats Directive).

authorities have a duty to strive to avoid the pollution or deterioration of Annex I habitats and all habitats integral to the functioning of SPAs.

The Wildlife Act, 1976, as amended (the 'Wildlife Act') is the principal legislative mechanism for the protection of wildlife in Ireland. A network of nationally protected Nature Reserves, which public bodies have a duty to protect, was established under the Wildlife Act. Sites of national importance for nature conservation are afforded protection under planning policy and the Wildlife Act. Natural Heritage Areas (NHAs) are sites that are designated under the Wildlife Act for the protection of flora, fauna, habitats and geological features of interest. Proposed Natural Heritage Areas (pNHAs) are published sites identified as of similar conservation interest but have not been statutorily proposed or designated – pNHAs are nonetheless afforded some protection under planning policies and objectives. The Wildlife Act also protects species of conservation value from injury, disturbance and damage to individual entities or to their breeding and resting places. All species protected under the Wildlife Act must, therefore, constitute a material consideration in the planning process.

An additional, important piece of national legislation for the protection of wild flora, i.e. vascular plants, mosses, liverworts, lichens and stoneworts, is the Flora (Protection) Order, 2015 (the 'FPO'), which makes it illegal to cut, uproot or damage listed species, i.e. species listed in the schedules to the Order, in any way or to alter, damage or interfere in any way with their habitats.

Ireland's *National Biodiversity Action Plan 2017-2021* (Department of Culture Heritage and the Gaeltacht, 2011), in accordance with the Convention on Biological Diversity, is a framework for the conservation and protection of Ireland's biodiversity, with an overall objective to secure the conservation, including, where possible, the enhancement and sustainable use of biological diversity in Ireland and to contribute to collective efforts for conservation of biodiversity globally. Action 1.1.3 of the National Biodiversity Strategy states that "*all Public Authorities and private sector bodies move towards no net loss of biodiversity through strategies, planning, mitigation measures, appropriate offsetting and/or investment in Blue-Green infrastructure*". This is particularly relevant to developments. The plan is implemented through legislation and statutory instruments concerned with nature conservation.

The *All-Ireland Pollinator Plan 2015-2021* (NBDC, 2015a) seeks to halt the decline in pollinators through a range of objectives. This plan is supplemented by the guidance document *Councils: actions to help pollinators* (NBDC, 2016).

6.1.2 Approach and Objectives

A 'habitat' is the environment in which an organism lives and is generally defined in terms of vegetation and physical structures. Habitats and species of ecological significance occurring or likely to occur within the defined Zone of Influence and Study Area of the proposed development were classified as Key Ecological Receptors.

In accordance with Transport Infrastructure Ireland (TII) *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (2009), an impact assessment has been undertaken of Key Ecological Receptors within the Zone of Influence of the proposed development. According to these guidelines, the Zone of Influence is the "effect area" over which change resulting from the proposed development is likely to occur and the Key Ecological Receptors are defined as features of sufficient value as to be material in the decision-making process for which potential impacts are likely.

In the context of the proposed development, a Key Ecological Receptor is defined as any feature valued as follows:

- International Importance
- National Importance
- County Importance
- Local Importance (Higher Value)

Features of local importance (Lower Value) and features of no ecological value are not considered to be Key Ecological Receptors. The assessment presented in this Chapter does not consider any other type of environmental effects other than those on biological diversity (of flora and fauna). This Chapter quantifies the potential effects on identified Key Ecological Receptors and prescribes mitigation measures required to avoid and reduce any significant negative effects identified.

Determining the ecological issues to be addressed in the assessment was informed by early engagement with relevant stakeholders. During this scoping process, selected consultees were allowed the opportunity to provide comments and observations on the proposed development. Further details of the consultation process, including a list of the statutory and non-statutory consultees, are presented in Section 6.2.5.

On completion of the scoping process, a desk study was undertaken to review all available published data describing ecological conditions within zone of influence. The desk study cross-referenced this published data with publicly available maps and aerial orthophotography from Ordnance Survey Ireland (OSi), the National Parks & Wildlife Service (NPWS) and the Environmental Protection Agency (EPA) to identify Key Ecological Receptors. During this assessment, the statutory conservation agency, the NPWS, provided data on nature conservation designations, habitats and species of conservation interest. The baseline information obtained from the desk study constituted the first stage in defining the Zone of Influence of the proposed development.

In addition to this desk study, a number of ecological surveys were carried out, originally in 2016 to inform the EIAR, and subsequently in 2017, 2018 and 2019 to obtain further information on the baseline environment with respect to biodiversity and to identify potential effects thereon. Section 6.2.6 presents details of these surveys.

Where potential significant negative effects were identified, detailed and specific mitigation measures have been proposed in accordance with the hierarchy of options suggested in European Commission report, '*Assessment of plans and projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'*. Accordingly, the avoidance of effects at their source is the prioritised approach. Where this is not possible, the following approaches are adopted, in order of decreasing preference: (i) reduction of effects at source, (ii) on-site abatement, and finally, (iii) abatement at receptor. These mitigation measures (as set out in Section 6.8 of this chapter) have been incorporated into the design of the proposed development.

The information provided in this chapter accurately and comprehensively describes the baseline ecological environment, provides an accurate prediction of the potential ecological impacts of the proposed development, prescribes specific mitigation as necessary and describes the likely residual ecological effects.

6.1.3 Terminology

The valuation of Key Ecological Receptors and the terminology used to determine ecological value is in accordance with aforementioned guidance (TII, 2009). The description of effects is in accordance with the EPA's Draft *Guidelines on the Information to be Contained in Environmental Impact Statements* (EPA, 2017).

6.2 METHODOLOGY

This section describes the methodologies that were followed in collecting information, in describing the baseline ecological conditions and in assessing the likely effects of the proposed development.

6.2.1 Guidelines on Environmental Impact Assessment

The process of identifying, quantifying and evaluating potential impacts of the proposed development on habitats, species and ecosystems was undertaken in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) best practice guidance (CIEEM, 2019). In addition, reference to the following recognised guidance on the Environmental Impact Assessment of National Road Schemes provided for an appropriately defined scope and evaluation process:

- EPA (2017) *Draft Guidelines on information to be contained in the Environmental Impact Assessment Report.*
- EPA (2015) *Draft Advice Notes for preparing Environmental Impact Statements.*
- EPA (2002) *Guidelines on the Information to be Contained in Environmental Impact Statements.*
- EPA (2003) *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements.*
- TII (2006a) *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes.*
- TII (2006b) *Guidelines for the Treatment of Bats during the Construction of National Road Schemes.*
- TII (2006c) *Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes.*
- TII (2006d) *Guidelines for the protection and preservation of trees, hedgerows and scrub prior to, during and post construction of national road schemes.*
- TII (2008a) *Environmental Impact Assessment of National Road Schemes – A Practical Guide (Revision 1).*

- TII (2008b) *Guidelines for Ecological Survey Techniques for Protected Flora and Fauna during the Planning of National Road Schemes.*
- TII (2008c) *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes.*
- TII (2008d) *Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes.*
- TII (2009) *Guidelines for Assessment of Ecological Impacts of National Road Schemes.*
- TII (2010) *Guidelines on Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads.*

6.2.2 Establishing the Zone of Influence

The key variables determining whether Key Ecological Receptors will be subject to effects through development are:

- the physical distance of the proposed development to the Key Ecological Receptors;
- the sensitivities of the Key Ecological Receptors within the receiving natural environment; and
- the potential for in-combination effects.

The Zone of Influence, as presented in Appendix S12, was defined as follows:

- Having regard to the above key variables, the Zone of Influence was defined as the entire area within 5km of the proposed development; and,
- The Glendoo Brook and all downstream waterbodies, including the Liffey Estuary Lower transitional waterbody as far as the North Bull and Poolbeg Lighthouses.

The likely Zone of Influence covers the trails from the Hell Fire Club car park to a distance of over 5km i.e. a 10km round trip. The length of visitor stays at the Hell Fire Club car park is typically about 1 hour and almost all visits are less than 2 hours (Appendix S9).

6.2.3 Establishing the Study Area

This Study Area was defined by the findings of the desk study (presence/absence of protected habitats, flora or fauna within the Zone of Influence) and best practice methodology referenced above for assessing effects on those ecological features. In general, the study area included the site of the proposed development and a 50m buffer, where accessible. The surveys extended beyond this area are as follows:

- The Merlin Survey also included Annamount Spink, the Featherbeds, Tibradden Mountain and the upper Glenasmole Valley (see Appendix S1).
- The otter survey including the Glendoo Brook 500 m upstream and downstream of the development boundary.
- The assessment of the upland habitats and trails outside the site extended to Cruagh Wood, Cruagh Mountain, Glendoo Mountain and Killakee Mountain.

6.2.1 Desk Study

The desk study undertaken for this assessment included a thorough review of the available baseline data relating to biological diversity in the study area. The following resources were used:

- Colhoun & Cummins (2013) *Birds of Conservation Concern in Ireland 2014-2019.*
- Environmental Protection Agency (EPA) Unified GIS Application data related to Water Framework Directive Status of waterbodies and watercourses within the Zone of Influence.
- National Parks & Wildlife Service (NPWS) *Map Viewer*.
- NPWS *Flora Protection Order- Bryophytes Map Viewer.*
- NPWS documents related to NHAs, pNHAs and Natura 2000 sites within the Zone of Influence.
- National Biodiversity Data Centre (NBDC) *Biodiversity Maps.*

As with all desk studies, the data considered were only as good as the data supplied by the recorders and recording schemes. The recording schemes provide disclaimers in relation to the quality and quantity of the data they provide, and these were considered when examining outputs of the desk study.

6.2.4 Consultation

The consultation period included pre-planning consultations and observations relating to biodiversity which were received during the planning process, which has included three further information requests and an oral hearing in November 2018. Observations received from the Department of Culture, Heritage and Gaeltacht (DCHG) and Inland Fisheries Ireland (IFI) are outlined in Table 6.1. Concerns raised by organisations and individuals during the planning process have been addressed as far as possible.

Table 6.1 Consultation

Consultee	Date Correspondence Received	Summary of Response
Statutory Consultees		
Department of Culture, Heritage and Gaeltacht (DCHG)	9th February 2017 25th September 2017 4th January 2018	Rare and protected species records were obtained on 9th February 2017. The NPWS (which is part of the DCHG) also provided two submissions on the planning application dated 25th September 2017 and 4th January 2018. The NPWS's main concerns included the potential impact on Natura 2000 sites as a result of an increase in visitor access, impacts on nesting Merlin, the protection of Red Squirrel and its habitat and management of Grey Squirrels at the site, the potential impacts of lighting on bats, the protection of birds during construction, the protection of badgers and the requirement for a construction management plan, the incorporation of deer lawns into the landscape design and the replacement of habitat lost to the proposed development.
Inland Fisheries Ireland (IFI)	20th February 2017	The proposed development is located in the catchment of the Owendoher River, which is a tributary of the River Dodder. The Owendoher is the most important nursery and recruitment tributary in the Dodder system. The Dodder system is exceptional amongst urban river systems in the area in supporting Atlantic Salmon (*Salmo salar*) (listed on Annex II and V to the Habitats Directive) and Brown Trout (*Salmo trutta*) (both anadromous and resident forms). The presence of these fish populations highlights the sensitivity of the Owendoher and Dodder catchment in general. Thus, it is vital to note that salmonid waters constraints apply to any development in this area.

6.2.5 Overview of Ecological Surveys

Field surveys of the site date back to 2016. In order to update and expand on the surveys carried out between 2016 and 2018, a range of ecological survey were carried out in 2019. An initial walkover of the site was undertaken on 3rd and 4th April 2019 and included a habitat survey. It also aimed to detect the presence, or likely presence, of protected and invasive species. The survey provided baseline information regarding the existing ecology of the study area and informed the need for further specialist surveys. Incidental records of higher plants and protected species were collected thought the surveys in 2019. Given the extent of the surveys carried out between April and September 2019, incidental records, including a list of higher plants, was collected on the specialist surveys were added to the overall survey results.

Specific ecological surveys were carried out with respect to the following:

- Habitats, plants and invasive species
- Badger, Otter and Pine Marten
- Bats
- Birds, including Merlin
- Bryophytes
- Red and Grey Squirrel
- Amphibians
- Marsh Fritillary
- Water Quality and Aquatic Ecology

The following paragraphs outline the personnel involved in the ecological surveys in 2019.

Patrick O'Shea was the Project Ecologist for the proposed development. Patrick is an ecologist with over seven years' experience in ecological assessment. He holds a degree in Botany from Trinity College Dublin and an MSc in Ecological Management and Conservation Biology from Queen's University Belfast. Patrick co-ordinated and completed the ecological surveys, unless otherwise stated, with assistance from members of the ROD Environment Team.

The bryophyte surveys were carried out by Dr George Smith of Blackthorn Ecology and Dr Joanne Denyer. George has extensive experience in botanical surveys and Ecological Impact Assessment. He is an experienced bryologist and the British Bryological Society (BBS) Regional Recorder for Offaly and Westmeath. Joanne has significant expertise in bryology and has carried out numerous bryophyte surveys, including assessments of rare and protected species. She is the BBS Regional Recorder for Wicklow and Kildare and a former member of the BBS Council.

The 2019 Merlin survey was co-ordinated by Alan Lauder. Alan has over 30 years' experience as a professional ornithologist and nature conservation specialist. He has extensive raptor-specific experience including being the organiser of the 2001/2002 UK National Peregrine Survey, a steering group member on the 2017 Irish National Peregrine Survey, a steering group member

and local organiser (Wicklow) for the Irish National Merlin Survey 2018. Alan was assisted by John Lusby and Hannah Keogh. John is an experienced raptor ecologist specialising in Barn Owl, Kestrel and Merlin and with an extensive publishing record on Irish Merlin. He was lead organiser of the 2018 National Merlin Survey and has been BirdWatch Ireland's lead officer on Merlin studies. Hannah is a professional field ornithologist and has wide experience of bird survey techniques.

The water quality assessment was carried out by ECOFACT Environmental Consultants. The chemical analysis of the water samples was carried out by BHP laboratories Ltd. The water quality surveys were co-ordinated by Dr William O'Connor, a senior environmental scientist with over 20 years' experience in ecological management.

Alan Lauder was contracted to peer review the updated EIAR biodiversity Chapter. Alan is a professional ornithologist, nature conservation and wildlife projects specialist with over 30 years' experience working across state and non-governmental wildlife and conservation organisations in the UK and Ireland. He has extensive experience of a wide range of ecological and ornithological research, survey and monitoring techniques, is a highly skilled field worker as well as being experienced in habitat, visitor/tourism and wildlife management projects.

Sections 6.2.7 – 6.2.20 outline the methodologies applied during these surveys. Results of these surveys are presented in Section 6.4. Table 6.2 below lists the surveys, dates and personnel involved. Where the surveys were carried out over several days, the exact dates are listed in the individual sections or Supplementary Appendices.

Table 6.2 Ecological Survey Details

Survey	Date (2019	surveyor
Habitat	3rd / 4th April	Patrick O'Shea
Breeding Birds	April/May/June	Patrick O'Shea
Bats	May-September	Patrick O'Shea and ROD Environment Team
Bryophytes	14th May, 15th August	George Smith and Joanne Denyer
Red Squirrel	April-September	Patrick O'Shea and ROD Environment Team
Pine Marten	July- August	Patrick O'Shea
Badger	3rd, 4th,17th April	Patrick O'Shea
Vegetation- Massy's Estate	18th June	Patrick O'Shea
Vegetation- Hell Fire Club	2nd July	Patrick O'Shea
Trails in SAC/SPA	18th / 25th July	Patrick O'Shea
Amphibians	13th May / 18th July	Patrick O'Shea
Water Quality Assessment	28th August	ECOFACT/BHP
Invasive Species	5th June	Patrick O'Shea
Otter	24th July	Patrick O'Shea
Marsh Fritillary	19th September	Patrick O'Shea
Merlin	April-July	Alan Lauder, Hannah Keogh, John Lusby, Patrick O'Shea, Michael Bailey

6.2.6 Survey of Habitats and Vegetation

The initial habitat survey was carried out on in April 2019 and the species list and descriptions were updated throughout the field season. The site was systematically walked, and habitats were assessed, classified and sketched on to field maps of the site in accordance with Smith *et al*. (2011) and *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* (TII, 2008b). Habitats were identified to Level 3 in accordance with

the Heritage Council's *A Guide to Habitats in Ireland* (Fossitt, 2000). Target notes were taken on each 'block' of habitat and a comprehensive higher plant species list was made.

Detailed vegetation surveys were undertaken in Massy's Estate and in heath habitat at the Hell Fire Club. Within each quadrat, a full species list and abundance (scoring using the Domin Scale) was recorded.

Ten (10 No.) 10m × 10m quadrats were surveyed in Massy's Estate to allow for a future monitoring and comparative analysis.

Five (5 No.) 3m × 3m quadrats were surveyed at the Hell Fire Club. The purpose of this was to assess the correspondence of heath habitat along the forest road edges to the Annex I habitat European dry heath [4030]. The assessment of this habitat was undertaken using the *Interpretation Manual of European Union Habitats – EUR28* (European Commission, 2013) and *Scoping study and pilot survey for a national survey and conservation assessment of upland habitats and vegetation in Ireland* (Perrin *et al*., 2009). GPS coordinates were recorded, and photographs were taken for each quadrat.

The proposed development will attract visitors to the site and may act as a starting point for the Dublin Mountains Way and other trails leading into the uplands, which includes the Wicklow Mountains SAC and SPA. Habitat surveys were undertaken to Level 3 in accordance Fossitt (2000) in a 20m band along the trail network for a distance of 5km from the location of the proposed visitor centre. Target notes on evidence of burning, existing erosion or areas that may require interventions to prevent erosion or braiding due to impeded drainage etc. were also taken.

6.2.7 Merlin

Merlin studies were carried out during the breeding season in 2018 and 2019. The general approach to fieldwork was similar to that used within the *National Merlin Survey 2018* (IRSG/BWI, 2018) and which is based on/derived from standard published methods for Merlin in the UK and from studies in Ireland which have helped to refine methods for this difficult-to-detect, near-cryptic species (Hardy *et al*., 2013; Norris *et al*., 2009; Lusby *et al*., 2011). The methodology is described further in Appendix S1.

6.2.8 Bryophytes

The desk study identified a number of rare bryophytes in the zone of influence and, therefore, field surveys were carried out to identify any presence of rare or protected bryophytes in the study area. The methodology is described further in Appendix S2.

6.2.9 Aquatic Survey

The water quality assessment included semi-quantitative sampling of benthic macroinvertebrates and chemical analysis at two locations, above and below the proposed drainage outfall. The methodology used in the water quality assessment report is provided in Appendix S3.

6.2.10 Amphibians

Amphibians were recorded in three ponds at the Hell Fire Club in 2016. The three ponds were resurveyed in 2019 adhering to TII (2008b). The surveys involved using a torch after dusk to

search for smooth newt and frog spawn in the ponds. Other survey methods for newt, such a netting and egg searching were not carried out in order to minimise disturbance.

6.2.11 Breeding Birds

The breeding bird survey were carried out in Massy's Estate and at the Hell Fire Club in April, May and June 2019. The survey followed an adapted methodology of Breeding Bird Survey (BBS) as described in Gilbert *et al*. (1998). A predetermined transect route was walked early in the morning at a slow pace, and birds within the surveyor's field of vision and hearing were recorded. The surveyor carried a pair of 10× binoculars to aid the identification of birds at distance. The transect routes are illustrated in Appendix S4.

All bird species were recorded using standard species codes from the British Trust of Ornithology (BTO). Breeding evidence for each species was also collected, noting 'possible', 'probable' and 'confirmed' breeding outlined in *Bird Atlas 2007-11* (BTO, 2011).

6.2.12 Marsh Fritillary

The fields to the north and east of the Hellfire Club building contain high densities of Devil's-bit Scabious (*Succisa pratensis*), the favoured food plant of the Marsh Fritillary (*Euphydryas aurinia*), which is also listed on Annex II to the Habitats Directive. A survey was undertaken in this area to check for Marsh Fritillary larval (caterpillar) webs on 19th September 2019. The fields were walked at a slow pace and the plants were inspected for larval webs of Marsh Fritillary.

6.2.13 Bats

Bat suitability assessment

A bat suitability assessment focussed on identifying built or natural features within or in close proximity to the construction envelope, i.e. area in which construction or ground works will take place.

The bat suitability assessment was conducted adhering to best practice guidance (TII, 2006a,b; Collins (ed.), 2016) and involved a visual assessment and categorisation of suitable features on trees and structures capable of supporting roosting bats. Trees and structures were assessed using the recognised criteria outlined in Collins (ed.) (2016). The locations of features on trees and structures with features that could provide moderate to high potential were recorded with a hand-held GPS unit and photographed. Trees or groups of trees with low or negligible potential were also noted.

Emergence/ Re-entry Surveys and Activity Transects

Health and Safety policy dictated that the surveyors undertook their work in pairs or groups. The surveyors used either Anabat Walkabout or Song Meter EM3+ bat detectors. Both detectors allow visual validation of echolocation recordings (species identification) in real time and all audio files are linked to a GPS and digitally geospatially referenced.

Following each survey, recordings (detections) were processed using Kaleidoscope Pro Analysis software to extract information including sound recordings, sonograms, GPS coordinates, time, date and species identification confidence values. Recordings with low confidence values or of rare species were validated manually. All validated detections were geospatially referenced

using the ESRI geographic information systems (GIS) programme, ArcGIS. The transect routes are illustrated in Appendix S4.

Emergence/ Re-entry Surveys

Following the bat roost suitability assessment, three trees close to the visitor centre building with potential to support a bat roost, were each surveyed once at dusk and once at dawn. The Hell Fire Club building was surveyed twice at dusk and once at dawn. The emergence surveys were undertaken between 15 minutes before sunset and two hours after sunset and the re-entry surveys from two hours before sunrise to sunrise. The emergence and re-entry surveys adhered best practice (Collins (ed.), 2016).

Bat activity transects

The bat activity surveys were conducted adhering to best practice guidance (TII/NRA, 2006a; Collins (ed.), 2016) and involved walking a pre-determined transect at a slow pace to observe and record bat activity in the study area. The bat activity transects were undertaken between 15 minutes before sunset and two hours after sunset or from two hours before sunrise to sunrise.

Static bat surveys

Automatic bat detectors (Song Meter EM3+) were placed close to the footprint of the proposed visitor centre building and the canopy bridge in Massy's Estate. The detectors were set to record from sunset to sunrise and were left recording for one week each in June and September. The data collected was analysed using Kaleidoscope Pro Analysis software.

6.2.14 Badger

A badger survey was conducted in April 2019 adhering to best practice guidance (TII, 2006c; 2009) and involved a systematic search of the woodland and scrub habitats for physical evidence of badgers, e.g. setts, latrines, badger paths. Five infra-red camera traps which were deployed to detect pine marten, also identified badger in the study area.

6.2.15 Pine Marten

The desk study identified recent records of pine marten in the study area. Five infra-red camera traps were placed in five locations throughout Massy's Estate and at the Hell Fire Club for at least one week each to detect pine marten presence. Scats were also recorded during the badger survey and incidentally throughout the surveys.

6.2.16 Red Squirrel

The red squirrel survey was undertaken in Massy's Estate and the wooded areas of the Hell Fire Club following the UK Forestry Commission methodology, *Practical Techniques for Surveying and Monitoring Squirrels* (Gurnell *et al*., 2009). A number of methods were used to establish the distribution of red and grey squirrels and provide a baseline for future monitoring of both species. The methodologies for the squirrel surveys are outlined below. Incidental records of squirrels were also recorded between 2016 and 2019 and are presented in Appendix S5.

Visual Surveys

Visual surveys following the 'basic method' outlined in Gurnell *et al*. (2009) involved a surveyor walking a transect in Massy's Estate (3km) or the Hell Fire Club (5km). The transect routes follow the paths in Massy's Estate and entered the conifer plantations at the Hell Fire Club. Live sightings of squirrels were recorded on field maps.

The activity transect surveys were carried out early in the morning and within a 2-week period in April 2019. The transect routes are illustrated in Appendix S4.

Drey Survey

The woodlands in the study area were divided into blocks based on the woodland characteristics, the locations of paths and other physical features. Each block was searched for dreys using 10× binoculars. The young conifer plantations at the Hell Fire Club were walked in transects c. 25m apart. Photographs were taken and a GPS location was recorded at each drey. The purpose of the drey survey was identify dreys which may be impacted by the proposed development. The location of the dreys recorded is presented in Appendix S5.

6.2.17 Otter

The otter survey involved walking up Glendoo Brook and its tributaries using the English Nature monitoring methodology (Chanin, 2003). The survey extended 500m upstream and downstream of the site boundary during which the entire watercourse was walked and searched for signs of otter activity (prints, spraints, trails, holts, couches, slides, feeding remains etc.), which were recorded and mapped. Two infra-red camera traps were placed along the Glendoo Brook from 17th June to 5th July 2019 to record otters. The locations of the camera traps are presented in Appendix S5.

The survey methodology was also cognisant of the recommendations in the *Otter Threat Response Plan 2009-2011* (NPWS, 2009a), which recognises the importance of the riparian buffer (10 m on both banks) for otters.

6.2.18 Other Mammals

During the ecological surveys, the potential for the study area to support other mammals protected under the Wildlife Act, such as Irish Hare, Pygmy Shrew, deer species, Irish Stoat and Hedgehog was assessed. Any natural and built features that could potentially support these species were searched thoroughly and any physical evidence, such as sightings, feeding signs and droppings/scats were recorded.

6.2.19 Invasive Plants

Invasive plants, including species listed on the Third Schedule to the Habitats Regulations, but also other species which can negatively impact biodiversity were recorded and their distributions sketched on field maps. Target notes were taken which detailed height, density and any signs of previous management.

6.2.20 Walker Survey

An analysis of visitor usage was carried out using data provided by the Dublin Mountains Partnership. Walker surveys for the proposed development were carried out in November 2017 and between June and August 2019. The walker survey report is presented in Appendix S9.

6.3 ECOLOGICAL EVALUATION AND IMPACT ASSESSMENT METHODOLOGY

The ecological evaluation and impact assessment within this chapter follows the methodology that is set out in Chapter 3 of *Guidelines for Assessment of Ecological Impacts of National Roads Schemes* (TII, 2009).

6.3.1 Evaluation of Ecological Resources

The criteria used for the ecological evaluation follows those set out in Section 3.3 of TII (2009). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular site is of importance on the following scale:

- International
- National
- County
- Local Importance (Higher Value)
- Local Importance (Lower Value)

This guidance clearly sets out the criteria by which each geographic level of importance can be assigned. For example, Locally Important (Lower Value) receptors contain habitats and species that are widespread and of low ecological significance and only of importance in the local area. Conversely, Internationally Important receptors are either designated for conservation as part of the Natura 2000 network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected fauna.

All habitats and species within the Zone of Influence and study area were assigned a level of significance on the above basis and Key Ecological Receptors were established and classified on this basis.

6.3.1.1 Impact Assessment Methodology

The impact assessment uses the EPA 2002 and 2003 guidelines, but also has regard to the 2015 and 2017 draft revised guidelines with respect to characterising the impact of the proposed development on the receiving environment. The parameters used to characterise impacts were:

- Magnitude – relates to the quantum of impact, for example the number of individuals affected by an activity;
- Extent – relates to the area over which the impact occurs;

- Duration – intended to refer to the length of time for which the impact is predicted to continue, until recovery or re-instatement;
- Reversibility – whether an impact is ecologically reversible, either spontaneously or through specific action; and,
- Timing – timing and/or frequency of impacts in relation to important seasonal and/or life-cycle constraints should be evaluated. Similarly, the frequency with which activities (and associated impacts) would take place can be an important determinant of the impact on receptors.

It is necessary to ensure that any assessment of impact takes account of construction and operational phases; direct, indirect and cumulative impacts; and, those that are temporary, reversible and irreversible. The most relevant criteria for assessment of effects include quality and significance and these criteria are defined in Table 6.3 and 6.4. Definitions of terms used when quantifying duration of effects are defined below (as per EPA, 2017):

- Temporary – up to 1 year
- Short-term – 1 to 7 years
- Medium-term – 7 to 15 years
- Long-term – 15 to 60 years
- Permanent – over 60 years

Table 6.3 Criteria for Assessing Impact Significance (EPA, 2017)

Impact Magnitude	Definition
No change	No discernible change in the ecology of the affected feature
Imperceptible Impact	An impact capable of measurement but without noticeable consequences
Slight Impact	An impact which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate Impact	An impact that alters the character of the environment that is consistent with existing and emerging trends
Significant Impact	An impact which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment
Profound Impact	An impact which obliterates sensitive characteristics

Table 6.4 Criteria for Assessing Impact Quality (EPA, 2017)

Impact Type	Criteria
Positive	A change which improves the quality of the environment e.g. increasing species diversity, improving reproductive capacity of an ecosystem or removing nuisances
Neutral	A change which does not affect the quality of the environment
Negative	A change which reduces the quality of the environment e.g. lessening species diversity or reducing the reproductive capacity of an ecosystem

Once the potential impacts are characterised, the significance of any such impacts on each of the Key Ecological Receptors is evaluated.

6.3.1.2 Assessing Significance of Effects

The significance of effects was determined following guidance set out in Section 6.2.20 of the TII guidelines (2009), whereby effects are assigned significance based on their characterisation, irrespective of the value of the receptor. Significance is determined by effects on conservation status or integrity, regardless of geographical level at which these would be relevant.

6.3.1.3 Mitigation

The proposed development has been designed to specifically avoid, reduce and minimise negative effects on all Key Ecological Receptors. Where potential significant negative effects on Key Ecological Receptors are predicted, mitigation has been prescribed to offset these effects.

Proposed best practice design and mitigation measures are specifically set out in this Chapter and are realistic in terms of cost and practicality. They have a high probability of success in terms of addressing the impacts on the identified Key Ecological Receptors.

The potential impacts of the proposed development were considered and assessed to ensure that all impacts on Key Ecological Receptors are adequately addressed.

6.3.1.4 Survey Limitations

Standard survey methods were followed and no particular difficulties were encountered during the completion of the surveys described above. However, any biases or limitations associated with these methods could potentially affect the results collected. While every effort was made to provide a full assessment and comprehensive description of the study area, ecological trends (e.g. population trends) may not be fully reflected due to the instantaneous/short-term nature of the field surveys. However, the data obtained from field surveys coupled with the background knowledge provided by the desk study provides a robust representation of the baseline for the habitats and species within the Zone of Influence.

6.4 DESK STUDY RESULTS

6.4.1 General Description and Context

The site of the proposed development is located at the Hell Fire Club and Massy's Estate area of South County Dublin.

The Hell Fire Club is located on Montpelier Hill, which rises to 388m and is the most north-westerly outlying hill of the Dublin Mountains. The slopes around the hill comprise agricultural grasslands on the north side and conifer plantation on the remaining sides.

The Hell Fire Club is a working, commercial forest and will remain so into the future. With a new visitor facility and enhanced amenity function there would be a need for some localised changes in land use and management to ensure the commercial forest and the planned amenity can coexist. It is proposed to increase the area of car-parking in the northern section of the site through the provision of new terraces on the upper slopes. At present, some mature trees have been retained adjacent to the car-park for aesthetic reasons and screening of the car-park. However, their retention will not be feasible due to their potential to become over-tall and prone to windthrow. The car-park spaces will be reinforced grass/grass-crete and the routes/drives will be

tarmac. A number of middle-aged broadleaved trees are found at the Hell Fire Club as well as some mature trees which pre-date the forest and clearly grew in open ground in the past.

Massy's Estate, in contrast to the Hell Fire Club, is predominantly a broadleaved woodland. There are some areas of coniferous plantation and specimen trees from the original Killakee demesne. Mature specimen trees are found throughout the woodland. Invasive species including Cherry Laurel (*Prunus laurocerasus*), Himalayan Honeysuckle (*Leycesteria formosa*), Rhododendron (*Rhododendron* spp.) and Snowberry (*Symphoricarpos albus*) are abundant in places and detract from the nature conservation interest of the site.

Whilst predominantly a recreational forest with a high biodiversity function, woodland management works are ongoing with the thinning of areas of Beech. It is expected that the management of the woodland can be adapted to accommodate the amenity value that may be required. Stone Bridges and an area which consists of a walled garden which was originally part of the Killakee demesne are located to the eastern extremity of the site.

The Glendoo Brook flows in a south-north direction along the eastern extremity of Massy's Estate section of the site. It has two tributaries which flow into the river from the east. The Glendoo Brook joins the Owendoher downstream of Massy's Estate, which the flows into the River Dodder approximately 6km downstream.

Both the Hell Fire Club and Massy's Estate are popular with recreational users. A well established and waymarked network of trails runs around the site and connects to Cruagh Wood and the Dublin Mountains Way through the southern end of Massy's Estate. From here, walkers can follow a number of waymarked routes in Cruagh Wood or follow the Dublin Mountains Way to Glenasmole or Tibradden Mountain, or, follow more informal trails into the uplands on Cruagh Mountain, Killakee Mountain and Glendoo Mountains.

6.4.2 Designated Sites

The NPWS online map viewer was consulted in order to identify legally designated sites within the Zone of Influence. Table 6.5 lists those sites. Thereafter follows a description of the sites in question, according to the NPWS site synopses (NPWS, 2009; 2015; 2016), conservation objectives (NPWS, 2013; 2018) and Natura 2000 Standard Data Forms (NPWS, 2017a,b) for the respective sites, where available. The Zone of Influence is illustrated in Appendix S12.

Table 6.5 Designated sites within the Zone of Influence

Site	Distance from Proposed Development
Designated under European Law	
Wicklow Mountains SAC [002122]	The shortest absolute distance (as the crow flies) from the proposed development to this SAC is 0.6km to the south. In terms of accessibility by visitors, the shortest walking distance between the proposed visitor centre car park and the SAC is 3.3km on the existing trails through Massy's Estate, Cruagh Wood and along the trail which traverses the western slope of Cruagh Mountain.
Wicklow Mountains SPA [004040]	The shortest absolute distance (as the crow flies) from the proposed development to this SPA is 0.9km to the south-east. In terms of accessibility by visitors, the shortest walking distance between the proposed visitor centre car park and the SPA is 2.8km on existing trails through Massy's Estate and Cruagh Wood and along the trail which traverses the western slope of Cruagh Mountain.

Site	Distance from Proposed Development
Glenasmole Valley SAC [001209]	The shortest absolute distance (as the crow flies) from the proposed development to this SAC is 1.2km to the west. In terms of accessibility by visitors, the shortest walking distance between the proposed visitor centre car park and the SAC is 7.9km on the Dublin Mountains Way. There is a shortcut through St. Anne's Burial Ground which is currently blocked by a farm gate and 'no entry' sign. If visitors were to leave the road and follow this route, the distance to the SAC would be 6.4km.
South Dublin Bay and River Tolka Estuary SPA [004024]	The shortest absolute distance (as the crow flies) from the proposed development to this SPA is 9km north-east. This distance is over land and the location is not within the zone of influence, i.e. there is no connection along these distances. The shortest distance from the proposed development to the SPA via a hydrological connection is 17km north-east (down the Glendoo Brook, the Owenadoher, the River Dodder and the River Liffey) at the ESB Dolphin, which is within the likely Zone of Influence. Therefore, the effective distance to the site is considered to be 1km.
North Bull Island SPA [004006]	The shortest absolute distance (as the crow flies) from the proposed development to this SPA is 14km north-east. This distance is over land, i.e. there is no connection along this distance. The shortest distance from the Project to the SPA via a hydrological connection is 20km northeast, through the Glendoo Brook, the Owendoher, the River Dodder, the River Liffey and across the Tolka Estuary to the Bull Wall, which is within the zone of influence. Therefore, the effective distance to the site is considered to be 20km.
Designated under National Law	
Wicklow Mountains National Park	The shortest absolute distance (as the crow flies) from the proposed development to the National Park is 0.6km to the south. In terms of accessibility by visitors, the shortest walking distance between the proposed visitor centre car park and the National Park is 3.3km on existing trails through Massy's Estate, Cruagh Wood and the along the trail which traverses the western slope of Cruagh Mountain.
Glenasmole Valley pNHA	The shortest absolute distance (as the crow flies) from the proposed development to this pNHA is 1.2km to the west. In terms of accessibility by visitors, the shortest walking distance between the proposed visitor centre car park and the pNHA is 7.9km on the Dublin Mountains Way. There is a shortcut through St. Anne's Burial Ground which is currently blocked by a farm gate and 'no entry' sign. If visitors were to leave the road and follow this route, the distance to the pNHA would be 6.4km.
Dodder Valley pNHA	The shortest absolute distance (as the crow flies) from the proposed development to this pNHA is 2.3km to the west. There is no hydrological connection between this pNHA, which is upstream of the confluence of the Owendoher and the River Dodder, and the proposed development. In terms of accessibility by visitors, the short shortest walking distance between the proposed visitor centre car park and the pNHA is c. 14km on the Dublin Mountains Way and along the roads and paths which follow the River Dodder.
North Dublin Bay pNHA	The shortest absolute distance (as the crow flies) from the proposed development to this site pNHA is 9.4km north-east. This distance is over land and the location is not within the likely Zone of Influence, i.e. there is no connection along these distances. The shortest distance from the proposed development to the site pNHA via a hydrological connection is 17 km north-east (down the Glendoo Brook, the Owenadoher, the River Dodder and the River Liffey) at the ESB Dolphin, which is within the Zone of Influence. Therefore, the effective distance to the site pNHA is considered to be 17km.

Site	Distance from Proposed Development
South Dublin Bay pNHA	The shortest absolute distance (as the crow flies) from the proposed development to this ~~site~~ pNHA is 9.4km north-east. This distance is over land and the location is not within the zone of influence, i.e. there is no connection along these distances. The shortest distance from the proposed development to the ~~site~~ pNHA via a hydrological connection is 17km north-east (down the Glendoo Brook, the Owenadoher, the River Dodder and the River Liffey) at the ESB Dolphin, which is within the likely Zone of Influence. Therefore, the effective distance to the ~~site~~ pNHA is considered to be 17km.

6.4.2.1 The descriptions of the European designated sites below are based on the Site Synopses, Conservation Objectives and Natura 2000 Standard Data Forms, as well as the Conservation objectives supporting documents, where applicable. The description of the Wicklow Mountains National Park is based on the Wicklow Mountains National Park Management Plan (NPWS, 2005). The description of the Dodder Valley pNHA is based on the Site Synopsis (NPWS, 2009b).

6.4.2.2 Wicklow Mountains SAC

SAC Overview

The Wicklow Mountains SAC is a complex of upland areas in Counties Wicklow and Dublin, flanked by the Poulaphouca Reservoir (Blessington Lake) to the west and Vartry Reservoir to the east, Cruagh Mountain in the north and Lybagh Mountain in the south. Most of the SAC is over 300m, with much ground over 600m. The dominant topographical features are the products of glaciation. High corrie lakes, deep valleys and moraines are common features of this area. The substrate over much of the area is peat, usually less than 2m deep. Poor mineral soil covers the slopes, and rock outcrops are frequent. The Wicklow Mountains are drained by several major rivers including the Dargle, Liffey, Dodder, Slaney and Avonmore.

The Wicklow Mountains are important as a complex, extensive upland site. It shows great diversity from a geomorphological and a topographical point of view. The vegetation provides examples of the typical upland habitats with heath, blanket bog and upland grassland covering large, relatively undisturbed areas. In all, twelve habitats listed on Annex I to the Habitats Directive are found within the SAC. Several rare or protected plant and animal species occur, adding further to its value.

Qualifying Interests of the Site

[1355] European Otter (*Lutra lutra*)

[3110] Oligotrophic waters containing very few minerals of sandy plains (*Littorelleralia uniflorae*)

[3160] Natural dystrophic lakes and ponds

[4010] Northern Atlantic wet heaths with *Erica tetralix*

[4030] European dry heaths

[4060] Alpine and Boreal heaths

[6130] Calaminarian Grassland of the *Violetalia calaminariae*

[6230] Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)*

[7130] Blanket Bogs (* if active bog)

[8110] Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*)

[8210] Calcareous rocky slopes with chasmophytic vegetation

[8220] Siliceous rocky slopes with chasmophyic vegetation

[91A0] Old sessile oak wood with *Ilex* and *Blechnum* in the British Isles

Sensitivities of the SAC and its Qualifying Interests

Large areas of the SAC are owned by the NPWS and are managed for nature conservation based on traditional land uses of upland areas. The most common land use is sheep grazing, but others include turf-cutting, mostly hand-cutting but some machine-cutting also occurs. Turf cutting is largely confined to the Military Road, where there is easy access. Large areas which had been previously hand-cut and are now abandoned are regenerating. In the last 40 years, forestry has become an important land use in the uplands and has affected both the wildlife and the hydrology of the area. Amenity use is very high, with Dublin city close to the site. Peat erosion is frequent on the peaks. This may be a natural process but is likely to be accelerated by activities such as grazing.

Conservation Objectives for the Qualifying Interests

The conservation objective is to maintain the favourable conservation status for the qualifying interests that are currently of that status, including otter, Calaminarian grassland, dystrophic lakes and oligotrophic waters. The remaining qualifying interests do not have favourable conservation status, thus the conservation objective for these qualifying interests is to restore favourable conservation status. These Conservation Objectives focus on the Attributes of "*Habitat area*", "*Distribution", "Ecosystem function", "Diversity",* and *"Composition"* and *"Structure" of vegetation.*

Plate 1 **Walking trail through the Wicklow Mountains SAC and SPA, south of Cruagh Wood. Killakee Mountain is in the background and heath habitat typical of the Wicklow Mountains SAC is present.**

6.4.2.3 Wicklow Mountains SPA

SPA Overview

This is an extensive upland SPA, comprising a substantial part of the Wicklow Mountains. Most of the SPA is in Co. Wicklow, but a small area lies in Co. Dublin. The underlying geology of the site is mainly of Leinster granites, flanked by Ordovician schists, mudstones and volcanics. The area was subject to glaciation and features fine examples of glacial lakes, deep valleys and moraines. Most of site is over 300m, with much ground being over 600m. The substrate over much of site is peat, with poor mineral soil occurring on the slopes and lower ground. Exposed rock and scree are features of the site. The predominant habitats present are blanket bog, heaths and upland grassland.

Up to 9 pairs of Merlin may breed within the site in any one year. The open peatlands provide excellent foraging habitat for Merlin with small birds such as Meadow Pipit being their main prey. The cliffs and crags within the site also provide ideal breeding locations for Peregrine (20 pairs in 2002). Other birds of the open peatlands and scree slopes that have been recorded within the site include Ring Ouzel and Red Grouse. The Wicklow Mountains SPA is of high ornithological importance as it supports nationally important populations of Merlin and Peregrine, both species that are listed on Annex I to the Birds Directive.

Qualifying Interests of the Site

[A098] Merlin (*Falco columbarius*)

[A103] Peregrine (*Falco peregrinus*)

Sensitivities of the SPA and its Qualifying Interests

Large areas of the SPA are owned by the NPWS and managed for nature conservation based on traditional land uses of upland areas. The most common land use is traditional sheep grazing, but others include turf cutting, mostly hand-cutting but some machine-cutting also occurs. In the last 40 years, forestry has become an important land use in the uplands and has affected both the wildlife and the hydrology of the area. Amenity use is very high, with Dublin city close to the site. Peat erosion is frequent on the peaks. This may be a natural process but is likely to be accelerated by activities such as grazing. The main threats which have been identified for this site include forestry, grazing, peat extraction, walking, horse riding, unmotorized vehicles, paths, tracks and cycle tracks.

Conservation Objectives for the Qualifying Interests

No Conservation Objectives have been published for the Wicklow Mountains SPA, therefore, the Qualifying Interests have been assigned Conservation Objectives requiring the restoration or maintenance of favourable condition. As there are no Conservation Objectives for the Qualifying Interests, the Conservation Objectives have been taken from similar SPAs. The Conservation Objectives for these Qualifying Interests focus on population trend and distribution.

6.4.2.4 Glenasmole Valley SAC

SAC Overview

Glenasmole Valley in south Co. Dublin lies on the edge of the Wicklow uplands, approximately 5km from Tallaght. The River Dodder flows through the valley and has been impounded here to form two reservoirs which supply water to south Dublin. The non-calcareous bedrock of the Glenasmole Valley has been overlain by deep drift deposits which now line the valley sides. They are partly covered by scrub and woodland, and on the less precipitous parts, by a herb-rich grassland. There is much seepage through the deposits, which brings to the surface water rich in bases, which induces local patches of calcareous fen and, in places, petrifying springs.

The SAC provides excellent habitat for bats, with at least four species recorded: Pipistrelle, Leisler's, Daubenton's and Brown Long-eared. Otter occurs along the river and reservoirs. The SAC supports Kingfisher, which is listed on Annex I to the Birds Directive. Glenasmole Valley contains a high diversity of habitats and plant communities, including three habitats listed on Annex I to the Habitats Directive. The presence of four Red Data Book plant species further adds to the value of the SAC, as does the presence of populations of several mammal and bird species of conservation interest.

Qualifying Interests

[6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)

[6410] *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)

[7220] Petrifying springs with tufa formation (*Cratoneurion*)

Sensitivities of the SAC and its Qualifying Interests

The main land use of the area within the site is agriculture and commercial forestry. The area supports pasture for grazing and commercial forest plantations. These activities alongside new developments are putting pressure on the sensitivities of the site. The Natura 2000 data form lists the main threats to the Glenasmole Valley SAC as non-intensive grazing, planting of non-native trees and clear-felling, untreated sewage, fertilisation, pollution from agriculture and forestry, discontinuous urbanisation and changes to hydrology.

Conservation Objectives for the Qualifying Interests

No Conservation Objectives have been published for the Glenasmole Valley SAC. Therefore, generic Conservation Objectives (requiring the restoration or maintenance of favourable condition) apply.

Plate 2 **An example of the Glenasmole Reservoir service road, which is on the Dublin Mountains Way.**

6.4.2.5 South Dublin Bay and River Tolka Estuary SPA

SPA Overview

This SPA comprises a substantial part of Dublin Bay. It includes the intertidal area between the River Liffey and Dún Laoghaire and the estuary of the River Tolka to the north of the River Liffey, as well as Booterstown Marsh. A portion of the shallow marine waters of the bay is also included. In the south bay, the intertidal flats extend for almost 3km at their widest. The sediments are predominantly well-aerated sands. Several permanent channels exist. A small sandy beach and bedrock shores occurs. The SPA includes an enclosed area of saltmarsh and muds that is cut off

from the sea by a railway line, being linked by a channel to the east. Sea water incursions into the marsh occur along this stream at high tide. An area of grassland is also included in the SPA.

The SPA is of ornithological importance as it supports an internationally important population of Light-bellied Brent Goose and nationally important populations of a further nine wintering species. Furthermore, the SPA supports a nationally important colony of breeding Common Tern and is an internationally important passage/staging site for three tern species. Notably, four of the species that regularly occur at this site are listed on Annex I to the Birds Directive, namely Bar-tailed Godwit, Common Tern, Arctic Tern and Roseate Tern. Parts of the SPA are also designated as the Ramsar Convention site "Sandymount Strand/Tolka Estuary".

Qualifying Interests of the Site

[A046] Light-bellied Brent Goose (*Branta bernicla hrota*)
[A130] Oystercatcher (*Haematopus ostralegus*)
[A137] Ringed Plover (*Charadrius hiaticula*)
[A141] Grey Plover (*Pluvialis squatarola*)
[A143] Knot (*Calidris canutus*)
[A144] Sanderling (*Calidris alba*)
[A149] Dunlin (*Calidris alpina*)
[A157] Bar-tailed Godwit (*Limosa lapponica*)
[A162] Redshank (*Tringa totanus*)
[A179] Black-headed Gull (*Chroicocephalus ridibundus*)
[A192] Roseate Tern (*Sterna dougallii*)
[A193] Common Tern (*Sterna hirundo*)
[A194] Arctic Tern (*Sterna paradisaea*)
[A999] Wetlands

Sensitivities of the SPA and its Qualifying Interests

As this SPA is mostly comprised of coastal wetlands and is located directly adjacent to a major city and port, expansion of the city and port poses the greatest threat to its integrity. Reclamation of land from the sea, estuary or marsh represents a direct loss of key Qualifying Interests of the site. Roads, urbanisation, human habitation, industrial and commercial activities and discharges present pressures on the SPA in terms of disturbance and pollution. Watersports, walkers, horse riding and non-motorised vehicles also cause persistent disturbance to the birds within the SPA. Angling, particularly bait collection, causes both disturbance to birds and reduces food availability. The SPA is also subject to some natural eutrophication pressures.

Conservation Objectives for the Qualifying Interests

All of the Qualifying Interests of the SPA are currently considered to be in a favourable conservation condition. Therefore, all Qualifying Interests, with the exception of Grey Plover, which is proposed for removal as a Qualifying Interest, have been assigned Conservation Objectives requiring the maintenance of this condition. These Conservation Objectives predominantly focus on the Attributes of "*Population trend*" and "*Distribution*", but those for the

three tern species cover a broader range of Attributes, e.g. "*Breeding population abundance: apparently occupied nests (AONs)*" and "*Productivity rate: fledged young per breeding pair*", and that for Wetlands focuses exclusively on the Attribute of "*Habitat area*".

6.4.2.6 North Bull Island SPA

SPA Overview

This SPA covers all of the inner part of north Dublin Bay, with the seaward boundary extending from the Bull Wall lighthouse across to Drumleck Point at Howth Head. The North Bull Island sand spit is a relatively recent depositional feature, formed as a result of improvements to Dublin Port during the 18th and 19th Centuries. It is c. 5km long and 1km wide and runs parallel to the coast between Clontarf and Sutton. Part of the interior of the island has been converted to golf courses.

The North Bull Island SPA is an excellent example of an estuarine complex and is one of the top locations in Ireland for wintering waterfowl. It is of international importance on account of both the total number of waterfowl and the individual populations of Light-bellied Brent Goose, Black-tailed Godwit and Bar-tailed Godwit that use it. Also of significance is the regular presence of several species that are listed on Annex I of the Birds Directive, notably Golden Plover and Bar-tailed Godwit, but also Ruff and Short-eared Owl. North Bull Island is a Ramsar Convention site, and part of the North Bull Island SPA is a Statutory Nature Reserve and a Wildfowl Sanctuary.

Qualifying Interests of the Site

[A046] Light-bellied Brent Goose (*Branta bernicla hrota*)
[A048] Shelduck (*Tadorna tadorna*)
[A052] Teal (*Anas crecca*)
[A054] Pintail (*Anas acuta*)
[A056] Shoveler (*Anas clypeata*)
[A130] Oystercatcher (*Haematopus ostralegus*)
[A140] Golden Plover (*Pluvialis apricaria*)
[A141] Grey Plover (*Pluvialis squatarola*)
[A143] Knot (*Calidris canutus*)
[A144] Sanderling (*Calidris alba*)
[A149] Dunlin (*Calidris alpina*)
[A156] Black-tailed Godwit (*Limosa limosa*)
[A157] Bar-tailed Godwit (*Limosa lapponica*)
[A160] Curlew (*Numenius arquata*)
[A162] Redshank (*Tringa totanus*)
[A169] Turnstone (*Arenaria interpres*)
[A179] Black-headed Gull (*Chroicocephalus ridibundus*)
[A999] Wetlands

Sensitivities of the SPA and its Qualifying Interests

The greatest pressures/threats to the integrity of the North Bull SPA come from the bridge/viaduct located within the site (and the potential for other structures to be built within the SPA. Recreational pressures include bait digging/collection, nautical sports, walking, horse riding, non-motorised vehicles and the golf course (all inside the site). Roads, motorways, shipping lanes, continuous urbanisation and industrial or commercial areas (all outside the site) also represent significant pressures/threats to the integrity of this site. Other patterns of habitation within the site represent a lower-level pressure/threat. The pressures/threats listed also impact the species within the site, some of which are listed under Annex I to the Birds Directive disturbance, habitat loss, and a reduction in food availability.

Conservation Objectives for the Qualifying Interests

All of the Qualifying Interests of the SPA are currently considered to be in a favourable conservation condition. Therefore, all Qualifying Interests have been assigned Conservation Objectives requiring maintenance of this condition. These Conservation Objectives focus on the Attributes of "*Population trend*" and "*Distribution*", but that for Wetlands focuses exclusively on the Attribute of "*Habitat area*".

6.4.2.7 Wicklow Mountains National Park

Wicklow Mountains National Park was established in 1991 to conserve the flora, fauna and scenery of the Wicklow uplands. The National Park has 20,000ha of upland habitats, each with their range of plant and animal species. Notable areas include the Liffey Head Bog, a very good example of an active growing mountain blanket bog. Native deciduous oak woodland is found in the valley of Glendalough, and native Scot's pine woodland at Coronation Plantation and also at Glendalough. Deep mountain lakes and upland rocky streams occur throughout the park. The underlying geology of the National Park is mainly of Leinster granites, flanked by Ordovician schists, mudstones and volcanics. The area was subject to glaciation and features fine examples of glacial lakes, deep valleys and moraines. Most of National Park is over 300m. The substrate over much of National Park is peat, with poor mineral soil occurring on the slopes and lower ground. Exposed rock and scree are features of the National Park . The predominant habitats present are blanket bog, heaths and upland grassland (WMNP, 2017).

6.4.2.8 Proposed National Heritage Areas

Only one of the four pNHAs found in the Zone of Influence has a site synopsis. The descriptions of the other three pNHAs, the Glenasmole Valley pNHA, the South Dublin Bay pNHA and the North Dublin Bay pNHA, are considered to be similar to those described in the sections above relating to the Glenasmole Valley SAC, the South Dublin Bay and River Tolka Estuary SPA and the North Dublin Bay SPA.

The Dodder Valley pNHA (000991) covers the stretch of the River Dodder for about 2km between Firhouse Bridge and Oldbawn Bridge in the south-west of Dublin City. The vegetation consists of woodland scrub mainly of willows (*Salix* spp.), but up to thirteen species of tree have been recorded. The understorey vegetation contains a good variety of plant species, including Early-purple Orchid (*Orchis mascula*) and Bugle (*Ajuga reptans*). Along the banks there are wild flower meadows with a good diversity of plant species. There is also a pond in the river bed at Firville which has flourished greatly since the floods of 1986. Forty-eight bird species have been recorded recently in the area, including Little Grebe, Kingfisher, Dipper and Grey Wagtail. Part of the river bank supports a Sand Martin colony of up to 100 pairs. The site represents the last

remaining stretch of natural river bank vegetation on the River Dodder in the built-up Greater Dublin Area.

6.4.3 Rare and Protected Species

This section lists the rare and protected species of flora and fauna recorded in the desk study.

6.4.4 National Parks & Wildlife Service

In October 2019, a data request was submitted to the NPWS to update the data collected for the previous desk study in February 2017. Records of rare and protected species from the Hectads within 5km of the project boundary were provided and are listed in Table 6.6 below.

Table 6.6 NPWS records for rare and protected species. Abbreviations: HD = Habitats Directive, -II/IV/V = Annex II/IV/V; WA = Wildlife Act, 1976 (as amended); FPO = Flora (Protection) Order, 2015; IRL = Ireland Red List, 1/2/3/4 etc. = No. 1/2/3/4 etc., -EN/VU/LC = Endangered/Vulnerable/Least concern

Common Name	Scientific Name	Status
Mammals/ Reptiles/ Amphibians/ Fish/ Birds/ Invertebrates		
Badger	*Meles meles*	WA
Brook Lamprey	*Lampetra planeri*	HD-II
Brown Long-eared Bat	*Plecotus auritus*	HD-IV; WA
Common Frog	*Rana temporaria*	HD-V; WA
Common Lizard	*Zootoca vivipara*	WA
Desmoulin's Whorl Snail	*Vertigo moulinsiana*	HD-II
Hedgehog	*Erinaceus europaeus*	WA
Irish Hare	*Lepus timidus hibernicus*	HD-V; WA
Leisler's Bat	*Nyctalus leisleri*	HD-IV; WA
Otter	*Lutra lutra*	HD-II,IV; WA
Peregrine Falcon	*Falco peregrinus*	BD-I
Pine Marten	*Martes martes*	HD-V; WA
Pygmy Shrew	*Sorex minutus*	WA
Red Deer	*Cervus elaphus*	WA
Red Squirrel	*Sciurus vulgaris*	WA
Sika Deer	*Cervus nippon*	WA
Smooth Newt	*Lissotriton vulgaris*	WA
Stoat	*Mustela erminea* subsp. *hibernica*	WA
Plants/ Bryophytes		
Basil Thyme	*Clinopodium acinos*	FPO; IRL10-NT
Betony	*Betonica officinalis*	FPO; IRL10-NT
Bog Orchid	*Hammarbya paludosa*	FPO; IRL10-NT
Borrer's Saltmarsh-grass	*Puccinellia fasciculata*	FPO; IRL10-NT
Darnel	*Lolium temulentum*	IRL10-EN
Divided Sedge	*Carex divisa*	FPO; IRL10-EN
Great Burnet	*Sanguisorba officinalis*	FPO; IRL10-VU
Green Figwort	*Scrophularia umbrosa*	IRL10-NT
Green-tufted Stubble-moss	*Weissia longifolia* var. *angustifolia*	IRL8-VU
Green-winged Orchid	*Anacamptis morio*	IRL10-VU
Hairy St John's-wort	*Hypericum hirsutum*	FPO; IRL10-VU
Hairy Violet	*Viola hirta*	FPO; IRL10-VU
Heath Cudweed	*Gnaphalium sylvaticum*	FPO; IRL10-EN
Henbane	*Hyoscyamus niger*	IRL10-NT
Killarney Fern	*Trichomanes speciosum*	HD-II; FPO
Meadow Barley	*Hordeum secalinum*	FPO; IRL10-VU
Moss	*Bryum intermedium*	FPO; IRL8-EN

Common Name	Scientific Name	Status
Moss	*Bryum uliginosum*	FPO; IRL8-EN
Narrow-Leaved Helleborine	*Cephalanthera longifolia*	FPO; IRL10-VU
Opposite-leaved Pondweed	*Groenlandia densa*	FPO; IRL10-NT
Red Hemp-Nettle	*Galeopsis angustifolia*	FPO; IRL10-VU
Reindeer Moss	*Cladonia portentosa*	HD-V
Rough Poppy	*Papaver hybridum*	FPO; IRL10-RE
Round-fruited Grimmia	*Grimmia orbicularis*	IRL8-VU
Shepherd's-needle	*Scandix pecten-veneris*	IRL10-RE
Small Cudweed	*Filago minima*	FPO; IRL10-NT
Small-white Orchid	*Pseudorchis albida*	FPO; IRL10-VU
Smooth Brome	*Bromus racemosus*	IRL10-NT
Weasel's Snout	*Misopates orontium*	FPO; IRL10-EN
Yellow Bird's-nest	*Hypopitys monotropa*	IRL10-NT

6.4.5 Inland Fisheries Ireland

IFI is the state agency responsible for the protection, management and conservation of Ireland's inland fisheries and sea angling resources. A data request was submitted to IFI for details on fisheries records from within the Glendoo Brook and Massy's Estate area. Table 6.7 lists the protected fisheries species records obtained from IFI. All records are from downstream of the site boundary.

Table 6.7 IFI records for rare and protected species. Abbreviations: HD = Habitats Directive, -II/IV/V = Annex II/IV/V

Common Name	Scientific Name	Status
Brook Lamprey	*Lampetra planeri*	HD-II
River Lamprey	*Lampetra fluviatilis*	HD-II
Atlantic Salmon	*Salmo salar*	HD-II
Sea Lamprey	*Petromyzon marinus*	HD-II

6.4.6 National Biodiversity Data Centre

The NBDC *Biodiversity Maps* was accessed in October 2019. Table 6.8 lists the rare and protected species recorded within approximately 5km of the project boundary. To avoid replication all records of species represented in the NPWS dataset have been removed from the displayed NBDC data. Since, with the exception of bullfinch (*Pyrrhula pyrrhula*), all wild birds in Ireland are protected under the Wildlife Act and since there are records of over 80 different species of birds in the NBDC database, only those bird species which are listed on Annex I to the Birds Directive and/or are Amber- or Red-listed Birds of Conservation Concern in Ireland (BoCCI), and/or are raptors have been listed here. Table 6.9 lists the invasive alien species recorded within approximately 5km of the proposed development boundary.

Table 6.8 NBDC records for rare and protected species. Abbreviations = HD = Habitats Directive, -II/IV/V = Annex II/IV/V; WA = Wildlife Act, 1976 (as amended); BD = Birds Directive, -I/II/III/IV/V = Annex I/II/III/IV/V; FPO = Flora (Protection) Order, 2015; IRL = Ireland Red List, 1/2/3/4 etc. = No. 1/2/3/4 etc., -EN/VU/LC = Endangered/Vulnerable/Least concern; BoCCI = Birds of Conservation Concern in Ireland, -Red/Amber/Green = Red/Amber/Green List.

Common Name	Scientific Name	Status
Mammals		
Common Pipistrelle	*Pipistrellus pipistrellus*	HD-IV; WA
Daubenton's Bat	*Myotis daubentonii*	HD-IV; WA
Nathusius' Pipistrelle	*Pipistrellus nathusii*	HD-IV; WA

Common Name	Scientific Name	Status
Natterer's Bat	*Myotis nattereri*	HD-IV; WA
Red Deer	*Cervus elaphus*	WA
Soprano Pipistrelle	*Pipistrellus pygmaeus*	HD-IV; WA
Whiskered Bat	*Myotis mystacinus*	HD-IV; WA
Birds		
Black-headed Gull	*Chroicocephalus ridibundus*	BoCCI-Red
Common Sandpiper	*Actitus hypoleucos*	BoCCI-Amber
Common Snipe	*Gallinago gallinago*	BoCCI-Amber
Coot	*Fulica atra*	BoCCI-Amber
Eurasian Curlew	*Numenius arquata*	BoCCI-Red
Eurasian Woodcock	*Scolopax rusticola*	BoCCI-Red
Goldcrest	*Regulus regulus*	BoCCI-Amber
Golden Plover	*Pluvialis apricaria*	BoCCI-Red
Herring Gull	*Larus argentatus*	BoCCI-Red
House Martin	*Delichon urbicum*	BoCCI-Amber
House Sparrow	*Passer domesticus*	BoCCI-Amber
Kestrel	*Falco tinnunculus*	BoCCI-Amber
Kingfisher	*Alcedo atthis*	BD-I; BoCCI-Amber
Lesser Black-backed Gull	*Larus fuscus*	BoCCI-Amber
Linnet	*Carduelis cannabina*	BoCCI-Amber
Little Grebe	*Tachybaptus ruficollis*	BoCCI-Amber
Long-eared Owl	*Asio otus*	BoCCI-Green
Meadow Pipit	*Anthus pratensis*	BoCCI-Red
Mediterranean Gull	*Larus melanocephalus*	BD-I; BoCCI-Amber
Mute Swan	*Cygnus olor*	BoCCI-Amber
Oystercatcher	*Haematopus ostralegus*	BoCCI-Amber
Red Grouse	*Lagopus lagopus*	BoCCI-Red
Red Kite	*Milvus milvus*	BoCCI-Amber
Sand Martin	*Riparia riparia*	BoCCI-Amber
Skylark	*Alauda arvensis*	BoCCI-Amber
Sparrowhawk	*Accipiter nisus*	BD-I; BoCCI-Amber
Swallow	*Hirudo rustica*	BoCCI-Amber
Swift	*Apus apus*	BoCCI-Amber
Teal	*Anas crecca*	BoCCI-Amber
Tufted Duck	*Aythya fuligula*	BoCCI-Red
Wheatear	*Oenanthe oenanthe*	BoCCI-Amber
Whinchat	*Saxicola rubetra*	BoCCI-Red
Wood Warbler	*Phylloscopus sibilatrix*	BoCCI-Amber
Plants/ Bryophytes		
Cernuous Thread-moss	*Bryum uliginosum*	IRL8-EN
Dwarf Haircap	*Pogonatum nanum*	IRL8-EN
Many-seasoned Thread-moss	*Bryum intermedium*	IRL8-EN
Round-fruited Grimmia	*Grimmia orbicularis*	IRL8-VU
Yellow Archangel	*Lamiastrum galeobdolon* subsp. *montanum*	IRL10-LC
Insects		
Marsh Fritillary	*Euphydryas aurinia*	HD-II

Table 6.9 Invasive species recorded within 5km of the project boundary

Common Name	Scientific Name
Species listed on the Third Schedule	
American Mink	*Mustela vison*
American Skunk- Cabbage	*Lysichiton americanus*

Common Name	Scientific Name
Brown Rat	*Rattus norvegicus*
Curly Waterweed	*Lagarosiphon major*
Fallow Deer	*Dama dama*
Giant Hogweed	*Heracleum mantegazzianum*
Giant Knotweed	*Fallopia sachalinensis*
Giant-rhubarb	*Gunnera tinctoria*
Grey Squirrel	*Sciurus carolinensis*
Himalayan Balsam	*Impatiens glandulifera*
Japanese Knotweed	*Fallopia japonica*
New Zealand Pigmyweed	*Crassula helmsii*
Parrot's-feather	*Myriophyllum aquaticum*
Rhododendron	*Rhododendron ponticum*
Sika Deer	*Cervus nippon*
Other Invasive Species	
Blackcurrant	*Ribes nigrum*
Butterfly Bush	*Buddleja davidii*
Harlequin Ladybird	*Harmonia axyridis*
Himalayan Honeysuckle	*Leycestaria formosa*
Rabbit	*Oryctolagus cuniculus*
Sycamore	*Acer pseudoplantanus*
Yellow-bellied Slider	*Trachemys scripta scripta*

6.4.7 Environmental Protection Agency

Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (the 'Water Framework Directive' or 'WFD') requires that each Member State protect and improve water quality in all waters so that good ecological status is achieved. Additionally, proposed actions (within discrete River Basin Management Plans) are also required, to secure national natural water resources for the future. The EPA is the competent authority responsible for monitoring, protecting and improving the water environment in the Republic of Ireland.

In accordance with WFD guidelines, water quality 'Status' is assigned using a variety of available data on aquatic flora and fauna (including fish), the availability of nutrients, and aspects like salinity, temperature and pollution by chemical pollutants. Morphological features, such as quantity, water flow, water depths and structures of the river beds, are also taken into account.

The original EPA water quality classification system (the 'Quality Rating System' or 'Q-values') is also used to assess water quality in Irish rivers, taking into account aquatic macrophytes, phytobenthos and hydromorphology. The Quality Rating System has been shown to be a robust and sensitive measure of riverine water quality and has been linked with both chemical status and land-use pressures in catchments. Individual macroinvertebrate species are ranked for their sensitivity to organic pollution and the Q-value is assessed based, primarily, on their relative abundance within a biological sample. A review of both the internal EPA Q-value status and WFD surface water status for the relevant watercourses was undertaken.

The EPA's online map viewer provides access to information at individual waterbody level in Ireland. Waterbodies can relate to surface waters (these include rivers, lakes, estuaries [transitional waters], and coastal waters) or to groundwater. Table 6.10 shows the information recorded regarding water quality status within the proposed development.

Table 6.10 EPA online water quality results

Water Quality Parameter	Glendoo Brook
River Water Quality (pre-2004)	Not monitored
River Water Quality (2004-2015)	500m downstream in a separate tributary Q4
River Waterbody WFD Status (2007-2009)	Poor
River Waterbody WFD Status (2010-2012)	Moderate
River Waterbody WFD Status (2010-2015)	Moderate

6.5 FIELD SURVEY RESULTS

6.5.1 Habitats

The following section describes the habitats recorded during field surveys in April 2019. A total of 15 habitats were recorded within and adjacent to the study area. Table 6.11 lists the habitats recorded on the mainland and island sides of the site of the proposed development. Habitat maps are presented in Appendix S13. A complete list of higher plants is presented in Appendix S6.

Table 6.11 Habitats recorded at the site of the proposed development

Habitat Name	Fossitt Code (Fossitt, 2000)
Artificial lakes and ponds	FL8
Buildings and artificial surfaces	BL3
Calcareous springs	FP1
Conifer plantation	WD4
Dense bracken	HD1
Dry-humid acid grassland	GS3
Dry meadows and grassy verges	GS2
Dry siliceous heath	HH1
Eroding/upland rivers	FW1
Hedgerows	WL1
Mixed broadleaved/conifer woodland	WD2
(Mixed) broadleaved woodland	WD1
Recently-felled woodland	WS5
Scrub	WS1
Treelines	WL2

General Character of Habitats at Site of Proposed Development

The site of the proposed development is woodland, scrub and clear-fell. The proposed car park will require an area of mature conifer plantation to be felled. The plantation question was retained for aesthetic purposes when the remainder of the crop was felled in 2016. The total area of conifers to be felled is 1.2ha, with 0.7ha being retained. The plantation consists of Douglas Fir (*Pseudotsuga menziesii*) with occasional oaks and Beech. A single large Sycamore (*Acer pseudoplatanus*) is found at the north end of the woodland. There is a higher broadleaved component at the western and southern sides of the wood, which have developed and include oak (*Quercus* spp.), ash (*Fraxinus excelsior*), willows (*Salix* spp.), Downy Birch (*Betula pubescens*), Beech (*Fagus sylvatica*) and Holly (*Ilex aquifolium*). The field layer is in general undeveloped, as is typical in conifer plantations, but there is relatively more diversity at the woodland edges where more light is able to penetrate. Shrubs including Gorse (*Ulex europeaus*) and Elder (*Sambucus nigra*) and the species present in the field layer include Hogweed (*Heracleum sphondylium)*, Enchanter's Nightshade (*Circaea lutetiana*), Ragwort (*Senacio*

jacobeo), Creeping Bent (*Agrostis stolonifera*), Nettle (Urtica dioica), Wood Speedwell (*Veronica montana)*, Creeping Buttercup (*Ranunculus repens*), Common Sorrel (*Rumex acetosa*), Bramble (*Rubus fruticosus* agg.), Goose-grass (*Galium aparine*), Heath Speedwell (*Veronica officinalis*), Herb-Robert (*Geranium robertanum*), Wood Sorrel (*Oxalis acetosella*), Yellow Pimpernel (*Lysimachia nemorum*), Short-fruited Willowherb (*Epilobium obscurum*), Perennial Rye-grass (*Lolium perenne*), Great Willowherb (*Epilobium hirsutum*), Spear-thistle (*Cirsium vulgare*), Prickly Sow-thistle (*Sonchus asper*), Ribwort Plantain (*Plantago lancelota*), Yorkshire Fog (*Hocus lanatus*), Cock's-foot (*Dactylis glomerata*), Rosebay Willowherb (*Chamerion angustifolium*), Lady-fern (*Athyrium filix-femina*), Broad-leaved Dock (*Rumex obtusifolius*). The invasive species, Himalayan Honeysuckle (*Leycesteria Formosa)* is also present at the southern end of the woodland.

The woodland to the south of the existing car park, which is between the proposed visitor centre and the R115, was planted c. 2006 and contains a mix of conifers and native broadleaves including Sitka Spruce (*Picea sitchensis*), European Larch (*Larix decidua*), Birch, Rowan (*Sorbus aucuparia*), Holly, Elder, Ash, Oak and Douglas Fir. The proposed canopy bridge crosses this woodland. The woodland is approximately 6m in height and in places has a dense understory of Gorse and Bramble. In the clearings the field layer consists of Nettle, Bramble, grasses, Bracken (*Pteridium aquilinum*) and thistles.

Between the existing car park and the R115 is a young mixed broadleaved/conifer woodland. The canopy height is approximately 5m and the tree species include Oak, Larch and Sitka Spruce, Rowan, Birch, Ash, Hazel (*Corylus avellana*) and Elder. The wood is very dense in places where it has not been thinned. Gorse, Bramble, Nettle, grasses and thistles dominate the understory and field layer.

The area west of the proposed visitor centre and car park was clear-felled in 2016. A number of mature Beech have been left standing. Since felling, the area has regenerated and is dominated by grasses, Gorse and Bramble with some rushes (*Juncus* spp.) in the wetter areas. Yorkshire Fog is the most common species with other grasses including Sweet Vernal-grass (*Anthoxanthum odoratum*), Red Fescue (*Festuca rubra*), Cock's-foot and Wavy Hair-grass (*Deschampsia flexuosa*) also found. In general, the area south of the steep path is grass dominated while the area north of the path is dominated by young Gorse.

The proposed canopy bridge crosses the R115 and winds through part of Massy's Estate between the R115 and the main forest path. This area is broadleaved woodland with discreet areas of Oak, Beech and Sweet Chestnut (*Castanea sativa*). Cherry Laurel (*Prunus laurocerasus*), Himalayan Honeysuckle and Snowberry (*Symphoricarpos albus*) all occur in this area, with Cherry Laurel the dominant shrub under Oak and Himalayan Honeysuckle the dominant shrub under Sweet Chestnut.

In general, the Hell Fire Club consists of conifer plantations and clear-fell of varying ages. Extensive areas, particularly on the western side, have been clear-felled replanted with conifers. European Gorse (*Ulex europaeus*) has colonised the clear-fell habitat and has formed dense scrub in places.

The edges of the forest road and trails are relatively diverse with species such as Wood Sage (*Teucrium scorodonia*), Greater Stitchwort (*Stellaria holostea)*, Smooth Sow-thistle (*Sonchus oleraceus*), Common Knapweed (*Centaurea nigra*), Common Spotted Orchid (*Dactylorhiza fuchii*), Common Vetch (*Vicia sativa*), Heath Speedwell, Burdock (*Arctium minus*) and Heath

Bedstraw (*Galium saxatile*) all found. Species associated with upland grassland such as Heath Milkwort (*Polygala serpyllifolia*) and Lousewort (*Pedicularis sylvatica*) are also present along the forest roads, particularly on the northern side of the Hell Fire Club.

Prior to being converted to commercial forestry plantation, the Hell Fire Club was likely covered with heath habitat. Remnants of this habitat is found intermittently along the forest road at the Hell Fire Club. Dwarf (Western) Gorse (*Ulex gallii*) is the dominant species and heathers are also present occasionally. No heath habitat is being lost as a result of the proposed development.

Massy's Estate, in contrast, is for the most part a broadleaved woodland with large areas of Beech. Areas of broadleaved trees have been planted in recent years and there are also specimen conifers and broadleaved trees. Natural regeneration has been limited by a lack of woodland management, the presence of Beech, invasive species such as Cherry Laurel and grazing by deer. Some areas have been fenced off and this has allowed a field layer to develop. The more natural areas of the woodland contain typical woodland species including Bluebell (*Hyancinthoides non-scripta*), Sanicle (*Sanicula europaea)*, Pignut (*Conopodium majus*), Great Wood-rush (*Luzula sylvatica*), Foxglove (*Digitalis purpurea*), Tutsan (*Hypericum androsaemum*), Woodruff (*Galium odoratum*) and Bugle. Lesser Celandine (*Ficaria verna*), which flowers early in the year, and Herb-Robert, are the most common species in the field layer. The site also contains a diverse range of bryophytes (see Appendix S2). The presence of mature broadleaved trees, rare bryophytes and protected mammals adds to the ecological value of Massy's Estate.

Tufa formation was recorded in three areas in Massy's Estate (see Appendix S2). Calcareous springs with tufa formation corresponds to the Annex I priority habitat 'petrifying springs with tufa formation (Cratoneurion)' [7720].

In order to facilitate access to the proposed development, a footpath will be constructed on the verge on the R115 which will also require a 100m section of the wall of Massy's Estate being moved back by 1m. The hedgerows which line the R115 will be retained. However, the verge, which contains species such as Hogweed, Cow Parsley (*Anthriscus sylvestris*), Common Vetch and grasses will be lost.

The Glendoo Brook is an upland river that flows through Massy's Estate. It has been badly affected by the invasive species Cherry Laurel, which in places covers the watercourse completely, preventing the growth of any riparian vegetation, making the riverbanks vulnerable to erosion and limiting the rivers biodiversity value. The Glendoo Brook could be impacted by sedimentation or the accidental introduction of pollution and therefore, the Glendoo Brook has been included as a Key Ecological Receptor of the proposed development.

The uplands, including Natura 2000 sites, are connected to the proposed development by a network of walking trails. These include the areas on Annmount Spink, Killakee Mountain, Cruagh Mountain and Glendoo Mountain which contain typical upland habitats, including Annex I dry heath and blanket bog. Overgrazing was apparent on Annamount Spink, and signs of burning were recorded on the western side of Killakee Mountain and the northern slopes of Glendoo Mountain. Upland habitats could be impacted by an increased number of visitors accessing these areas, potentially leading or erosion and to disturbance of wildlife. Upland habitats have been included as a Key Ecological Receptor of the proposed development.

6.5.1.1 Vegetation Surveys

The heath habitat along the edges of the conifer plantations at the Hell Fire Club was assessed for its affiliation to the Annex I habitat European dry heaths [4030]. This habitat is dominated by Dwarf Gorse (*Ulex galii*) with occasional examples of Bell Heather (*Erica cinerea*). The bare ground component is often >10%.

According to the *Interpretation Manual of European Union Habitats – EUR28* (European Commission, 2013), this habitat corresponds to subtype 31.23 'Atlantic *Erica-Ulex* Heath (Heaths rich in gorse of Atlantic margins)'.

Each quadrat was assessed in accordance with the criteria for monitoring European dry heaths (Perrin *et al*., 2009). All five quadrats failed at least five of the 12 applicable criteria listed in Perrin *et al*. (2009). The conservation assessment consists of three aspects, structure, function and future prospects. The overall conservation condition for this habitat is 'Unfavourable (Bad)'. This is due to: 1) the high percentage of disturbed ground in the vicinity; 2) the high percentage of non-native species in the vicinity (non-native conifers); and, 3) the low numbers of positive indicator species. Only two of eight positive indicator species listed in Perrin *et al*. (2009) were recorded in the quadrats. The results of the conservation assessment and quadrats surveys are presented in Appendix S7.

The results of the quadrat surveys in Massy's Estate are also presented in Appendix S7. These results may be used in future comparative analyses of the woodland habitats.

6.5.1.2 Significance of Habitats at Site of Proposed Development

Massy's Estate is one of approximately ten sites in Co. Dublin that are listed on the Ancient and Long-established Woodland Inventory (NPWS, 2012). The proposed development will lead to a small amount of habitat loss in Massy's Estate in order to facilitate the foundations for the canopy bridge, the new link path, improvements to the existing paths and the new meadow area in the walled garden. The significance of Massy's Estate is that it is a mature broadleaved woodland, although a non-native woodland. The loss of habitat in Massy's Estate is minimal and, therefore, it is not considered significant at the local level.

The conifer plantation next to the exiting car park is over mature and, therefore, will be lost whether the development takes place or not. The mixed broadleaf/ conifer woodland is quite immature and is widespread in the locality. The proposed development includes planting of 3ha of mixed broadleaf-conifer woodland on the clear-fell. Therefore, the loss of this habitat is not considered significant at the local level. The existing forest roads will not be widened and therefore the heath habitat will not be impacted by the proposed development.

There will be no loss of Annex I habitat as a result of the proposed development.

6.5.2 Fauna

6.5.2.1 Red Squirrel

Red Squirrel (*Sciurus vulgaris*) is protected under the Wildlife Act and was recorded throughout Massy's Estate and at the Hell Fire Club. Grey Squirrel (*Sciurus carolinensis*), an invasive species, was recorded in Massy's Estate. The survey details and results are presented in Table

6.12 and Table 6.13 below. A map showing the distribution of sightings of live squirrels between November 2016 and September 2019, and, the dreys and feeding signs recorded in 2019 are presented in Appendix S5. The drey survey of Massy's Estate and the Hell Fire Club was carried out on 6th April and 24th August 2019 respectively.

Table 6.12 Squirrel transect survey details

Survey No.	Date	Start	End	Site	Weather Conditions	Red/ Grey
1	03/04/2019	07:40	10:00	Hell Fire Club	Dry, 3-4°C 70% cloud, light breeze.	1/0
1	03/04/2019	07:40	09:50	Massy's Est.	Dry, 3-4°C, 70% cloud, light breeze.	0/0
2	09/04/2019	07:30	09:30	Massy's Est.	Dry, 8°C, 100% cloud, light breeze.	1/0
2	09/04/2019	07:30	09:30	Hell Fire Club	Dry, 8°C, 100% cloud, light breeze.	0/0
3	10/04/2019	07:20	09:55	Hell Fire Club	Dry, 6-9°C, 5% cloud, calm.	0/0
3	10/04/2019	07:20	09:30	Massy's Est.	Dry, 6-9°C, 5% cloud, calm.	0/1
4	12/04/2019	07:10	09:20	Hell Fire Club	Dry, 5°C, 50% cloud, light breeze.	0/0
4	12/04/2019	07:10	09:20	Massy's Est.	Dry, 5°C, 50% cloud, light breeze.	0/0

Table 6.13 Dreys in Massy's Estate and the Hell Fire Club

Drey Ref.	Description
1	This drey is in a conifer stand close to entrance to Massy's Estate. The drey is on the east side of a tree at 15m.
2	This drey is in a Beech on the eastern end of Massy's Estate. The tree trunk is 30 cm in diameter. The drey is 8m high.
3	This drey is in the fork of a Beech tree at 12m next to path.
4	This drey is in Beech tree next to first bridge on entering Massy's Estate. It is in a fork of main stem at 15m.
5	This drey is in the fork of a Beech tree next to path. The drey is 8m high.
6	This drey is in a conifer tree near the Miller's Cottage. The drey at 12m on eastern side.
7	This drey is in a conifer tree near the Miller's Cottage. The drey is in a bend in the trunk at 9m high. It is in the same stand of conifers as Drey 6.
8	The drey was recorded in 2016 and is in the conifer plantation north of the existing car park in an area that is being retained.

The carrying capacity of the Hell Fire Club and Massy's Estate, based on Gurnell *et al*. (2009), is 4-16 Red Squirrels at the Hell Fire Club (40 hectares of conifers @ 0.1-0.4 squirrels/ha) and 42 Red Squirrels in Massy's Estate (47 hectares @ 0.9 squirrels/ha). In reality, the number of Red Squirrels is likely to be much lower than 45 individuals in Massy's Estate due to the presence of Grey Squirrel and issues related to habitat quality such as invasive species and the lack of a well-developed understorey in many parts of the woodland.

Red Squirrel could be impacted by the proposed development and have been included as a Key Ecological Receptor.

6.5.2.2 Pine Marten

Pine Marten (*Martes martes*) is protected under the Wildlife Act and listed on Annex V to the Habitats Directive. The desk study revealed a number of records of Pine Marten exist within 5km of the site. Probable pine marten scats were recorded on the trails at the Hell Fire Club in summer 2019, during the ecology surveys. Pine marten was also recorded on an infra-red camera in Massy's Estate on 1st July 2019. The location of probable pine marten scats, camera traps and sightings are presented in Appendix S5.

Pine Marten could be impacted by the proposed development and has been included as a Key Ecological Receptor.

6.5.2.3 Badger

Badger (*Meles meles*) is protected under the Wildlife Act. Five setts were recorded during the badger survey in April 2019. None of the setts will be directly affected by the works. Camera trapping at locations in the study area recorded badger and show that badgers are present throughout the site, as would be expected.

Table 6.14 summarises the results of the badger survey. Following advice from the NPWS, and due to signs of interference at one of the setts, the exact locations of the badger setts are not provided.

Table 6.14 Badger Survey Results

Sett Ref.	Sett Description
Sett 1	This main sett has 11 entrances, four of which show signs of recent activity. Fresh digging was recorded at two of the entrances and bedding was also found at one of these. The other two active entrances were clear, indicating recent use, whereas the inactive holes had dead needles and fallen sticks covering them, indicating that they had not been used recently. The sett is <10m from a forest road, although it protected by 10m of mature trees. The sett is 600m from the proposed visitor centre.
Sett 2	This outlier sett has two entrances, one of which has signs of recent digging. The sett is in a block of mature conifers at the Hell Fire Club and is c. 75m from the nearest path and 700m from the proposed visitor centre.
Sett 3	The sett has four entrances, two of which were full of fallen leaves. The sett is in the Massy's Estate on relatively flat ground. An infrared camera was put on the sett between 27th June and 4th July 2019. The camera was triggered by pine martens, deer, badgers, foxes, dog walkers and motorbikes. No badgers were seen using the sett. However, it is considered to be used occasionally. The sett is c. 50m from the nearest path.
Sett 4	This main sett had 11 entrances, four of which were active. There was fresh bedding and badger prints at one entrance, indicating the sett is active. The sett is in Massy's Estate and will not be impacted by the works.
Sett 5	This sett is 30m from Sett 4 and had six entrances, four of which were active. There was fresh bedding at one entrance. Another entrance had the remains of a net on a tree close to it but there were no signs of damage to the sett itself. The sett is in Massy's Estate and will not be impacted by the works.

6.5.2.4 Otter

A single spraint was recorded close to the Miller's Cottage in 2016. However, no evidence of otters was recorded on the Glendoo Brook within 500m of the proposed development boundary during the 2019 survey. Two infra-red cameras which were deployed on the Glendoo Brook from 17th June to 5th July 2019 did not record any otters. Otters are present in the River Dodder catchment and, therefore, it is possible that they could move upstream as far as the Glendoo Brook. However, it is clear that the Glendoo Brook and its tributaries are not important otter habitat. Notwithstanding this, the proposed development could lead to water quality impacts which could impact on otters further downstream. Therefore, Otter has been included as a Key Ecological Receptor.

6.5.2.5 Bats

Bat Suitability Assessment

The bat suitability assessment of the trees and structures was carried out on 3rd and 4th April 2019.

Trees and structures close to the proposed visitor centre and canopy bridge, and the trees recommended for removal in the Tree Report (Vol 2, Chapter 10 Landscape and Visual Resources) were surveyed for potential roost features. In general, the trees in the vicinity of the proposed visitor centre are either conifers or young trees.

The trees in Massy's Estate within 30m of the canopy bridge were surveyed and were categorised as "Low" potential based on the fact that they were ivy-clad and had no visible potential roost features. In general, the trees in the walled garden are self-seeded young trees, typically sycamores and ash, and have no bat potential.

The bridges over the Glendoo Brook and its tributary were also surveyed. The bridges are constructed from stone and have lots of gaps. No signs of bats were found. Birds' nests were recorded in all of the bridges and cave spiders (*Meta menardi*) were also present in the crevices. Cave spiders are not rare or protected but are of ecological interest. Table 6.15 below lists the trees and structures which were inspected for bat roost potential.

Table 6.15 Trees and Structures assessed for bat suitability. (Tree T137, T139 and T150 are reference numbers from the Tree Report)

Feature	ITM coordinates	Category	Notes
Tree 1	711751 723539	Moderate	This tree is a 6m tall spruce monolith leaning to the east. A woodpecker hole on the southwest side 5.5m up has moderate potential for bats. Bird droppings were noted at the entrance suggesting that there is a cavity inside. The tree is above the clear-fell on the eastern slope of the Hell Fire Club.
Tree 2	711763 723457	Moderate	This 16m beech is in the stand of beech trees above the clear-fell at the southern boundary of the site and has moderate potential for bats. The feature is on the west side 1m up and it is a split of a basal stem leaving open wound that extends upwards. Bird droppings were recorded below the entrance.
Tree 3	711883 723835	Moderate	This tree is at the west side of the plantation by the car park and has moderate potential for bats. It is a spruce monolith with a woodpecker hole on the south side at 8m up.
Tree T137	712517 723777	Low	Sycamore identified for removal in the tree report. The tree is 12m tall and 1m in diameter. The tree is ivy-clad and has two dead branches at 4m above ground level. This tree has low potential for roosting bats.
Tree T139	712527 723783	Negligible	Sycamore identified for removal in the tree report. The tree is 15m tall and has two trunks. There are some small dead branches and light ivy cover. This tree has low potential for roosting bats.
Tree T150	712478 723679	Negligible	Ash identified for removal in the tree report. The tree is 16m tall. There is one rot hole at 1m above ground level which was inspected. The inside is rough and no signs

Feature	ITM coordinates	Category	Notes
			of use by bats was recorded. This tree has low potential for roosting bats.
Walled Garden	-	Moderate	The walled is in good condition overall but has damaged stonework on the north end where there is a large hole and at the south end on either side of the entrance. Other areas where mortar has been worn away were also inspected. No evidence of bats was recorded. Several birds' nests were recorded in the walls.
Icehouse	-	Negligible	The inside of the icehouse is well sealed and has no features that could be used by bats. The northwest corner is partially collapsed. There is a lot of moss and ferns growing on the brickwork. There are no cracks or crevices suitable for roosting bats on this structure.
Miller's Cottage	-	Low	The Miller's Cottage has one cavity at 1m above ground level on the eastern wall. No evidence of use by bats was recorded.
Hell Fire Club Building	-	Low	The inside of the building is well sealed with calcareous seepage in some areas. There are two 30cm × 30cm holes inside the building towards the front. The western hole has a bird's nest, possibly Barn Swallow. The chimney flues have some gaps and weren't entirely visible from inside. There were signs of recent fire lighting. The outside of the building has a few areas where mortar has been eroded. These areas are at the south-east corner the northwest 'inside' corner at the rear of the building and the west side of the building front. The roof is made of rough stone. No gaps were visible in the roof from ground level.
Bridges	-	Moderate	The bridges in Massy's Estate are constructed of stone. No evidence of bats was found. Birds' nests, likely to be Dipper, were quite common.

Emergence and re-entry surveys

One emergence and one re-entry survey were undertaken at Tree 1, Tree 2 and Tree 3 on separate dates in July 2019. Two dusk surveys and one dawn survey were carried out at the Hell Fire Club building. Table 6.16 below lists the dates of the emergence and re-entry surveys.

Table 6.16 Dates of emergence and re-entry surveys

Survey	Date	Sunrise/ Sunset	Start Time	End Time	Weather Conditions	No. Bat Passes
Tree 1, 2, 3	01/07/2019	21:20	21:05	22:50	Gentle breeze, dry, 12°C, 50% cloud.	Tree 1: 41
						Tree 2: 4
						Tree 3: 7
Tree 1, 2, 3	18/07/2019	05:20	03:40	05:35	Gentle breeze, dry, 12°c, 50% cloud.	Tree 1: 77
						Tree 2: 50
						Tree 3: 0
Hell Fire Club Building	04/07/2019	22:45	22:30	00:20	Light breeze, dry, 15°c, cloudy.	1
Hell Fire Club	25/07/2019	05:30	04:00	05:30	Light breeze, dry,	2

Survey	Date	Sunrise/ Sunset	Start Time	End Time	Weather Conditions	No. Bat Passes
Building					17ºc, cloudy.	
Hell Fire Club Building	12/08/2019	20:59	20:40	22:55	Light breeze, dry, 13ºc, 60% cloud.	3

No bats were recorded entering or exiting the trees and structures in July and August 2019. Bats were recorded on almost all of the surveys. In total four species, Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat and at least one *Myotis* sp. were recorded. Given the habitat it is likely that the *Myotis* bats were Natterer's or Whiskered Bat. Tree 1, Tree 2 and Tree 3 are being retained as part of the development. Detecting the presence of bat roosts in trees is difficult because dropping do not persist as long on trees and many species that use trees exhibit roost switching behaviour. For this reason, all of the trees with potential roost features are considered an important resource for bats (Collins (ed.), 2016). The potential roost feature on Tree 2 is at 1m above ground level and was inspected from the ground using a torch and endoscope. Trees 1 and 3 are monoliths (standing dead trunks) and unsafe to climb. Therefore, emergence and re-entry surveys were used to establish the presence of a roost, in accordance with Collins (ed.) (2016).

Bat Activity Surveys

The bat activity surveys were undertaken in suitable weather conditions and lasted approximately two hours each. Table 6.17 presents the survey details of the activity transects and Table 6.18 presents the results of the bat activity transects. On 11th July 2019, the survey in Massy's Estate was abandoned after one hour for health and safety reasons. The second hour was surveyed on 16th July 2019.

Table 6.17 Bat Activity Survey Details

Transect	Date	Start	End	Weather Conditions
Hell Fire Club	13/05/2019	21:20	23:20	Light breeze, dry, 12ºC, clear
Massy's Estate	16/05/2019	21:20	23:20	Gentle breeze, dry, 9ºC, clear
Massy's Estate	11/07/2019	22:25	23:30	Gentle breeze, dry, 17ºC, 100% cloud cover
Massy's Estate	16/07/2019	21:44	22:55	Light breeze, dry, 20ºC, 100% cloud cover
Hell Fire Club	18/07/2019	21:23	23:18	Gentle breeze, dry, 15ºC, 20% cloud cover
Hell Fire Club	14/08/2019	03:45	05:47	Calm, light drizzle, 14ºC, 50% cloud cover
Massy's Estate	21/08/2019	03:55	05:40	Light breeze, dry, 13ºC, 50% cloud cover

Table 6.18 summaries the results of the bat activity survey. The recordings were geospatially referenced and mapped and are presented in Appendix S8.

Table 6.18 Bat Passes Recorded on Activity Surveys. SPip = Soprano Pipistrelle; CPip = Common Pipistrelle; BLe = Brown Long-eared

Transect	Date	SPip	CPip	Leisler's	BLe	*Myotis*
Hell Fire Club	13/05/2019	14	4	8	0	0
Massy's Estate	16/05/2019	116	38	0	0	27
Hell Fire Club	18/07/2019	3	7	6	0	0
Massy's Estate	11/07/2019	39	10	3	0	3
Massy's Estate	16/07/2019	21	8	0	0	0
Hell Fire Club	14/08/2019	21	2	2	0	3
Massy's Estate	21/08/2019	10	2	5	6	2
Total		**224**	**71**	**24**	**6**	**35**

Static Surveys

detectors were deployed at the site of the proposed visitor centre and the site of the proposed canopy bridge in June and September 2019 for one week each. Weather conditions were within the acceptable limits for bat activity surveys. Table 6.19 presents the details and results of the static surveys.

Table 6.19 Static Survey Results

Site	Start Date	End Date	No. Bat Passes
Visitor Centre (ITM 711987 723565)	27/06/2019	04/06/2019	3 *Myotis* sp. 7 Leisler's 9 Common Pipistrelle 11 Soprano Pipistrelle
	06/09/2019	13/09/2019	1 Soprano Pipistrelle
Canopy Bridge (Massy's Wood) (ITM 712080 723675)	17/06/2019	24/06/2019	1 Leisler's 2 Soprano Pipistrelle 12 Common Pipistrelle
	06/09/2019	13/09/2019	14 Common Pipistrelle 2 Soprano Pipistrelle

Five species were recorded during the activity transects, namely Soprano Pipistrelle, Common Pipistrelle, Leisler's, Brown Long-eared and at least one *Myotis* sp. Sonograms alone are not reliable for separating the three *Myotis* species found in Ireland (Collins (ed.), 2016). Given the habitat it is likely that the Myotis bats were Natterer's or Whiskered Bat, both of which were identified in the desk study. The distribution of bats passed recorded on the activity surveys was concentrated in Massy's Estate which accounted for a total of 290 bat passes during the survey period. This in contrast to the Hell Fire Club where 70 bat passes were recorded during the same survey period. This would be expected due to the difference in habitats between these areas.

Soprano and Common Pipistrelle were recorded most frequently. These bats were found throughout the site with concentrations of bat passes found in the woodland edge habitats in Massy's Estate, where they were recorded at the north end of the Walled Garden, the bridge at the north end of Massy's Estate, the clearing near the old Killakee House and the existing car park at the Hell Fire Club.

Leisler's Bat was the only bat which was recorded more frequently at the Hell Fire Club. This bat favours more open foraging habitat but is also found along woodland edges, grassland and scrub. This species emerges early and can be viewed foraging relatively high and in open areas, when compared to other bats.

Brown Long-eared bat was recorded on one of the activity surveys. Brown Long-eared call much quieter than pipistrelles and Leisler's, making them more difficult to detect on bat detectors. One pass was recorded at the existing car park and the remainder were made in Massy's Estate, with a concentration recorded at the north end of Massy's Estate.

Myotis bats were in Massy's Estate, primarily along the Glendoo River corridor at the north end of the wood. This most likely to be either Natterer's or Whiskered Bat.

Bat activity at the Hell Fire Building was low on the three of the surveys, with 1, 2 and 3 bats passes recorded respectively. The activity recorded at the trees varied, with Tree 1 (max.

passes: 70) and Tree 2 (max. passes: 50) having significantly more bat activity than Tree 3 (max. passes:7). Low levels at the Hell Fire Club building and Tree 3 can be attributed to exposure and habitat.

The static surveys recorded relatively low levels of activity. The static detector in the area of the proposed visitor recorded three *Myotis* passes. The results of the static detector surveys are broadly in line with the activity surveys where the two pipistrelle species were the most frequently recorded bat.

6.5.2.6 Bryophytes

The Bryophyte survey recorded rare and protected bryophytes in the study area. The report is presented in Appendix S2. One species, *Orthotrichum stramineum*, is listed on the Flora (Protection) Order 2015 and was recorded on the trees in the vicinity of the proposed canopy bridge. Another species, *Plagiothecium laetum*, was recorded near the proposed visitor centre. Within the study area, the most notable findings were:

- One moss listed on the Flora (Protection) Order 2015
- Four Red List mosses, two ranked Vulnerable and two ranked Near Threatened (Lockhart *et al*., 2012)
- Two species not previously recorded in Co. Dublin
- Five species not recorded in Co. Dublin since 1959
- 49 species considered rare in Co. Dublin
- 34 species considered occasional in Co. Dublin

The variety of rare bryophytes at the site, in the context of County Dublin, is due to the scarcity of woodland on acidic soil in the county, which is predominantly lowlands on base rich soils. Tufa formation was recorded in three areas of Massy's Estate (see Appendix S2). This habitat corresponds to the Annex I priority habitat 'petrifying springs with tufa formation (Cratoneurion)' [7720]. 'Bryophytes and Tufa Springs' have been included as a Key Ecological Receptor.

6.5.2.7 Amphibians and Reptiles

The three ponds where Common Frog (*Rana temporaria*) and Smooth Newt (*Lissotriton vulgaris*) were recorded in 2016 were revisited in 2019. Up to 10 adult newts were recorded in Pond 1. Frog spawn and/or tadpoles were also recorded in all of the ponds, as well as in ditches and puddles. The locations of the ponds are illustrated in Appendix S5. Therefore, amphibians are included as a Key Ecological Receptor of the proposed development.

Common (Viviparous) Lizard (*Zootoca vivipara*) is widespread and can be found in a range of habitat types, occurring in highest densities on bog, heath, coastal habitats and the margins of coniferous woodland where these habitats provide basking sites, refuges, foraging areas and hibernacula.

The construction footprint of the proposed development has limited suitable habitat for common lizard in the form of track edges. Small numbers of common lizard may be present in the construction footprint. However, the loss of a small number of individuals will not be significant in

the context of the local population and this species' conservation status of 'Least Concern' in Ireland (King *et al*, 2011).

6.5.2.8 Water Quality

Watercourses are sensitive to pollution and sedimentation. The results of the water quality assessment, which were collected at two locations, above and below the drainage outfall, are presented in Appendix S3. The Glendoo Brook is a sensitive ecological habitat which supports species such as Atlantic Salmon and European Otter downstream. Therefore, the Glendoo Brook (including its tributary) has been included as a Key Ecological Receptor of the proposed development.

6.5.2.9 Invasive Plants

Invasive plants within the site were surveyed and mapped on 18th June 2019. A map showing the distribution of invasive species is presented in Appendix S5. Four invasive species were recorded on the site, Rhododendron, Himalayan Honeysuckle, Cherry Laurel and Snowberry. One of these species, Rhododendron, is listed on the Third Schedule to the Habitats Regulations. Significant areas of Massy's Estate, including the Glendoo Brook corridor, are infested with these species and, as a result, the field layer and native tree regeneration is compromised. A draft invasive species management plan has been developed for the site and is presented in Appendix S9. Invasive species detract from the conservation value of the site and have been included as a Key Ecological Receptor

6.5.2.10 Breeding Birds

A breeding bird survey was carried out in the period May-July 2019. Details of the surveys are presented in Table 6.20 below.

Table 6.20 Breeding Bird survey details

Transect	Date	Start	End	Weather Conditions
Massy's Estate	25/04/2019	07:30	08:30	9ºC, overcast, dry, still.
Hell Fire Club	29/04/2019	07:35	09:00	9ºC, overcast, dry, gentle breeze.
Massy's Estate	18/06/2019	05:30	07:50	9ºC, clear, still.
Hell Fire Club	19/06/2019	06:45	08:10	9ºC, clear, light breeze.
Massy's Estate	10/07/2019	05:45	07:00	17ºC, 50% cloud, dry, still.
Hell Fire Club	11/07/2019	05:50	07:00	16ºC, overcast, drizzle, still.

The breeding bird survey identified 29 species of bird, 18 in Massy's Estate and 28 at the Hell Fire Club. Of the 29 species recorded, one species, Meadow Pipit, is Red-listed and four are Amber-listed. The results of the breeding bird survey are presented in Table 6.21 below.

Twenty-one species not recorded on the breeding bird survey were recorded on other ecological surveys within the site of the proposed development between April and August 2019. Four additional species were recorded in Massy's Estate and a further 17 species were recorded on Montpelier Hill. Of the 21 additional species, two are Red-listed and nine are Amber-listed.

The 2019 Merlin survey extended into the uplands on Cruagh Mountain, Glendoo Mountain, Killakee Mountain and Annamount Spink. Twelve species were recorded in this area which were not recorded within Massy's Estate or Montpelier Hill. Of the 12 species, one was Red-listed and six were Amber-listed. These species are listed in Table 6.22 below.

Long-eared Owl was recorded on 18th July 2019 flying close to the site of the proposed visitor centre. A Long-eared Owl pellet was also found near Tibradden Mountain on the 2019 Merlin Survey. No evidence of this species breeding at the Hell Fire Club was recorded, despite the regular presence of surveyors on site after dusk throughout the nesting season.

The species assemblage found at the site and the wider area is typical for these habitats in Ireland. Birds could be impacted by the proposed development and have been included as a Key Ecological Receptor of the proposed development.

Table 6.21 presents a list of bird species recorded in the study area during the breeding bird surveys. Table 6.22 lists the species recorded incidentally on other surveys and gives their highest breeding code.

Table 6.21 Species of birds recorded during the breeding bird surveys

Common Name	BoCCI Listing	Massy's Estate	Hell Fire Club	Breeding Status
Blackbird	Green	✓	✓	Confirmed
Blackcap	Green	✓	✓	Possible
Blue Tit	Green	✓	✓	Probable
Bullfinch	Green	×	✓	Probable
Buzzard	Green	✓	✓	Possible
Chaffinch	Green	✓	✓	Probable
Chiffchaff	Green	✓	✓	Probable
Coal Tit	Green	✓	✓	Probable
Dunnock	Green	✓	✓	Confirmed
Feral Pigeon	Green	×	✓	Possible
Goldcrest	Amber	×	✓	Possible
Great Tit	Green	✓	✓	Probable
Hooded Crow	Green	×	✓	Probable
Jackdaw	Green	✓	✓	Possible
Jay	Green	✓	✓	Confirmed
Long-tailed Tit	Green	×	✓	Confirmed
Magpie	Green	✓	✓	Confirmed
Meadow Pipit	Red	×	✓	Confirmed
Pheasant	Green	×	✓	Possible
Pied Wagtail	Green	×	✓	Possible
Robin	Green	✓	✓	Confirmed
Song Thrush	Green	✓	✓	Probable
Sparrowhawk	Amber	✓	✓	Possible
Starling	Amber	×	✓	Possible
Swallow	Amber	×	✓	Confirmed
Tree Creeper	Green	✓	✓	Possible
Willow Warbler	Green	×	✓	Probable
Wood Pigeon	Green	✓	✓	Probable
Wren	Green	✓	✓	Confirmed

Table 6.22 Other species incidentally recorded during other ecological surveys in 2019 (species already listed in Table 6.21 have been removed)

Species	BoCCI Listing	Massy's Estate	Hell Fire Club	Max breeding code
Species recorded within the site of the proposed development during surveys other than the breeding bird survey.				
Common Crossbill	Green	×	✓	Probable
Dipper	Green	✓	×	Probable
Goldfinch	Green	×	✓	Possible
Great-spotted Woodpecker	Green	✓	✓	Probable
Greenfinch	Amber	×	✓	Probable
Grey Wagtail	Green	✓	×	Probable
Heron	Green	✓	✓	Possible
Herring Gull	Red	×	✓	Flying over
House Martin	Amber	×	✓	Flying over
Kestrel	Amber	×	✓	Probable
Lesser Black-backed Gull	Amber	×	✓	Flying over
Linnet	Amber	×	✓	Probable
Long-eared Owl	Green	×	✓	Possible
Mallard	Green	×	✓	Confirmed (Featherbeds)
Mistle Thrush	Amber	×	✓	Probable
Raven	Green	×	✓	Probable
Redwing	Green	✓	×	Non-breeding
Skylark	Amber	×	✓	Probable
Swift	Amber	×	✓	Flying over
Whitethroat	Green	×	✓	Probable
Woodcock	Red	×	✓	Probable
Other species recorded on the Merlin Survey 2019 VPs 4-15 (outside the site of the proposed development)				
Cuckoo	Green			Possible
Grouse	Red			Probable
Hen harrier	Amber			Possible
Lesser Redpoll	Green			Probable
Merlin	Amber			Possible
Rook	Green			Possible
Sand martin	Amber			Flying over
Siskin	Green			Probable
Snipe	Amber			Possible
Stonechat	Amber			Confirmed
Wheatear	Amber			Possible

6.5.2.11 Marsh Fritillary

Fields containing high densities of Devil's-bit Scabious occur on the northern and eastern slopes of the Hell Fire Club, outside the site of the proposed development. No larval webs of Marsh Fritillary were found, and this species is considered to be absent from this area. The nearest recent Marsh Fritillary records, dated 2014, to the application site are from Ballysmuttan Bridge, 12km to the south-west (NBDC, 2019). There are also records from the 10km squares to the north, east and south which pre-date 1985. The closest point of these 10km squares to the fields containing high densities of Devil's Bit Scabious is approximately 6km.

6.5.2.12 Other Species

Irish Hare (*Lepus timidus hibernicus*) was recorded occasionally at the Hell Fire Club and regularly in the fields to the south in the Piperstown Gap. The habitat within the vicinity of the proposed development is not important for the local hare population given the high levels of human (and dog) presence on the trails close to the existing car park. Furthermore, suitable habitat for this species is common in the wider area. Therefore, Irish Hare is not included as a Key Ecological Receptor and no further surveys are required.

Irish Stoat (*Mustela ermina hibernica*) is likely to occur within the study area. Significant impacts on this species are not anticipated due small footprint of the proposed development and the range of alternative habitat available in the wider area. Therefore, this species is not included as Key Ecological Receptors of the development and no further surveys are required.

Similarly, Hedgehog (*Erinaceous europaeus*) is likely to occur within the study area. Significant impacts on this species are not anticipated due small footprint of the proposed development and the range of alternative habitat available in the wider area. Therefore, Hedgehog is not included as Key Ecological Receptors of the development and no further surveys are required.

Pygmy Shrew (*Sorex minutus*) is likely to occur within the study area. Significant impacts on this species are not anticipated due small footprint of the proposed development and the range of alternative habitat available in the wider area. Therefore, they are not included as a Key Ecological Receptor of the development and no further surveys are required.

Sika Deer (*Cervus nippon*) was recorded frequently throughout the site and was by far the most common species recorded on the trail cameras. Sika Deer is an introduced species originally from Japan and is protected under the Wildlife Act for hunting purposes rather than for conservation purposes. Therefore, Sika Deer is not included as a Key Ecological Receptor. The control of Sika Deer in the Dublin Mountains would require a co-ordinated effort which is outside the scope of the proposed development.

6.5.3 Walker Surveys

The walker survey report is presented in Appendix S9. The surveys showed that people linking between Cruagh Wood and Massy's Estate are a small minority of the overall number who visit Cruagh. Furthermore, the survey showed that the approximately 50% of vehicles visiting the Hell Fire and Cruagh Wood car parks stay for less than one hour, with 89% and 98% of visitors respectively staying less than two hours. Based on the data obtained during the 2015-2019 walker surveys, the key findings are as follows:

- The Hell Fire and Cruagh Wood Car Parks are the busiest areas in terms of visitor numbers.
- There is a link, although not well used, between the Hell Fire Club car park and Cruagh Wood.
- At both the Hell Fire Club and Cruagh Wood, visitors tended to stay for a short period of time, with half of the visitors staying less than one hour, and almost all staying less than two hours.
- Based on the dwell times at both car parks, there are very few visitors that stay for enough time to venture far into the uplands.

- In Cruagh Wood, the majority of visitors do not enter the heath habitats, and it appears that the walks alongside and through Cruagh Wood are the most popular.

- A three-fold increase in visitor numbers at Hell Fire Club is highly unlikely to result in a significant increase in visitor numbers accessing Cruagh Wood or the Natura 2000 sites through the existing trail network.

6.5.4 Ecological Corridors

Article 10 of the Habitats Directive recognises the importance of ecological networks as corridors and stepping stones for wildlife, including for migration, dispersal and genetic exchange of species of flora and fauna. The Directive requires that ecological connectivity and areas of ecological value outside the Natura 2000 network are maintained and it recognises the need for the management of these areas through land use planning and development policies.

Ecological corridors are important in connecting areas of local biodiversity with each other and with nearby designated sites and in preventing habitat fragmentation/the creation of isolated islands of habitat. Ecological corridors include linear features such as treelines, hedgerows, disused railway lines, rivers, streams, canals and ditches as stepping stones for wildlife moving within their range. They are particularly important for mammals, especially bats, and small birds.

Linear woodlands, streams, as well as hedgerows on roadsides are examples of potential ecological corridors in the Zone of Influence. The protection of Ecological Corridors has been incorporated into the Key Ecological Receptors, and their mitigation measures, of the proposed development.

6.6 KEY ECOLOGICAL RECEPTORS

This section of the report provides details of the Key Ecological Receptors that were identified during the desk study and the field surveys. The desk study provided information on rare and protected species and on designated sites of conservation interest in relation to the proposed development. This included an assessment of features of interest of Natura 2000 sites with the potential to be impacted by the proposed development and also a study of sites that are designated under national legislation (Nature Reserves and NHAs) and international conventions (Ramsar sites). Features of Proposed Natural Heritage Areas (pNHAs) were also considered within the study area.

Table 6.23 Key Ecological Receptors.

Key Ecological Receptor	Description	Importance/Ecological Valuation (TII, 2009)
KER1 Red Squirrel	Red Squirrel is found through the Hell Fire Club and Massy's Estate and forms part of the wider population in the Dublin Mountains. Red Squirrel are vulnerable to habitat loss, habitat fragmentation, disturbance and competition from grey squirrels.	**County Importance** as this species is protected under the Wildlife Act and the population within the study area is likely to account for >1% of the County Dublin population.
KER2 Pine Marten	Pine Marten is present at the Hell Fire Club and in Massy's Estate. No dens were identified during the surveys. Pine Marten uses houses, holes in trees, old shelters of other animals (e.g. foxes/badgers) and piles of brash as denning sites, all of which are widespread in the area. Pine Marten may also play a key role in controlling Grey Squirrel (Sheehy & Lawton, 2014; Sheehy *et al*., 2013).	**County Importance** as this species is protected under the Wildlife Act and the population within the study area is likely to account for >1% of the County Dublin population.
KER3 Badger	Five setts are present within the study area, two at the Hell Fire Club and three in Massy's Estate. Badgers are regularly found in areas with high levels of amenity use, including the Dodder Valley and several suburban parks in Dublin. Badgers are vulnerable to disturbance and persecution.	**Local Importance (Higher Value)** as this species is protected under the Wildlife Act and is present within the study area.
KER4 Otter	No signs of otters were recorded during the survey in 2019. However, a single spraint was recorded in 2016. Otters are known to occur downstream in the River Dodder and are likely present in the Owendoher. Otters could be impacted through the introduction of pollutants to the Glendoo Brook and its tributaries.	**Local Importance (Higher Value)** as this species is listed on Annexes II and IV to the Habitats Directive and protected under the Wildlife Act and is present downstream of the study area.
KER5 Bats (all Irish species except Lesser Horseshoe Bat *Rhinolophus hipposideros*)	Bats and their roosts are protected wherever they occur and the habitats found in Massy's Estate and at the Hell Fire Club provide high-quality commuting and foraging habitat. Bats are vulnerable to habitat loss, especially the loss of roosting habitat.	**Local Importance (Higher Value)** as these species are listed on Annex IV to the Habitats Directive and protected under the Wildlife Act and are present within the study area.
KER6 Bryophytes and Tufa Springs	The site contains Annex I priority habitat (tufa springs) as well as one bryophyte species listed on the Flora (Protection) Order 2015, four bryophytes listed as vulnerable or near threatened, two bryophytes previously unrecorded in Co. Dublin and 83 bryophytes listed as rare or occasional in Co. Dublin. The Bryophyte survey report is presented in Appendix S2.	**County Importance** on the basis that the site contains Annex I priority habitat and a diverse range of Bryophytes including species listed on the Flora (Protection) Order 2015 and the Irish Red List.

Key Ecological Receptor	Description	Importance/Ecological Valuation (TII, 2009)
KER7 Upland Habitats	A walking trail through Massy's Estate links the proposed development to upland habitats including the Wicklow Mountains SAC and SPA. The habitats include heath, bog and grasslands which support ground nesting birds such as Meadow Pipit, Skylark and Grouse and raptors such as Merlin. These upland habitats could be impacted by disturbance and erosion from an increase in walker access.	**International Importance** on the basis that these habitats include the Qualifying Interests of Natura 2000 sites.
KER8 Amphibians	Three ponds were recorded within the study area. All three ponds were suitable for both Common Frog and Smooth Newt. Frogspawn and/or tadpoles were found in all three ponds. Smooth newt was found in one pond. Ponds perform an important ecological function and support species including frogs and newts.	**Local Importance (Higher Value)** as this habitat supports species protected under the Wildlife Act.
KER9 Invasive Plants	Invasive plants have been selected as a Key Ecological Receptor because of the presence of Himalayan Honeysuckle, Cherry Laurel, Rhododendron and Snowberry within the footprint of the proposed development. These species can impact negatively on the biodiversity, preventing the regeneration of native species and leading to soil erosion.	Invasive plants have the potential to impact negatively on biodiversity locally.
KER10 Birds	The habitats within and around the proposed development support over 50 bird species. Birds could be impacted by habitat loss, disturbance and through collisions with the windows of the proposed visitor centre.	**County Importance** as birds listed on the BoCCI Red List and protected under the Wildlife Act are present within the study area.
KER11 Glendoo Brook	The Glendoo Brook is a tributary of the Owendoher and River Dodder and flows along the eastern boundary of Massy's Estate. Rivers provide an important wildlife corridor which supports species such as otters, lampreys and salmonids. The proposed development includes a surface water outfall into a tributary of the Glendoo Brook.	**Local Importance (Higher Value)** as the river corridor supports species listed on Annex IV to the Habitats Directive and protected under the Wildlife Act. It also acts as a wildlife corridor.

6.7 'DO-NOTHING' SCENARIO

If the proposed development does not proceed, there will be no immediate loss of the conifer plantation next to the existing car park or elsewhere at the Hell Fire Club, however, the woodland next to the car park is over-mature and would either be felled or windblown in the coming years.

The mixed woodland and scrub in close proximity to the proposed visitor centre would mature and its ecological value will increase with time.

The clearfell on the eastern slope of the Hell Fire Club would likely be replanted with conifers.

The woodlands at the Hell Fire Club would continue to be used for commercial timber production and the ecological impacts associated with these practices would continue.

The numbers of visitors would not increase beyond the existing trend and, therefore, the number of visitors to the Hell Fire Club and Massy's Estate would not be likely to increase substantially in the 'do-nothing' scenario.

It is likely that the current level of woodland management would allow the invasive species, particularly Cherry Laurel, to spread in Massy's Estate, negatively affecting biodiversity.

Surface water would continue to flow out of the existing car park untreated.

6.8 DESCRIPTION OF LIKELY EFFECTS (UNMITIGATED)

6.8.1 Effects on Natura 2000 Sites

The Zone of Influence overlaps with five Natura 2000 sites: the Wicklow Mountains SAC, the Wicklow Mountains SPA, the Glenasmole Valley SAC, the South Dublin Bay and River Tolka Estuary SPA and the North Bull Island SPA. As likely significant effects could not be excluded at the screening stage, a Natura Impact Statement (NIS) was prepared at the direction of An Bord Pleanála. The NIS presents all of the predicted effects on these sites and their Qualifying Interests and also provides a detailed analysis and evaluation of these effects in the context of the relevant Conservation Objectives. The NIS also prescribes mitigation measures to address any negative effects identified. As such, there is some overlap between this chapter of the EIAR and the NIS for the proposed development. However, both the EIAR and NIS for the proposed development are standalone documents which do not rely on each other. Impacts on the relevant Natura 2000 sites are dealt with under KER 7 'Upland Habitats'.

6.8.2 General Impacts on Key Ecological Receptors

General impacts on biodiversity that are typical of development are described in this section. Negative effects on specific Key Ecological Receptors are discussed in Table 6.24.

6.8.2.1 Habitat Loss

The proposed development will lead to habitat loss in order to facilitate the proposed visitor centre. The following elements of the proposed development will lead to habitat loss:

- Visitor centre

- Canopy bridge
- Extended car park
- Reconfiguration of the R115
- Improved forest trails
- New link trail in Massy's Estate
- Drainage works including swales and ponds
- Meadow in the walled garden
- Various conservation works on structures
- Landscaping including planting and woodland conversion
- Site compound and material storage area(s)

The construction of the new visitor centre, car park, circulation roads and forest trails/paths will result in a new hardstanding area of approximately 12,000m^2 or 1.2ha. This area includes conifer plantation, clear-fell, mixed broadleaved woodland, grassy verge and scrub. This area counts for 0.8% of the total area of the Massy's Estate and the Hell Fire Club sites.

The canopy walkway will be designed to meander through the existing tree canopy, with a limited number of individual excavations required for support column footings. The total area required for the foundations is c. 33m^2. It is possible some limited removal of juvenile trees may be required and occasional limited pruning of trees to facilitate construction works access. On the west side of the R115, c. 200m^2 of mixed woodland will be felled for the canopy bridge. The ground underneath the canopy bridge, once constructed, will be allowed to revegetate naturally.

A new link path is proposed in Massy's Estate which is c. 200m long and up to 1.2m wide. This will result in c. 240m^2 of habitat loss in an area of broadleaved woodland which has been badly affected by Cherry Laurel. A second link path which was proposed at the northern end of Massy's Estate in the previously submitted EIAR (July 2017) has been removed from the design. The proposed development includes two new trails at the Hell Fire Club and it is proposed to bring the existing forest roads up to Class 2/3 (See previously submitted EIAR: Volume 2 Chapter 10 Landscape and Visual Resources). The proposed upgrading of the forest roads which will not require any widening as they are already above the maximum width of a Class 2/3 trail (3m).

Two potential locations for the site compound are presented in the Construction and Traffic Management Plan (See previously submitted EIAR: Volume 3 Chapter 14 Roads, Traffic and Transportation). The proposed site compound will be c. 1ha in size and will either be located in the footprint of the proposed car park (Location 1) or on clear-fell close to the proposed visitor centre (Locations 2). Location 2 will result in the temporary loss of clear-fell habitat. Following completion of the works, this area will be planted with native species. Neither of these locations are sensitive in term of habitat or species, and construction works are proposed very close to both of the proposed compound locations.

Repairs to the walled gardens and other structures will be carried out to preserve these structures as ruins. The type of conservation works has not yet been defined but will involve a detailed survey and repair of the Protected Structures. Initially each structure will be surveyed and recorded, and any necessary repairs will be carried out to ensure structural integrity. Minor works are proposed at the Hell Fire Club building including a new handrail, a new step, discrete public lighting and sealing of the chimney flues. Other works such as repair works to the roof will require further assessment.. Any repairs or repointing may result in the loss of some nesting bird habitat and potentially bat roosting habitat. The optimal crevices for bat roosts are at least 400mm deep and between 17mm and 35mm wide. However, almost any crevice greater than 50mm deep and 10mm wide can be utilised as a roost or to gain access to a larger chamber behind (Bat Conservation Trust, undated). No evidence of roosting bats was recorded during the bat suitability assessment.

The creation of a wildflower meadow in the walled garden will lead to a loss of c. 0.61ha of scrub and mixed woodland habitat. Specimen trees in the walled garden will be retained.

The drainage proposals will involve the construction a 15m long pipe under the R115 and another 3m long pipe under the forest road in Massy's Estate to carry excess surface water to the proposed outfall at the Glendoo Brook. In Massy's Estate, a small channel will be excavated adjacent to the forest road to carry the surface water to the proposed outfall. The channel will be dry under normal conditions. This will involve the loss of a small area of woodland habitat, which will be allowed to revegetate after the works.

The development proposals include a series of ponds and extensive planting which will result in the loss of clear-fell, scrub and mixed broadleaf/conifer woodland. This will lead to an overall increase in biodiversity, although the woodland and ponds will take a number of years to mature. The proportion of mature conifers that will be retained is c. 0.7ha of the existing 1.9ha. At the Hell Fire Club, there is c. 12ha of mature conifer plantation and a further 20ha of middle-aged conifers. The area of conifers to be retained is illustrated in Plate 2 below.

Footpaths will be constructed on the R115 to allow pedestrians to access the proposed development. This will lead to the loss of 0.35ha of grassy verge. It is also proposed to widen the R115 by 1.2m for a 100m stretch opposite the Stewards House. This will result in the loss of 0.012ha of broadleaf woodland habitat, although no trees are required to be felled.

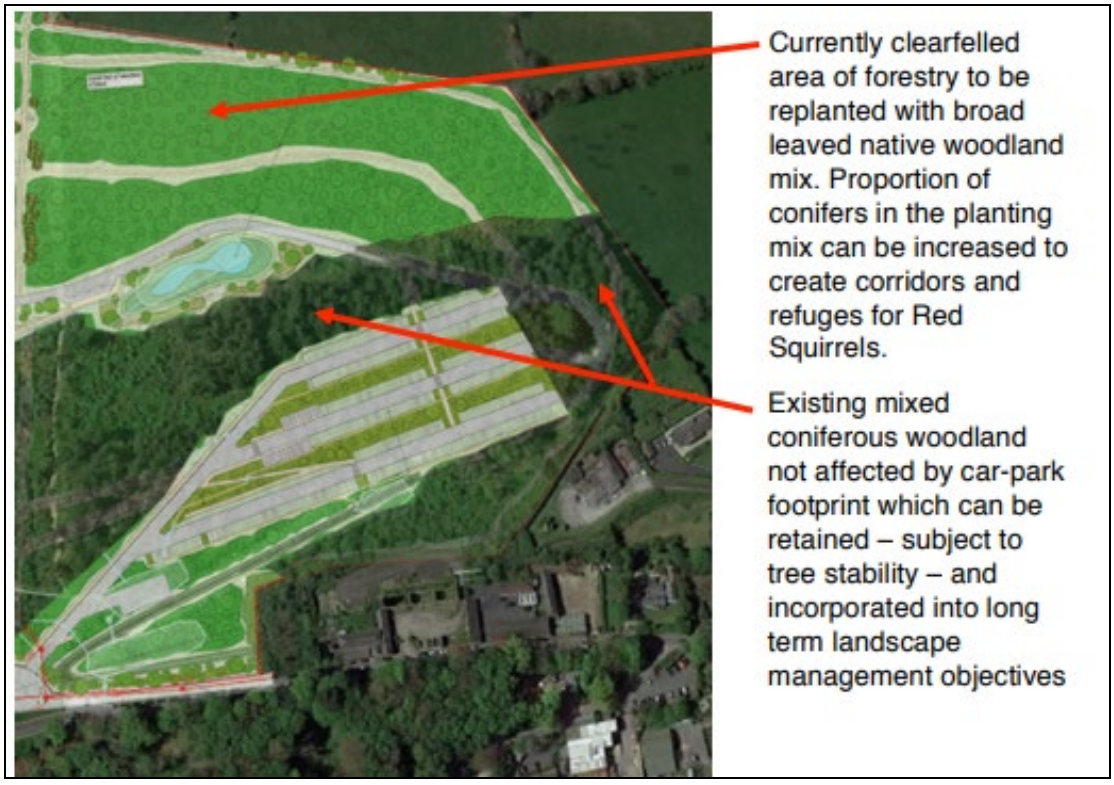


Plate 3 Areas of conifer to be retained.

During the operation of the proposed development, the increase in visitors may lead to habitat loss through trampling. The proposals include improvements to the trails throughout the site and this will reduce the instances of trail widening and braiding, which can result when trail conditions become poor due to either lack of maintenance or from heavy traffic.

The habitats which will be lost are common in the local area and in many cases are being replaced with habitats of higher ecological value. The canopy bridge and new trails will be designed to avoid felling trees as far as practicable. As such, it is not considered that the loss of these habitats will constitute a significant negative effect on these habitats the local level.

6.8.2.2 Habitat Fragmentation and Barrier Effect

The proposed development may result in some habitat fragmentation as it will lead to the loss of habitat within the construction footprint.

Noise, vibration, lighting and visual disturbance during the construction and operation of the proposed development could lead to the displacement of species over a wider area than the construction envelope itself and may potentially inhibit the movement of species such as Red Squirrel and Pine Marten moving between the Hell Fire Club and Massy's Estate.

6.8.2.3 Disturbance

Construction of the proposed development will result in temporary noise, vibration, lighting and visual disturbance during the construction phase and will affect species both within outside the construction footprint. Disturbance will be most significant at the site of the proposed visitor centre and car park where vehicle movements, tree felling and earthworks will lead to a higher degree of noise, vibration and visual disturbance than other elements of the proposed

development such as trail improvements. Light spill from security lighting at the compound may increase the level of disturbance on light-sensitive species.

The works in Massy's Estate, including invasive species management and trail improvements will lead to disturbance to fauna. The impact of these works will be restricted to small area at any one time and be temporary in nature. Therefore, these impacts, including on dreys which are close to the paths, are not considered to be significant.

The operation of the proposed development may lead to increased levels of disturbance to fauna as a result of increased visitor movements at the Hell Fire Club and Massy's Estate, including vehicle movements in the car park. Light spill from the proposed visitor centre after dark, discreet lighting at the Hell Fire Club buildings and the low level bollard lighting between the proposed visitor centre and the car park could lead to impacts on light-sensitive species, such as bats. The opening hours of the visitor centre have been curtailed (8am-8pm from April to September and 9am-5pm from October to March) to reduce duration of this impact.

Recreational use can lead to disturbance to wildlife. Factors that determine the impact of disturbance include the habitat structure, the sensitivity of a particular species and the existing level of habituation. In a study on the impact of human related disturbance on Red Squirrel in Fota Wildlife Park (Haigh *et al*, 2017), which receives 300,000 visitors per year (the same figure as the proposed development after five years), Red Squirrel were shown to concentrate activities in areas without human disturbance and move into these areas after the park closed. The study concluded that Red Squirrels can habituate to humans provided there are quiet zones nearby. Red Squirrel are found in many areas with high levels of amenity use in Ireland such as Fota Island, Co. Cork, Glendalough, Co. Wicklow, Slieve Gullion Forest Park, Co. Armagh and Killiney Hill, Co. Dublin.

Banks & Bryant (2007) showed that dog-walking in natural recreation areas has negative effects on birds (a 35% reduction in species diversity and a 41% reduction in abundance). However, these impacts appeared to be short-term. Bötsch *et al*. (2018) examined the effects of recreational trails on birds and found that the presence of people on trails led to reductions in density (14%) and species richness (4%) and that habituation did not outweigh the disturbance close to trails, but suggested that quiet zones could mitigate for this disturbance. Bötsch *et al*. (2018b) studied the distance at which birds flush when approached by a humans and found that the distances correlate to the intensity of use at a particular site. A literature review entitled *Recreational use of forests and disturbance to wildlife* (Marzano & Dandy, 2012) which was commissioned by the Forestry Commission in the UK summarised studies on forest birds and disturbance and concluded that "*On balance, the available evidence does not indicate significant negative impacts on UK forest birds following 'flight' responses to walking- including no clear long-term or population-level impacts*". Most of the species that were recorded in Massy's Estate and at the Hell Fire Club are regularly found in suburban gardens. Suitable nesting habitat for species such as Meadow Pipit, Skylark, Long-eared Owl and Kestrel, are likely to be limited at present by the existing level of amenity use and forestry practices.

As illustrated in the Walker Survey Report (Appendix S9), both the Hell Fire Club and Massy's Estate currently experience high levels of use, which will have led to a certain amount of habituation of species such as Red Squirrels and birds. Nevertheless, an increase in visitor numbers could lead to an increase in anti-predator responses in fauna, which may result in reduced time spent foraging and/or elevated levels of stress, potentially reducing overall breeding success.

6.8.2.4 Direct Mortality

Direct mortality is possible as a result of site clearance, tree felling and vegetation removal. Birds are particularly vulnerable during the nesting season (February- August) when works could lead to the loss of nests. No protected species shelters were recorded within the footprint of the proposed development in 2019, however species such as Red Squirrel and Badger could build shelters within the footprint between the time of the surveys to inform the EIAR and the construction phase.

During the operational phase of the proposed development, the large windows of the proposed visitor centre could lead to bird mortality through collision. The risk of this depends on a variety of factors including the local bird population density and the species present, landscape conditions and the building design. Products are available which reduce the risk of bird collisions.

Increased traffic as a result of the proposed development will also increase likelihood of vehicular collisions with wildlife. It is not considered, however, that this presents a significant negative effect for any of the Key Ecological Receptors identified, as the traffic will be slow moving.

6.8.2.5 Introduction and Spread of Invasive Species

Construction activities could aid the spread of invasive species within the site. In the absence of control measures, there is a possibility that these species may be inadvertently spread during construction, through the movement of equipment and contaminated soil to, from, or within the site.

Ongoing woodland management could also lead to the introduction or spread of invasive species.

The operation of the development may lead to an increase in the availability of food scraps which could lead to an increase in Grey Squirrel numbers and the displacement of Red Squirrel.

6.8.2.6 Reduction in Water Quality

Construction and operational activities adjacent to and upstream of surface waters can negatively impact on water quality in a variety of ways.

Surface water run-off from construction activities can contain high levels of suspended sediments and other pollutants. Such run-off, if not attenuated and treated prior to discharge, has the potential to cause significant ecological impacts. Large amounts of fine sediment deposition can smother benthic habitats, leading to changes in biological composition.

During construction, concrete, grout or other pollutants may spill directly into the local environment or be washed into the water in construction site run-off. These materials are highly alkaline and, consequently, can drastically alter the pH of the receiving water body. This can lead to profound ecological impacts and can affect the condition of habitats by causing damage to pH-sensitive species.

Vehicles, plant and equipment which will be used during construction rely on hydrocarbons such as diesel, petrol and lubricating oils. Leaks from poorly maintained vehicles, plant, equipment or storage tanks risk the input of hydrocarbons into the environment. In the absence of appropriate

mitigation, hydrocarbons from the construction site may be washed into surface waters in construction site run-off. This has the potential to cause negative ecological impacts on freshwater habitats. Hydrocarbons can have direct toxic effects, including reducing the ability of organisms to absorb water and nutrients. Hydrocarbons can also alter the nutrient balance and microbiota in soil and water, which can benefit some species while detrimentally affecting others. Such changes have the potential to alter the ecological community structures and ecological integrity of habitats.

Inadequate treatment of wastewater from on-site toilets and washing facilities also provides for potential water quality impacts which could lead to ecological effects. Faecal contamination can alter the nutrient balance in soils and water, causing significant changes in microbial communities and reductions in oxygen levels. This can have significant effects on the biological composition of receiving habitats.

6.8.3 Impacts on Key Ecological Receptors

Impacts on the Key Ecological Receptor as defined in the preceding sections are described in Table 6.24.

Table 6.24 Impact characterisation for Key Ecological Receptors based on EPA (2017) and TII (2009).

KER	Construction-phase Impacts	Operational-phase Impacts	Ecological Significance if Unmitigated
KER1 Red Squirrel	• Habitat Loss • Habitat Fragmentation and Barrier Effect • Disturbance • Direct Mortality	• Disturbance • Direct Mortality • Introduction and Spread of Invasive Species	Loss of woodland habitat at the site of the proposed visitor centre will lead to habitat loss, habitat fragmentation and barrier effect and will make Red Squirrel more vulnerable to disturbance, predation and reduce the food availability in the local area. Habitat loss and fragmentation and disturbance during the construction phase are considered to be a **Medium-term Moderate Negative Impact at the local level.** The risk of direct mortality during site clearance and including road collisions during the construction phase is considered to be a **potential Short-term Significant Negative Impact at the local level.** Disturbance as a result of increased visitor numbers is considered to be a **Permanent Moderate Negative Impact at the local level.** The risk of direct mortality including road collisions during the operational phase is considered to be a **permanent Moderate Negative Impact at the local level.** The potential increase in the prevalence of Grey Squirrel is considered to be a **potential Long-term Significant Negative Impact at the local level** and could potentially lead to the displacement of the Red Squirrel population. It is considered that without mitigation, the proposed development has the potential to result in significant impacts on Red Squirrel at the local level.
KER2 Pine Marten	• Habitat Loss • Habitat Fragmentation and Barrier Effect • Disturbance • Direct Mortality	• Disturbance • Direct Mortality	The loss of woodland habitat at the site of the proposed visitor centre will lead to habitat loss, habitat fragmentation and barrier effects. Habitat loss and fragmentation and disturbance during the construction phase are considered to be a **Medium-term Moderate Negative Impact at the local level**. The risk of direct mortality during site clearance and including road collisions during the construction phase is considered to be a **Short-term Significant Negative Impact at the local level.** Disturbance as a result of increased visitor numbers is considered to be a **Permanent Moderate Negative Impact at the local level.** The risk of direct mortality including road collisions during the operational phase is considered to be a **Permanent Moderate Negative Impact at the local level.**

KER	Construction-phase Impacts	Operational-phase Impacts	Ecological Significance if Unmitigated
			It is considered that without mitigation, the proposed development has the potential to result in significant impacts on Pine Marten at the local level.
KER3 Badger	• Habitat Loss • Direct Mortality	• None	The loss of woodland habitat at the site of the proposed visitor centre will lead to habitat loss, habitat fragmentation and barrier effects. Habitat loss and fragmentation and disturbance during the construction phase are considered to be a **Permanent Negligible Negative Impact at the local level**, given the availability of suitable habitat in the surround area. The risk of direct mortality during the construction phase is considered to be a **potential Short-term Moderate Impact at the local level.** No significant impacts on Badger at any level.
KER4 Otter	• Reduction in water quality	• None	The potential for pollution of Otter habitat during the construction phase is considered to constitute a **potential Temporary Moderate Negative Impact at the local level**. No significant impacts on Otter at any level.
KER5 Bats	• Habitat Loss • Disturbance	• Habitat Loss • Disturbance	The loss of woodland habitat at the site of the proposed visitor centre will lead to habitat loss. Habitat loss and disturbance during the construction phase are considered to be a **Medium-term Moderate Negative Impact at the local level**. This impact will occur over a small area relative to the widespread habitat in the surrounding area. Disturbance during the construction phase arising from the use of artificial lighting could lead to **Short-term Moderate Negative Impact at the local level.** The excessive use of artificial lighting and light spill from the proposed development during the operational phase could result in a **Permanent Moderate Negative Impacts at the local level.** No significant impacts on Bats at any level.
KER6 Bryophytes and Tufa Springs	• Habitat Loss	• Habitat Loss	It is considered that the potential for habitat loss, either during site clearance, through trampling or through the use of herbicide leading to the loss of rare and protected Bryophytes, either during construction or operation is a **Permanent Significant Impact at the county level.** It is considered that without mitigation, the proposed development has the potential to result in significant impacts on Bryophytes and Tufa Springs at the county level.
KER7 Upland Habitats	• None	• Habitat Loss • Disturbance	It is considered that the potential for damage to the paths and disturbance to birds is a **potential Permanent Slight Negative Impact at the local level.** No significant impacts on Upland Habitats at any level.

KER	Construction-phase Impacts	Operational-phase Impacts	Ecological Significance if Unmitigated
KER8 Amphibians	• Habitat Loss • Direct Mortality	• Habitat Loss • Direct Mortality	It is considered that there is the potential for a **Permanent Significant Negative Impact** on amphibians associated with habitat loss and direct mortality. Ongoing habitat degradation leading to habitat loss and direct mortality is considered to be a **Permanent Significant Negative Impact at the local level.** It is considered that without mitigation, the proposed development has the potential to result in significant impacts on Amphibians at the local level.
KER 9 Invasive Plants	• Introduction and spread of invasive species.	• Introduction and spread of invasive species.	Construction and operation of the proposed development may lead to the introduction and spread of invasive species. It is considered that the introduction and spread of invasive species is a **Permanent Significant Negative Impact at the local level.** It is considered that without mitigation, the proposed development has the potential to result in significant impacts on Invasive Species at the local level.
KER10 Birds	• Habitat Loss • Habitat Fragmentation and Barrier Effect • Disturbance • Direct Mortality	• Disturbance • Direct Mortality	The loss of woodland habitat at the site of the proposed visitor centre will lead to habitat loss, habitat fragmentation and barrier effects. Habitat loss and fragmentation and disturbance during the construction phase are considered to be a **Medium-term Moderate Negative Impact at the local level**. Disturbance during the construction phase arising from the use of artificial lighting, noise, vibration and visual disturbance could lead to **Short-term Moderate Negative Impact at the local level.** The risk of direct mortality, including the loss of active nests during site clearance is considered to be a **Short-term Moderate Negative Impact at the local level.** Disturbance as a result of increased visitor numbers is considered to be a **Permanent Moderate Negative Impact at the local level.** The level of disturbance will be higher around the proposed visitor centre, along the trails and the points of interest. The use of large windows and the risk this poses to bird is considered to constitute a **Permanent Moderate Negative Impact at the local level**. No significant impacts on Birds at any level.
KER11 Glendoo Brook	• Reduction in water quality	• Reduction in water quality	The potential for the accidental introduction of pollutants and sediment during the construction phase is considered to constitute a **potential Temporary Moderate Negative Impact at the local level**. The potential for the accidental introduction of pollutants and sediment during the operational phase, particularly herbicides, is considered to constitute a **potential Temporary Moderate Negative Impact at the local level.**

KER	Construction-phase Impacts	Operational-phase Impacts	Ecological Significance if Unmitigated
			No significant impacts on the Glendoo Brook at any level.

6.9 MITIGATION

This section describes the measures that are in place to mitigate offset likely significant adverse effects on the environment associated with the proposed development and the identified Key Ecological Receptors, as described in the preceding sections. Construction phase mitigation measures are described first, followed by general mitigation measures which will apply during the construction and operational phases. Lastly, mitigation measures which related specifically to the Key Ecological Receptors is described.

The proposed development has been developed having regard to EU and Irish legislation and all relevant guidelines in relation to ecology and engineering best practice for the planning and construction of proposed developments. These guidelines provide practical measures that can be incorporated into the design to minimise impacts and protect the receiving environment. The design has followed the basic principles outlined above to eliminate the potential for ecological impacts, where possible, and to minimise such impacts where total elimination is not possible. The design has followed the TII Publications (Standards) and the TII Environmental Assessment and Construction Guidelines.

6.9.1 Construction Phase Mitigation

The following general mitigation measures will be employed to minimise potential significant negative effects on biodiversity which might arise during the construction of the proposed development.

- A Construction and Traffic Management Plan (CTMP) shall be developed by the Contractor prior to the commencement of works. It shall be developed in accordance with the description of the Outline CTMP which was provided in the previously submitted EIAR (Volume 3 Chapter 14 Roads, Traffic and Transportation).

- The Contractor will prepare a Construction Method Statement detailing how the works will be carried out. The Site Foreman shall read, sign and abide by the Construction Method Statement. A signed copy will be submitted to the District Conservation Officer of the National Parks and Wildlife Service. The Works Team will be inducted on the ecological considerations listed in the Construction Method Statement by the Site Foreman.

- An Ecological Clerk of Works (ECoW) shall be appointed by SDCC prior to the commencement of works. It shall be their responsibility to supervise and provide recommendations on the execution of any and all works which have the potential to give rise to negative effects on biodiversity/ecological integrity. The ECoW will have similar professional experience of recreation based projects and be a member of the Chartered Institute for Ecology and Environmental Management (CIEEM).

- The Contractor will appoint a Site Environmental Manager (SEM) prior to the commencement of works. This person shall be responsible for carrying out environmental monitoring of the works and ensuring that the mitigation measures proposed in this EIAR (as well as the CTMP and Construction Method Statement) are adhered to.

- The construction envelope associated with the proposed development will be temporarily fenced off at the outset of the construction phase of the project and will avoid the potential for un-necessary loss of habitat outside of the construction footprint.

- Appropriately sized machinery with low pressure tyres/ tracks will be used for the trail construction, landscaping and all works in Massy's Estate.

- Mature trees and scrub outside of the footprint of the proposed car park, visitor centre and canopy bridge will be retained (See section 6.8.2.1). Fencing will be erected around trees which are to be retained and will include the Root Protection Area, as defined by a professionally qualified Arborist. It is recommended than an Arborist be retained as required by the principal contractor to monitor and advise on any works within the RPA of retained trees to ensure successful tree retention and planning compliance. All recommendations contained in the tree survey report will be followed.

- Fallen trees, standing dead trees and stumps outside the footprint of the proposed car park, visitor centre and canopy bridge will be retained as habitat for invertebrates, bryophytes and fungi. Similarly, native trees that are felled to facilitate the proposed development will be moved to areas of the Hell Fire Club where they will provide dead wood habitat.

- The use of artificial lighting on site will be minimised in terms of the area required to be illuminated and the length of time for which any lighting is switched on. Light spillage will be prevented as far as reasonably practicable. Artificial lighting will be shut off at night when not in use or when works cease at the end of the day in order to minimise the effects of light pollution and disturbance to crepuscular and nocturnal species. Security lighting, if required, will be cowled, to prevent light spill outside the compound. The ECoW will ensure that light spill is reduced as much as possible.

- A pre-construction survey will be undertaken 2-3 weeks prior to construction to ensure that protected species such as Red Squirrel and Badger have not taken up residence within the construction envelope. The survey will cover the footprint of the proposed development and a 50m buffer. Should any protected species shelters (e.g. dreys, setts) be found, the ECoW will seek direction from the NPWS.

- Any excavations deeper than 1m will be either covered or have ramps fitted outside of working hours, which will allow badgers and other wildlife to escape. Similarly, any temporarily exposed open pipe system will be capped to prevent species such as Otter from gaining access when contractors are off site.

- The exact route of the canopy bridge, new trail and surface water drainage in Massy's Estate will be agreed with the ECoW and a qualified arborist, and will adapted to retain as many trees below the proposed visitor centre as possible and minmise damage to tree roots.

6.9.2 Non-Specific Mitigation Measures

The following is an overview of the non-specific mitigation measures that will be employed to avoid or minimise significant impacts on the ecological receptors within the Zone of Influence:

- The proposed trail improvement and new trails have been designed as Classes 1, 2 and 3 in accordance with the National Trail Office's *Classification and Grading of National Trails* (2008). This will ensure that proposed increase in footfall will not damage the existing paths which could lead to erosion outside this area.

- A Strategic Oversight Group comprised of representatives at Senior Management / Director Level from SDCC and Coillte will be established to provide formal high-level governance in relation to the proposed Dublin Mountains Visitor Centre. This group will meet at least every two months in the initial year following opening of the centre in order to address strategic and governance issues in relation to the proposed visitor centre as well as responding to issues arising from the Management Steering Committee. It is proposed that the Strategic Oversight Group will be responsible for carrying out an annual inspection of the site trails during the operational phase of the development. The inspections will be carried out by the Dublin Mountains Partnership (DMP) and Coillte. The annual inspections will establish the condition of all trails with reference to National Trails Office standards. If necessary, the trails will be closed and/ or repair works will be specified, and implementation will be supervised by the DMP and Coillte. The trails inspection and specification of works will be informed by the results of the annual ecological surveys, in order that any necessary protection measures for heritage resources are incorporated. This may include temporarily restricting or prohibiting access to areas where erosion is a problem.

- Information boards will be provided at the proposed visitor centre, in the car park, at the entrances to Massy's Estate and at the southern end of Massy's Estate. The boards shall be aesthetically engaging to encourage buy-in from visitors. Signage has been demonstrated to effectively manage the negative impacts of recreation on wildlife. Herstine *et al*. (2006) concluded that signage can be an effective approach for passively managing human behaviour and tourism in natural resource settings. A study from Iceland (Marschall *et al*., 2017) on the impact of signage on visitor behaviour around seals showed that signage was effective, but in particular, 'teleological' signage which provided an explanation as well as a command was more effective. The information boards will provide information on the ecology of the site and include a request for visitors to remain on the trails and to keep dogs on leads. Plate 4 provides a good example of outdoor signage for natural recreation areas.

Plate 4 Examples of aesthetically engaging signage advising walkers of the sensitivity of species to human disturbance. Source: Stonehouse Designs

- During the operational phase, the series of improved trails will maintain 'quiet zones' (areas away from trails) which will reduce the impact of noise and visual disturbance on species such as Red Squirrel and birds. The quiet zones include blocks of woodland and edge woodland edge habitat away from the trails.

- Site clearance including vegetation removal will take place from October to January inclusive. This has taken early nesting birds, such as Common Crossbill, as well as late nesting birds into account and will therefore avoid direct impacts on nesting birds. Nonetheless, a pre-clearance survey will be carried out for nesting birds prior to the felling of conifers. No trees with features suitable for roosting bats will be felled as part of the proposed development.

- The lighting plan has been designed to minimise impacts on biodiversity. Low-level bollard lighting has been proposed for the path leading from the visitor centre to the car park which will remain on at night long enough for staff to reach the car park safely, then be switched off. The proposed low-level bollard lighting will be designed in accordance with *Bats and Artificial Lighting in the UK* (BCT, 2018).

- The opening hours of the visitor centre are 8am-8pm from April to September and 9am-5pm from October to March. This will limit the presence of light spill from the visitor centre and outside lighting after dark. For a short period, light spill from the visitor centre will be felt over a small area. However, this will be significantly less after the vegetation matures and during the summer months when the trees are in leaf and artificial lighting is not required as much.

- The construction and operation of the proposed development will maintain a drainage neutral situation i.e. there will be no increase or decrease in the flow discharge rate from the application site. The drainage design includes a hydrocarbon interceptor and the construction of ponds and swales to attenuate surface water, which will also provide additional wetland habitat (See previously submitted EIAR: Volume 1 Chapter 8 Water & Hydrology).

- The landscaping plan includes the widespread planting of native Irish species of trees and shrubs (See previously submitted EIAR: Volume 1 Chapter 10 Landscape and Visual). The eastern slopes of the Hell Fire Club will be planted before construction work begins so as to enhance the existing habitat and reduce the impacts during construction. The biodiversity value of the woodlands will be low at first but will improve with time as the trees grow and a diverse field layer becomes established.

- The conversion of the conifer plantations to native woodland will take place after the construction phase and will involve the felling of a maximum of 10% of mature conifers per annum.

- There will be no seeding carried out as part of the proposed development, with the exception of the wildflower meadow in the walled garden. The disturbed habitats, including areas where invasive species have been removed, will be allowed to regenerate naturally with locally occurring native species.

- Perimeter fencing will allow wildlife such as badger and hedgehog to pass through it. Crossing points will be located a minimum of every 50m along new perimeter fences and will be at least 30cm × 20cm.

6.9.3 Specific Mitigation Measures

In addition to the general mitigation measures described above, specific measures are described in relation to individual Key Ecological Receptors in the following sections.

6.9.3.1 Red Squirrel (KER 1)

- Site clearance will take place between October and January which is outside the period when Red Squirrel will be nursing young.
- Mature trees will be checked by the ECoW immediately prior to felling to ensure no red squirrels are in the area. If any red squirrel are in the trees, or in the immediate vicinity, felling will be postponed until they have left the area.
- Tree planting the Hell Fire Club will consist of at least 10% Scots Pine and shrub planting will include 20% hazel. In the context of the wider landscape and the South Dublin red squirrel population, which currently depends on monocultures of conifers that are subject to clear-felling, a permanent native woodland will be a positive impact. Broadleaved woodland can support a higher population density of red squirrels and provide a year-round food source for the species.
- Two rope bridges will be constructed, one on each side of the canopy bridge. The siting of the bridges will be agreed with the ecologist and the contractor, depending on ground conditions and suitable trees to link the rope bridges to. The rope bridge will be 6.25m above the road level to accommodation traffic and to match the height of the canopy bridge. The use of rope bridges to reduce road fatalities for red squirrels has been widely documented in Europe and is listed as a 'proposed action' in Section 5.3.8 of the All-Ireland Red Squirrel Species Action Plan (NPWS/ EHS, 2008).
- The proposed interpretive signage at the site will include information on red squirrel ecology and notices requesting the public not to feed grey squirrels.
- Two artificial dreys will be erected the Hell Fire Club. The location will be directed by the ECoW. Suggested locations are presented in the draft Red Squirrel Management Plan (Appendix S11).
- The draft Red Squirrel Management Plan (Appendix S11) will be implemented and will include measures to control grey squirrels, if required.

6.9.3.2 Pine Marten (KER 2)

- Two pine marten nest boxes will be erected. The locations will be directed by the ECoW. Suggested locations are presented in the draft Red Squirrel Management Plan (Appendix S11).

6.9.3.3 Bats (KER 5)

- In order to avoid impacts on bats, a pre-construction bat suitability assessment will be undertaken. This should be undertaken no more than 3 weeks prior to the works to identify any new features that have been created since the surveys which informed this EIAR were undertaken.
- The construction of the canopy bridge may require some pruning of branches or felling of immature trees. The trees in this area have low bat potential and as such, should be left on the ground for 24 hours once felled.

- Should any bat roost be detected during the pre-construction survey which will be disturbed or lost during construction, a derogation licence will be required from the NPWS.

- Following an assessment by a conservation architect, any proposed works to the structures will be reviewed by the ECoW and bat surveys shall be undertaken, if required.

- The chimney flues in the Hell Fire Club building will be sealed using a single iron bar or similar. This will be off centre so as to prevent people climbing up the chimney while leaving as much of an open gap as possible. Signs of recent fire lighting mean the flues are likely unsuitable bat roosting habitat.

- Three crevice type bat boxes will be placed in the application site. The bat boxes will be located at a sufficient distance from the construction envelope to limit any disturbance and the type and location will be directed by the ECoW and in accordance with Kelleher & Marnell (2006).

6.9.3.4 Bryophytes and Tufa Springs (KER 6)

- In order to protect the area containing *Orthotrichum stramineum* in the vicinity of the proposed canopy bridge and the population of *Plagiothecium laetum* in the vicinity of the proposed visitor centre, a pre-construction survey will be carried out to determine the abundance of these species.

- The populations of O. *stramineum* will marked by the ECoW and the populations will be protected from damage during construction.

- The paths near the proposed visitor centre will be routed locally to avoid the populations of *Plagiothecium laetum.*

- The populations will be protected during the operational phase by fencing, as directed by the ECoW.

- The tufa springs adjacent to the paths, including their sources, will be marked out by the ECoW and protected during the path upgrades.

- The northern link path which was proposed in the original EIAR has been removed from the design to avoid the potential for impacts on the tufa springs.

6.9.3.5 Upland Habitats (KER 7)

In order to prevent/minimise (i) terrestrial habitat degradation/destruction and (ii) disturbance of upland habitats and ground-nesting species of birds as a result of increased numbers of visitors accessing the upland habitats, the following mitigation measures shall be implemented.

- Information boards will be provided at the proposed visitor centre, in the car park, at the entrances to Massy's Estate and at the southern end of Massy's Estate. The boards shall be aesthetically engaging to encourage buy-in from visitors.

The information boards will communicate the following to visitors:

- The presence of Natura 2000 sites.

- The presence of ground nesting birds and other sensitive wildlife.
- The presence of sensitive heath habitats.
- A request to remain on the paths and to keep dogs on the lead.
- A map showing the waymarked trails in Massy's Estate, the Hell Fire Club and the Dublin Mountains Way but not the trails leading into the SAC or SPA.

A number of looped, waymarked walking routes will be established in Massy's Estate and at the Hell Fire Club. These will be on the existing trails, with some sections improved and a small section of new trail forming a new link path. The establishment of these walks shall involve:

- The placement of suitably spaced colour-coded way marker posts at appropriate locations along the trails; and,
- The erection of a sign at the outset of the routes displaying a map of the routes with approximate length (km), duration (hours/minutes) and a conservative estimate of difficulty level (i.e. easy/moderate/strenuous).

6.9.3.6 Amphibians (KER 8)

The following measures will be implemented to ensure the preservation of amphibians in the local area:

- The three ponds will be retained.
- The scrub and grassland habitats within 25m of the pond where newts were recorded (Pond 1) will not be disturbed.
- Prior to the construction phase the ponds will be demarcated during the construction phase to prevent accidental damage.
- Six ponds will be constructed as part of the drainage plan which will provide wetland habitat for amphibians (See previously submitted EIAR: Volume 1 Chapter 8 Water & Hydrology). One of these ponds will be permanently wet; the others will be ephemeral. This will create a wetland habitat mosaic with a mixture of permanent and seasonal ponds, which will provide habitat for a variety of wildlife.
- The use of a pond lining may be required and will be determined by the local ground conditions.
- The creation of the ponds will follow the guidance in *Guidance on good practice in the* management *and creation of small waterbodies in Scotland* (SEPA, 2000) in order to maximise their biodiversity potential.
- Terrestrial refugia will be created at each pond which will consist of either log piles or clean inert material covered with topsoil.

- Permanent fencing and signage will be erected around the existing and created permanent pond as part of the trail upgrades to protect this habitat from disturbance. The fencing will be set back from the pond edge as far as practicable to provide a buffer of vegetation around each pond.

6.9.3.7 Invasive Species (KER 9)

- During the construction phase, to prevent/minimise potential negative effects as a result of the introduction and/or spread of invasive during the operation of the proposed development, SDCC will adopt an invasive species management plan, a draft of which is presented in Appendix S10.

- The invasive species management plan adopted by SDCC will seek to eradicate invasive species in Massy's Estate and at the Hell Fire Club and promote the regeneration of native species.

- Herbicides will be used in accordance with the European Communities (Plant Protection Products) Regulations, 2012 (S.I. No. 159 of 2012) and the (Sustainable Use of Pesticides) Regulations, 2012, (S.I. No. 155 of 2012) (as amended).

- Landscaping of the proposed development shall use native species of plants of national provenance only and, insofar as possible, soil reused from on-site excavations. If soil/substrate needs to be imported to the site for the purposes of the proposed development, the Contractor shall ensure that the imported soil/substrate is free from invasive species.

6.9.3.8 Birds (KER10)

- If any vegetation needs to be removed outside the permitted period (October-January), the area shall be checked by an experienced ecologist for nesting birds. If nesting birds are found, the works will be postponed until the chicks have fledged.

- Where larger trees are removed and to further minimise the loss of nesting sites, 20 nest boxes will be erected. The nest boxes will be located at a sufficient distance from the construction envelope and the type and location will be directed by the ECoW.

- Bird-friendly glass (e.g. www.ornilux.com or equivalent) or retrofitted measures such as tape and film, which will reduce the reflectivity of glass facades and windows, will be used on all buildings. This will not prevent all bird collisions but will reduce the risk of collisions significantly. These measures will be approved by the ECoW and will follow the guidance published by the American Birds Conservancy (ABC, undated)

6.9.3.9 Glendoo Brook (KER11)

- In order to prevent pollution of surface water during the construction of the proposed development, which could potentially give rise to negative effects on biodiversity and freshwater habitats, all of the mitigation measures contained in the previously submitted EIAR Chapters 8 (Water and Hydrology) and 10 (Landscape and Visual) shall be implemented.

- All machinery will be refuelled from mobile tankers on the local/access/haul/site roads. No refuelling will take place within 50m of any watercourse.

- Mobile storage facilities, such as fuel bowsers, will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators will be double skinned.

- When not in use, all valves and fuel trigger guns from fuel storage containers will be locked.

- Only dedicated trained and competent personnel will carry out refuelling operations. A spill kit and drip tray will be on site at all times and available for all refuelling operations. Equipment will not be left unattended during refuelling. All pipework from containers to pump nozzles will have anti siphon valves fitted.

- Strict procedures for plant inspection, maintenance and repairs will be detailed in the contractor's method statements and machinery will be checked for leaks before arrival on site.

- All site plant will be inspected at the beginning of each day prior to use. Defective plant will not be used until the defect is satisfactorily fixed.

- All major repair and maintenance operations will take place off site.

- Care will be taken at all times to avoid contamination of the environment with contaminants other than hydrocarbons, such as uncured concrete and other chemicals.

- The track on the western side of the Glendoo Brook within Massy's Estate will be realigned further west/uphill (away from the Glendoo Brook) and will comprise the upgrading of an existing earthen track along the nearby small stream, which is a less ecologically sensitive corridor, located within a mature Beech wood. The route will connect to the existing river trail where the eastern route already crosses the river, avoiding the need for a new crossing of the watercourse. This will minimise works along the Glendoo Brook and allow this area to remain undisturbed by a formalised new trail and increased visitor numbers.

- A low-key estate-type railing, which is common in the country houses in the area, will restrict access to the steeper sections of the river banks, which would otherwise cause erosion and likely sediment input. Access will be deterred more subtly in other areas by placing logs along the edge of the path.

- Surface water from the Hell Fire Club will travel under the Military Road in a pipe and flow into an open drain along the Military Road where it will flow into the Glendoo Brook. Run-off will be treated in attenuation ponds and a petrochemical interceptor prior to entering Massy's Estate.

- Run-off generated from the new hardstanding areas is initially stored on site before being gradually released at the rate that water naturally flows from the site. Therefore, there is no significant change to the quantity or rate of water flowing into the Glendoo Brook. The proposed development will not lead to an increase in the rate or quality of run-off entering Massy's Estate or the Glendoo Brook.

6.9.4 Residual Impacts on Key Ecological Receptors

Table 6.25 Assessment of the Residual Impacts Scale and Significance, following EPA (2017) and TII (2009).

KER	Pre-mitigation Impacts	Ecological Significance following Mitigation
KER1 Red Squirrel	• Habitat Loss • Habitat Fragmentation and Barrier Effect • Disturbance • Direct Mortality • Introduction and spread of Invasive Species	The loss of habitat is considered a **Medium-term Slight Negative Impact at the local level**. The loss of habitat is unavoidable, however, the retention of some of the mature conifers and the widespread planting prior to construction have reduced this impact and will reduce it completely as the new woodlands mature. Habitat fragmentation and barrier effect during the construction phase is considered to be a **Short-term Moderate Negative Impact at the local level.** Disturbance and the risk of direct mortality to Red Squirrel during the operational phase is considered to be a **Medium-term Slight Negative Impact at the local level**. Following the implementation of the mitigation measures described in Section 6.9, the medium-term to permanent impact of the proposed development on Red Squirrel will become a **Permanent Slight Positive Impact at the local level**. There are no significant residual negative effects on this Key Ecological Receptor at any scale.
KER2 Pine Marten	• Habitat Loss • Habitat Fragmentation and Barrier Effect • Disturbance • Direct Mortality	The loss of habitat is considered a **Medium-term Slight Negative Impact at the local level**. The loss of habitat is unavoidable. However, the retention of some of the mature conifers and the widespread planting prior to construction have reduced this impact. Habitat fragmentation and barrier effect during construction phase is considered to be a **Short-term Moderate Negative Impact at the local level.** Disturbance and the risk of direct mortality to Pine Marten during the operational phase is considered to be a **Medium-term Slight Negative Impact.** Following the implementation of the mitigation measures described in Section 6.9, the medium-term to permanent impact of the proposed development on Pine Marten will become a **Permanent Slight Positive Impact at the local level**. There are no significant residual negative effects on this Key Ecological Receptor at any scale.
KER3 Badger	• Habitat Loss • Direct Mortality	There are no setts within the footprint of the works. One sett is within 10 m of the forest road which will be improved. However, the works are minor, and this sett screened by trees and is already exposed to disturbance. There is potential for the development to have a **Permanent Positive Impact at the local level** on badger foraging habitat through improved woodland management, eradication of invasive species and widespread planting. There are no residual negative effects on this Key Ecological Receptor at any scale.
KER4 Otter	• Reduction in water quality	No signs of otters were recorded on the site or within 500m upstream and downstream of the site. Following the implementation of the mitigation measures described in Section 6.9, including the removal of invasive species along the Glendoo Brook, the proposed development will have a **Permanent Slight Positive Impact at the local scale** on Otter. There are no residual negative effects on Otter at any scale.

KER	Pre-mitigation Impacts	Ecological Significance following Mitigation
KER5 Bats	• Habitat Loss • Disturbance	No roosts were recorded inside the construction footprint. The loss of habitat is considered to be a **Medium-term Slight Negative Impact at the local scale**. The loss of habitat is unavoidable. However, the retention of some of the mature conifers and the widespread planting prior to construction have reduced this impact. Disturbance during the construction phase, particularly from artificial lighting, is considered to be a **Short-term Slight Negative Impact at the local scale.** Disturbance, particularly from artificial lighting during the operational phase is considered to be a **Permanent Slight Negative Impact at the local scale.** Following the implementation of the mitigation measures described in Section 6.9, such as the removal of invasive species, the planting of native woodland and the creation of ponds, the short to medium-term impact on bats will be a **Permanent Positive Impact at the local scale.** There are no significant residual negative effects on this Bats at any scale.
KER6 Bryophytes and Tufa Springs	• Habitat Loss	Following the implementation of the mitigation measures described in Section 6.9 including the protection of the populations or rare and protected and the removal of invasive species, the proposed development will have **Permanent Slight Positive Impact at the local scale** on bryophytes and tufa springs**.** There are no residual negative effects on Bryophytes and Tufa Springs at any scale.
KER7 Upland Habitats	• Habitat Loss • Disturbance	Based on the results of the walker survey, which indicated no significant increase in users accessing the uplands, and following the provision of the mitigation measures described in Section 6.9 including signage to inform the public about the sensitivity of the environment, the potential for erosion along paths and disturbance to wildlife is considered to be a **Potential Imperceptible Negative to Slight Positive Impact at the local level.** The new signage may lead to visitors altering their behaviours which could reduce the impacts of, for example, dogs off leads. There are no significant negative effects on Uplands at any scale.
KER8 Amphibians	• Habitat Loss • Direct Mortality	The risk of habitat loss during construction is considered to be **Short-term Imperceptible Negative Impact at the local level,** as it will apply only to terrestrial habitats in the construction footprint, which are not important amphibian habitat. Construction works could result in the loss of individual amphibians in their terrestrial habitats. This would affect very few individuals, which, in the context of the local population would constitute a **Short-term Imperceptible Negative Impact at the local level.** Following the implementation of the mitigation measures described in Section 6.9 such as the protection of the existing ponds, the creation of new ponds, and enhancements of the terrestrial habitats at the Hell Fire Club, the impact on amphibians during the operational phase will be a **Permanent Significant Positive Impact at the local level.** There are no significant negative residual effects on Amphibians at any scale.
KER9	• Introduction and spread of invasive species	Following the implementation of the mitigation measures described in Section 6.9 such as the removal of

KER	Pre-mitigation Impacts	Ecological Significance following Mitigation
Invasive Plants		invasive species is carried out in accordance with legislation and current best practice guidance, the removal of invasive species from the Hell Fire Club and Massy's Estate will constitute a **Permanent Significant Positive Impact at the local level.** There are no significant negative residual effects on Invasive Plants at any scale.
KER10 Birds	• Habitat Loss • Habitat Fragmentation and Barrier Effect • Disturbance • Direct Mortality	The loss of habitat, habitat fragmentation and barrier effects in and around the proposed is unavoidable and are considered to be a **Short-term Slight Negative Impact at the local level**. Site clearance will not take place during the nesting season and habitat outside the construction footprint will be protected, reducing these impacts. New habitat will be created which will compensate the small loss of mixed woodland and conifer plantation. Construction activities within and in the vicinity of the construction footprint will lead to disturbance of birds. This is considered to be a **Short-term Slight Negative Impact at the local level,** as the construction footprint is small, and the construction activities will vary in intensity and disturbance they cause. Conifers outside the construction footprint are being retained and the planting of new woodland will take place before the construction works begin, which will reduce the level of disturbance. The risk of direct mortality during the construction phase is considered to be imperceptible as site clearance will take place outside the nesting season. During the operational phase, the increased numbers of visitors will lead to a **Permanent Neutral Impact at the local level**. The potential for disturbance impact as a result of the increase in visitors numbers will be offset by measures including new planting and the removal of invasive species management. The risk of birds colliding with windows will be reduced significantly through the use of windows with increased reflectivity. The residual impact of potential widow collisions will be a **Negative imperceptible Impact at the local level.** Following the implementation of the mitigation measures described in Section 6.9 including the removal of invasive species, the planting of permanent native woodland and the creation of ponds, the proposed development will have a **Permanent Slight Positive Impact at the local level** on birds. There are no significant residual negative effects on Birds at any scale.
KER11 Glendoo Brook	• Reduction in water quality	Even after the mitigation measures described in Section 6.9 are applied, there will still be a **Potential Temporary Slight Negative Impact at the local level** on the Glendoo Brook (and its tributaries) as the risk of accidental pollution will remain, although significantly reduced. Following the implementation of the mitigation measures described in Section 6.9 during the operational phase, the proposed development will have a **Permanent Significant Positive Impact at the local level** through the removal of invasive species which will lead to the establishment of native riparian vegetation and an improvement in water quality. There are no residual negative effects on the Glendoo Brook at any scale.

6.10 MONITORING

It is proposed that, for an initial period of five years, the Management Steering Committee (See previously submitted EIAR: Volume 3 Chapter 3 Operational Management Plan) carry out or arrange to have carried out an annual review of all Key Ecological Receptors as well as usage patterns. The inspections will be carried out by a suitable qualified and experienced ecologist.

The monitoring will establish the condition/prevalence of each Key Ecological Receptors and will include the following surveys as a minimum and as described in Section 6.6 of this updated EIAR biodiversity chapter:

- Squirrel activity surveys.
- Bat activity surveys.
- Rare bryophyte population monitoring.
- Badger sett assessments.
- Aquatic assessment of the Glendoo Brook above and below the drainage outfall.
- Invasive species survey.
- Walker survey at the car park and path leading to Cruagh Wood.

If necessary, e.g. in the event of deterioration of a habitat, or significant reduction in the population of a rare or protected species, or significant spread of an invasive species, management measures will be prescribed by the ecologist, in addition to those already outlined in the Red Squirrel Conservation Management Plan and the Invasive Alien Plant Species Management Plan.

Such measures might take the form of additional habitat development, or restriction of public access to certain areas for a prescribed period.

After the initial five-year monitoring period, the requirement for annual ecological inspections/surveys will be reviewed and a new regime of inspections/surveys at wider (or shorter) intervals will be implemented.

In order to facilitate the adaptive management of the proposed development:

- It is proposed to monitor visitor behaviour for a period of five years post construction. The monitoring shall be carried out using cameras or counters and will be carried out by a suitably qualified person. The visitor monitoring will establish what proportion of visitors use the different looped walks, enter Cruagh Wood and the Dublin Mountains Way from the site of the proposed development and finally, it will record the number of walkers entering the upland habitats on Cruagh Mountain.

- A survey of the trail conditions shall be carried out on an annual basis for five years post construction to establish if there are any changes in the patterns or intensity of use on the paths within the application site and leading into the upland habitats on Cruagh Mountain. The inspections will be carried out by the Dublin Mountains Partnership (DMP) and Coillte. The annual inspections will establish the condition of all trails with reference to

National Trails Office standards. If necessary, within Coillte lands, trails will be closed and/ or repair works will be specified, and implementation will be supervised by the DMP and Coillte. The trails inspection and specification of works will be informed by the results of the annual ecological surveys, in order that any necessary protection measures for heritage resources are incorporated.

6.11 ASSESSMENT OF CUMULATIVE EFFECTS

Cumulative effects are those which accrue to KERs as a result of incremental changes caused by other existing or proposed plans or projects together those caused by the proposed development. For the purposes of this chapter, the cumulative impact assessment considers cumulative impacts on biodiversity which are:

(a) Likely;

(b) Significant; and

(c) Relating to a future event, reasonably foreseeable.

None of the developments identified during the cumulative assessment were determined to result in significant negative cumulative effects with regard to biodiversity, as defined in Chapter 15 'Interactions of this EIAR.

Chapter 15 'Interactions of this updated EIAR presents an in-depth assessment of potential cumulative effects.

6.12 MAJOR ACCIDENTS AND DISASTERS, CLIMATE CHANGE AND NATURAL RESOURSES

It is considered unlikely that the proposed development will result in an increased risk of major accidents or disasters. The risk of significant effects to Biodiversity arising from major accident or natural disaster at the site are considered highly unlikely and indeterminable.

There will be no negative residual impact on Natural Resources as a result of the proposed development. Impacts on Climate Change during the construction and operational phases are considered to be imperceptible and therefore no residual impacts are predicted.

6.13 CONCLUSION

It is considered that, with the implementation of the mitigation measures set out in this Chapter, in the Outline CTMP, in Chapter 3 and in the NIS for the proposed development, the construction and operation of the proposed development will not have a significant negative impact on biodiversity in the Zone of Influence.

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7.0 ~~SOILS, GEOLOGY AND HYDROGEOLOGY~~ LAND

7.1 INTRODUCTION

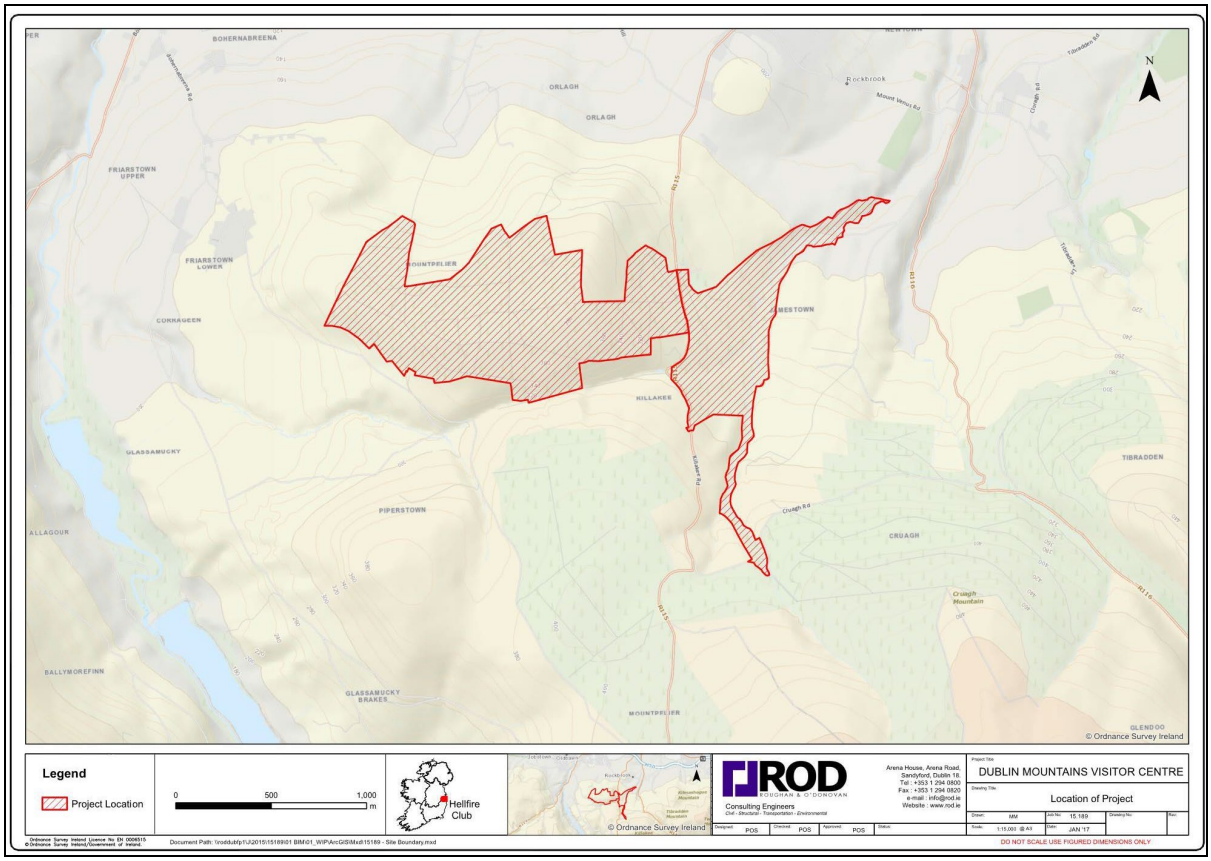
This chapter of the Environmental Impact Assessment Report (EIAR) assesses the geological and hydrogeological impacts of the proposed construction and operational activities of the proposed visitor centre at the Hell Fire Club, Dublin. The chapter sets out the methodology used in the assessment (Section 7.2), describes the existing geological and hydrogeological environment (Section 7.3), details the likely significant geological and hydrogeological impacts associated with the construction and operational phase of the proposed development (Section 7.4), describes mitigation measures (Section 7.6) and details residual impacts post mitigation (Section 7.7) and proposed monitoring (Section 7.8). No difficulties were encountered during the preparation of this chapter.

This Chapter was prepared by Seamus Mac Gearailt of Roughan & O'Donovan Consulting Engineers. Seamus is a Civil and Structural Engineer who holds a Bachelor of Engineering Degree from University College Dublin awarded in 1986. Seamus is a Chartered Engineer, a Fellow of Engineers Ireland, and a Fellow Professional Consulting Engineer (F.Cons.EI) with the Association of Consulting Engineers of Ireland (ACEI).

Seamus is a Director of Roughan & O'Donovan Consulting Engineers. Over the past 30 years his relevant professional experience includes a very wide range of civil and structural engineering projects including transportation facilities and public buildings.

The location of the proposed development is presented in Figure 7.0.1.

Figure 7.1 Site Location Map



7.2 METHODOLOGY

The assessment of the potential impact of the activity of water services was carried out according to best practice and the methodology specified in the following guidance documents.

- Environmental Protection Agency Guidelines on the Information to be contained in Environmental Impact Statements (2002);
- Environmental Protection Agency Advice Notes on Current Practice (in the Preparation of EIS) (2003);
- Draft Environmental Protection Agency Guidelines on the Information to be Contained in Environmental Impact Statements, Draft (2017~~5~~);
- Draft Environmental Protection Agency Advice Notes on Current Practice in the preparation of Environmental Impact Statements, Draft (2015);
- Institute of Geologists of Ireland (IGI) 2013 Guidelines for the Preparation of Soils, Geology and hydrogeology Chapters of Environmental Impact Statements;
- Institute of Geologists of Ireland (2002~~3~~) Geology in Environmental Impact Statements, a Guide;
- ~~DG Environment~~ European Commission (1999~~2002~~) Guidelines on the Assessment of Indirect & Cumulative Impacts as well as Impact Interactions.

The following sources of information were also consulted:

- Acquisition and compilation of all available regional information on the geology and hydrogeology aspects of the study area, including:
    - Interrogation of the Geological Survey of Ireland's (GSI) online mapping service, including:
    - GSI Teagasc Soils mapping;
    - GSI Teagasc Subsoils mapping;
    - GSI Bedrock Geology mapping;
    - GSI Landslide Events;
    - GSI Mineral Localities;
    - GSI Mineral Active Quarries.
- Acquisition and examination of the Ordnance Survey of Ireland's (OSI) mapping and aerial photography;
- Examination of topographical survey of the site;
- Findings of a Preliminary Ground Investigation (trial pits) at the proposed site;
- A walkover survey of the entire site.

The Preliminary Ground Investigation for the proposed development was undertaken by a contractor appointed by Coillte with visual inspections carried out by ROD on the 10th December 2015. The investigation was required to determine the soil, bedrock and groundwater conditions at the site. A total of 6 No. trial pits have been carried out at the proposed site. The findings of this report are presented in 7.3.2 Geological Setting.

7.3 EXISTING ENVIRONMENT

A description of the site is provided in Chapter 2. This section provides information on the existing local and regional geological and hydrogeological environments, with details of available site investigation data including subsoil information and bedrock geology.

7.3.1 Hydrogeological Setting

According to the bedrock aquifer mapping compiled by the GSI, the bedrock formation is classified as a poor aquifer which is generally unproductive except for Local Zones (Pl).

The site is located within the Kilcullen GWB (IE_EA_G_003). The main aquifer lithology of the mountainous areas of this GWB is granite derived till with some smaller areas of peat. The majority of groundwater will occur in the top couple of metres and this flow is mostly along weathered zone in a lateral direction towards rivers and springs. The mountainous granite areas are expected to have a low permeability.

According to interim classification work carried out as part of the Water Framework Directive, the Kilcullen GWB is classified as having good status in terms of quality and quantity.

Groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. The vulnerability of groundwater depends on the connectivity between the land surface and the aquifer, therefore it is a function of subsoil permeability, subsoil depth and recharge type, i.e. diffuse or point recharge.

According to the interim aquifer vulnerability mapping compiled by the GSI, the underlying Groundwater Vulnerability is classified at the location of the proposed development as *"'X' with Rock at or near Surface or Karst"*. The Massy Estate, the final location of the surface water runoff, is described as either *"Extremely Vulnerable"* or *"Highly Vulnerable"*.

Figure 7.2 GSI Groundwater Vulnerability – Montpelier Hill

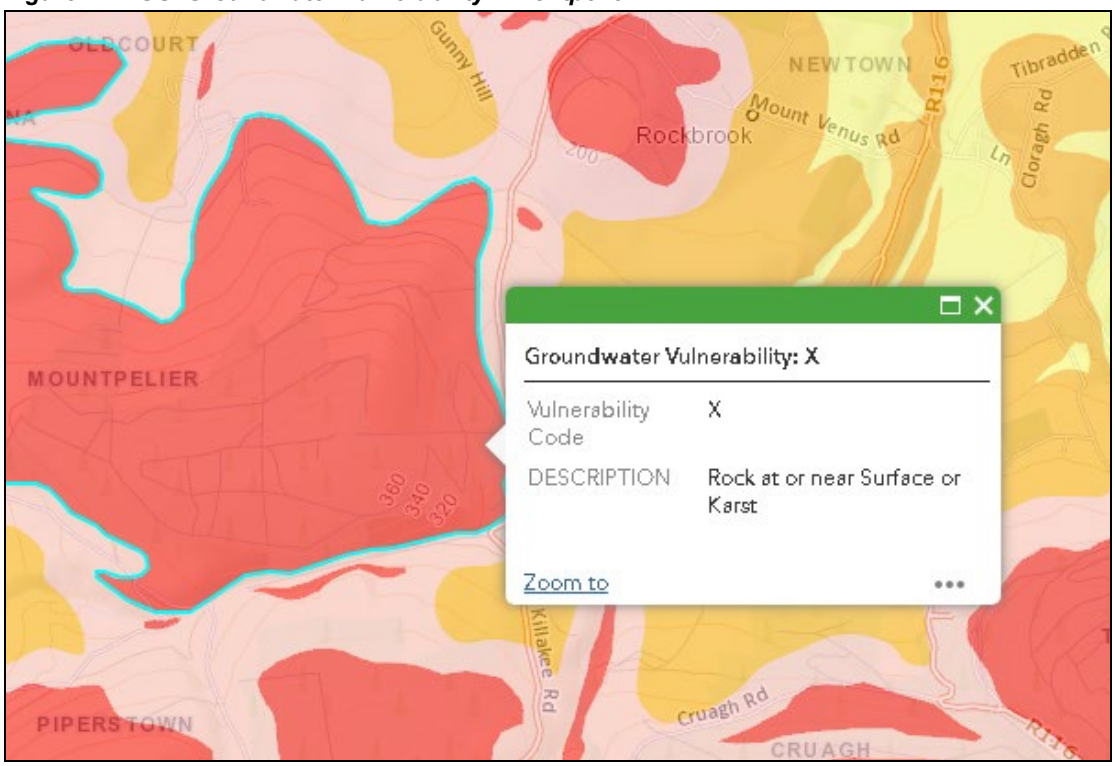
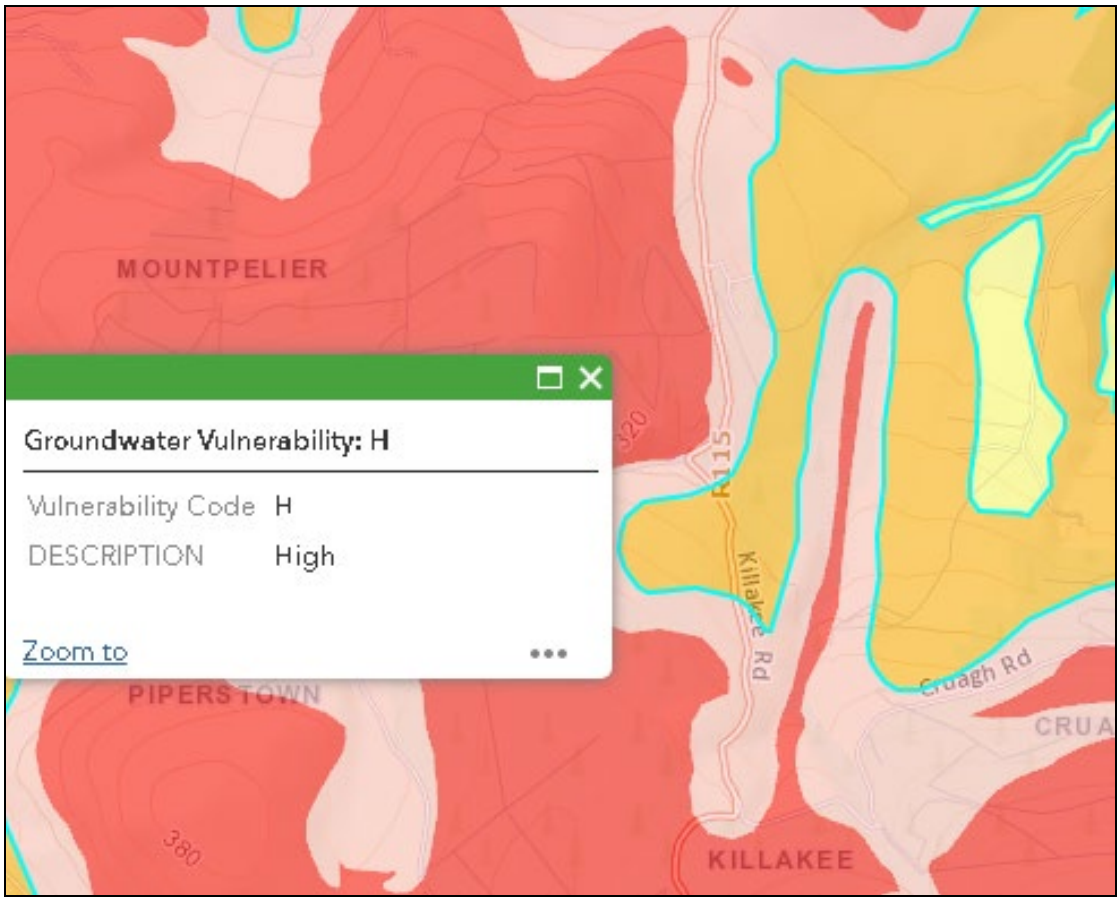


Figure 7.3 GSI Groundwater Vulnerability – Massy's Wood



The dominant recharge process in this area will be diffuse recharge from water percolating through the overlying tills and in to the aquifer. High rates of potential recharge are expected in the hilly areas where there are very thin subsoils and high rainfall. A large portion of this potential recharge will be rejected because the rocks in this area are considered to be poor aquifers and hence do not have a high enough storativity to accept all the water.

- The aquifer is not considered to have any significant porosity and flows are likely to be through fractures;
- The study area is not serviced by a mains water supply. There is no historic wells identified within the national well database compiled by the GSI;
- The site is not located within a zone of contribution and/or groundwater source protection area for any public groundwater supply source.

7.3.2 Geological Setting

Ground conditions encountered during the preliminary ground investigation can be summarised as follows:

Visitor centre location

- 0 – 1.0m Sand
- > 1.0m Rock

Car park location

- 0 – 1.5m Sand
- > 1.5m Rock

Massy Estate

- 0 – 1.5m Clay

The soils distribution across the site is provided on the Teagasc Soils Map. The site of proposed development is indicated to have predominantly shallow soils derived from non-calcareous rock or gravels with/without a peaty surface horizon and with bedrock at surface-or non calcareous (Figure 7.4).

Bedrock outcrop and sub crop is present at Montpelier Hill and till derived from Lower Palaeozoic sandstones and shale is noted at the Massy Estate (Figure 7.5)

The GSI Bedrock Geology Map shows that the rock underlying the site and vicinity is Type 2p microcline porphyritic, which is a type of granite with microcline penocrysts. This is part of the formation known as the Northern and Upper Liffey Valley Plutons (Figure 7.6).

The anticipated depth to bedrock is approximately 1.5m in the car park area and approximately 1.0m at the visitor centre.

Figure 7.4 GSI Teagasc Soils

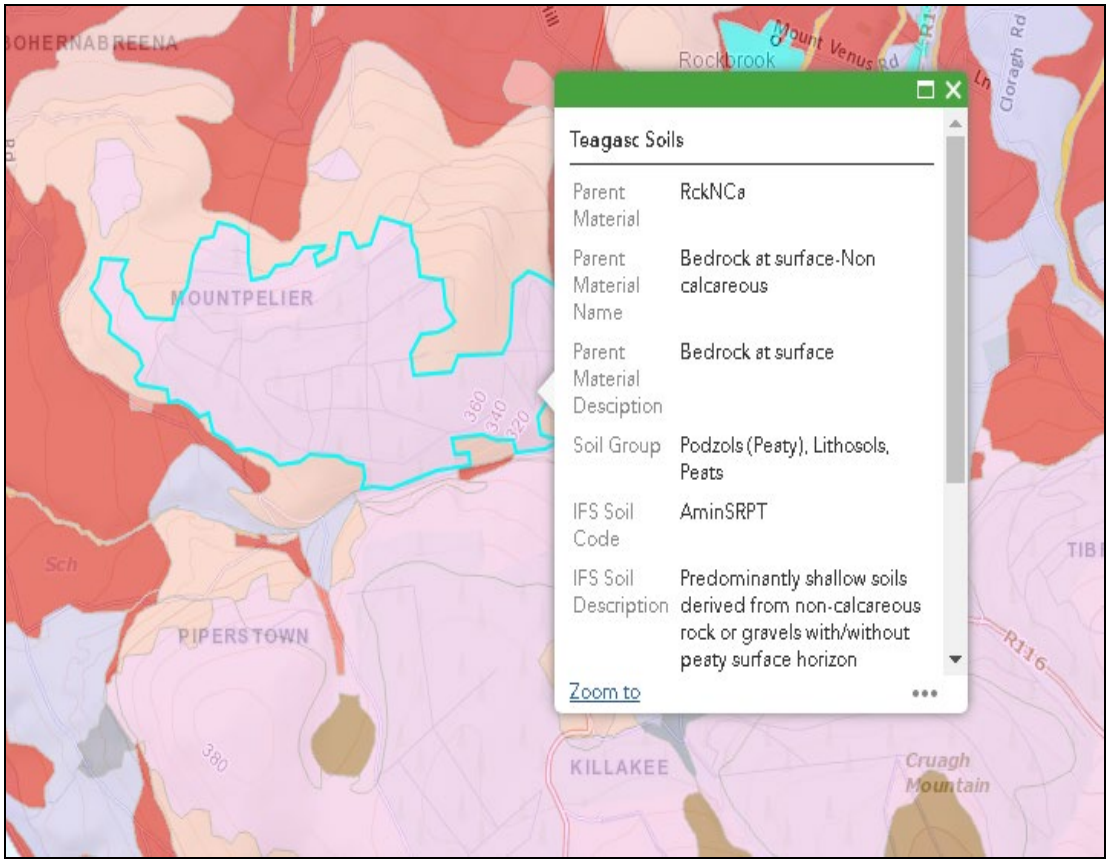


Figure 7.5 GSI Teagasc Subsoils

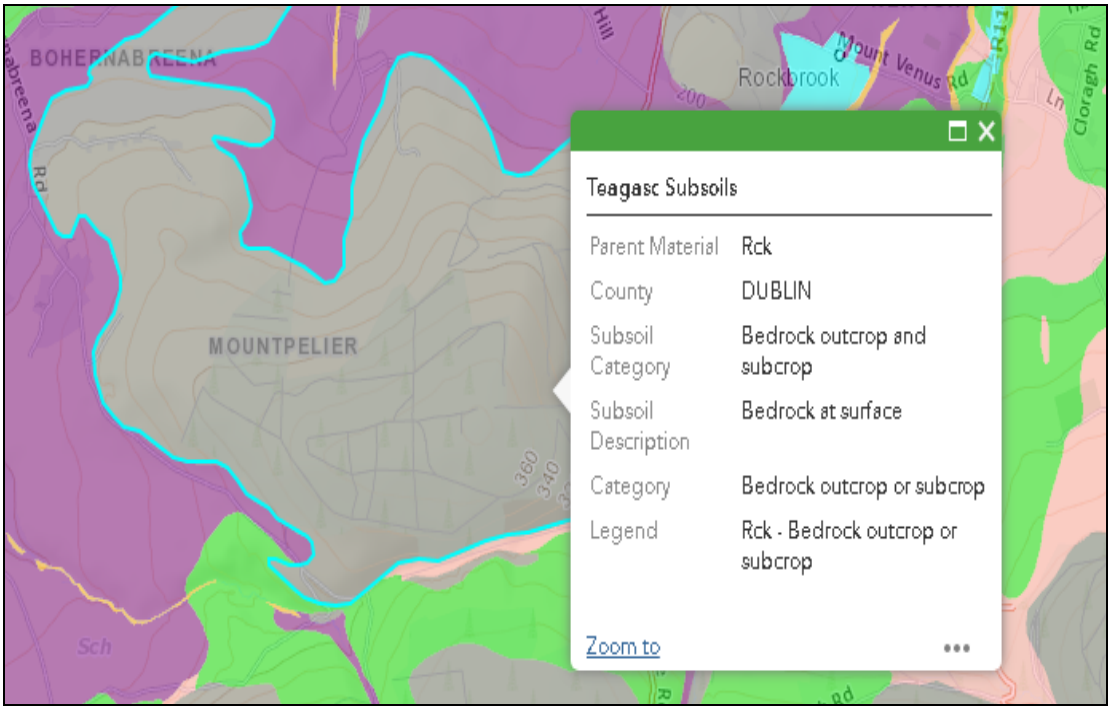
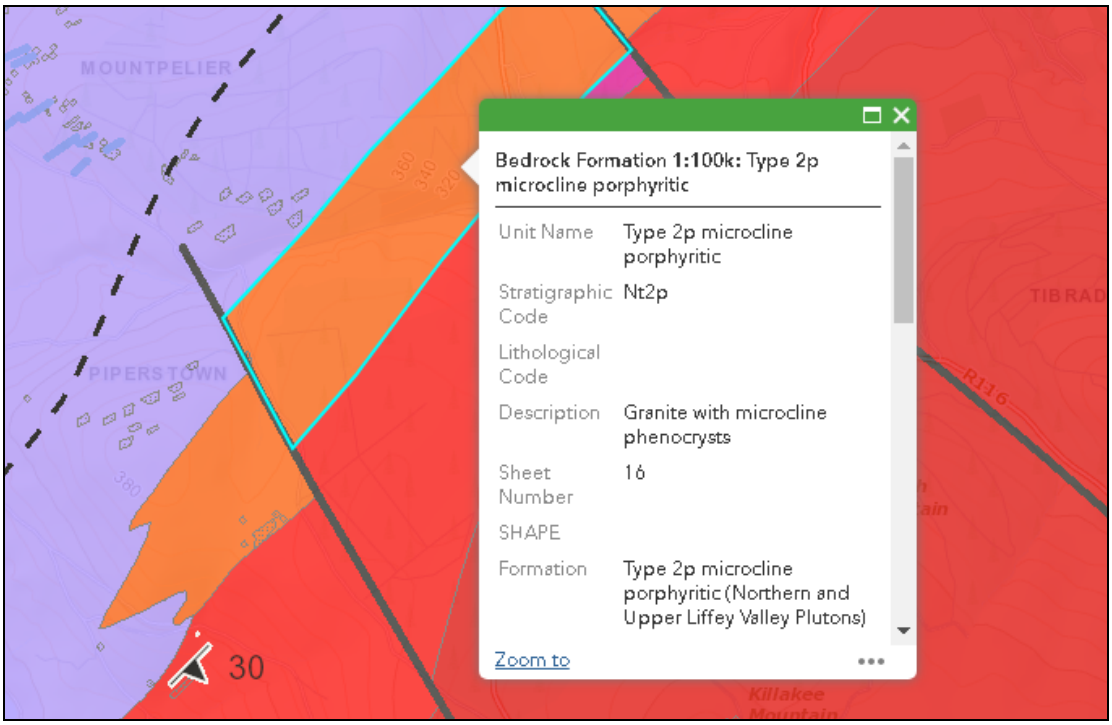


Figure 7.6 GSI Bedrock Geology



7.4 PROPOSED DEVELOPMENT

Chapter 3 of the EIAR contains a full description of the proposed development. This section provides information on the characteristics of the proposed development with regard to soil, geology and hydrogeology activities

The construction of the new visitor centre, car park, circulation roads and forest trails/paths will result in a new hardstanding area of approximately 12,000 m^2 within the site.

At the site, ground levels slope steeply downwards from west to east across the site. It is proposed that excavated material from the eastern side of excavations will be reused at the western sections to provide a level surface for the proposed construction.

Material will be excavated for the construction of the proposed foundations at the visitor centre. The proposed foundations will be founded on lean mix concrete placed onto the rock bearing stratum. The levels for the building and car parks have been set to minimise excavation and in particular breaking of rock on the site. Material will also be excavated to allow for the construction of the new roadways, parking facilities, walking trails and the foul water drainage and water main systems. Foundations for the roads and parking will be founded on a stone granular fill material placed into the rock bearing stratum. Foundations for the drainage will be founded on lean mix concrete placed into a suitable bearing stratum. Where feasible, excavated material will be re-used for landscaping purposes.

7.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

An analysis of the potential impacts of the proposed development on the soils and geology environment during the construction and operation is outlined in this section.

7.5.1 Construction Phase

The proposed development will involve the excavation of material for foundations, disturbance of topsoil and subsoil to enable the levelling of the site, deliveries of imported engineering fill, crushed stone, concrete, reinforcement and other construction materials.

During construction of the development, there is a potential risk of accidental pollution incidences from spillage or leakage of oils from construction machinery. Accidental spillages may result in contamination of soils and groundwater underlying the site should contaminants migrate through the subsoils and impact underlying groundwater. Concrete is highly alkaline and any spillage which migrates though the subsoil would be detrimental to groundwater quality.

The magnitude of these potential contaminants is dependent on the site management practices during the works. The contractor will be required to submit and implement a construction management plan detailing surface water management strategy during the works. This process will also be consistent with the Outline Construction and Traffic Management Plan, which is submitted separately.

There are no predicted significant impacts arising from the proposed development. This is due to the relatively small scale and temporary nature of the construction and the expected use of temporary facilities by a competent contractor.

7.5.2 Operational Phase

During the operational phase of the development the following potential risks to soils and groundwater have been identified:

- Accidental spillage of hydrocarbons from the visitor centre café / restaurant;
- Accidental spillage of hydrocarbons from the car park;
- Foul waste and surface water discharging to ground through leakage in the drainage systems.

A range of mitigation measures have been proposed for the operational phases of the project. These measures, as detailed on the drawings, seek to ensure that all discharges from the development are controlled to prevent impacts to receiving systems.

7.5.3 'Do Nothing' Scenario

If the proposed development does not proceed, there will be no additional impacts to the existing hydrogeological or geological aspects of the site.

Along with the existing car park, a large number of cars park on the existing road. There are currently no measures in place to control spillages of pollutants.

7.6 REMEDIAL AND MITIGATION MEASURES

7.6.1 Construction Phase

Avoidance and reduction of the volume of excavated material and backfill material has been a key consideration throughout the design process. The visitor centre has been designed as a split level building in order to suit the steep topography of the site. Similarly, the new circulation roads and parking tiers match the existing ground levels where possible. The foul drainage and water main lines are located below the new access road so do not require separate excavations.

Bunded storage units for oil/fuel/hydrocarbons/chemicals are to be provided on impermeable surfaces with a minimum 110% capacity. There will be designated refuelling points selected which will be located on hard standing areas with no pathway to the surface water drainage system. Oil interceptors will be provided in order to prevent runoff of pollutants to the soils and sub soils. The use of interceptors will be in compliance with Pollution Prevention Guidelines (PPG) 3. No detergents will be discharged to interceptors as this practice renders the interceptor useless. A designated vehicle wash down area will be identified with consideration to drainage arrangements and will be located away from surface water discharge point. Wash water will be collected and contained for disposal off site. Concrete washout will not be permitted to enter the surface water system. All new drainage systems will require pressure testing by the contractor and a CCTV survey to discover any possible defects.

All excavated materials will be assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred at the proposed development site. Should it be determined that any of the soil excavated is contaminated, this will be managed according to best practice and disposed of accordingly by a licensed waste disposal contractor

Construction operation will be required to take cognisance of the following guidance documents for construction work on, over or near water.

- CIRIA C532D Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors.

7.6.2 Operational Phase

All new drainage on site will be pressure tested and have a CCTV survey carried out prior to being made operational. All fuel tanks will be required to be double bunded and leak detection measures to be put in place to prevent any accidental discharge.

A petrol interceptor will be used to capture any pollutants arising from vehicles in the car park.

7.5.3 'Do Nothing' Scenario

As there will be no impact on soils and geology if the development does not proceed, no measures are proposed.

7.7 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

This section describes the predicted impact of the proposed development following the implementation of the mitigation measures.

7.7.1 Construction Phase

There are no predicted significant soils and geology impacts arising from the proposed construction of the development. The remedial measures indicated will ensure that the soils and geology environment is not adversely impacted during construction operations. There is minimal built form in the proposal, which consists mainly of an upgrade to and improved management of existing trails.

7.7.2 Operational Phase

There are no predicted significant impacts for soils and geology arising from the proposed operation of the new development. The proposed development seeks to make efficient use of an existing amenity with significantly improved management and maintenance of this recreational land.

7.7.3 'Do Nothing' Scenario

If the proposed development does not proceed, the site will remain as a popular tourist woodland hillside amenity.

7.8 RESIDUAL IMPACT AND PROPOSED MONITORING

Monitoring during construction will consist of the following:

- Quality control and inspection of the works during excavation of materials down to an acceptable bearing stratum;
- Adherence to the Construction and Environmental Management Plan (CMP);
- All excavations will be visually assessed for signs of possible contamination such as staining or strong odours;
- Review of any water encountered during excavation.

7.9 CUMULATIVE IMPACTS

Cumulative impacts to the hydrogeology and geology due to the proposed development with those of previous developments, current developments in planning and proposed future developments which are reasonably foreseeable were assessed. No cumulative impacts are predicted to the hydrogeology or geology of the area due to the scale of the works and the implementation of effective environmental control measures.

7.10 MAJOR ACCIDENTS AND NATURAL DISASTERS, CLIMATE CHANGE AND NATURAL RESOURCES

It is considered unlikely that the proposed development will result in an increased risk of major accidents or disasters. The risk of significant effects to Soils, Geology or Hydrogeology arising from major accident or natural disaster at the site from the proposed development are considered highly unlikely and indeterminable.

Impacts on climate change during the construction and operational phases are considered to be imperceptible and therefore no residual impacts are predicted. There will be no negative residual impact on Natural Resources as a result of the proposed development.

8.0 WATER AND HYDROLOGY

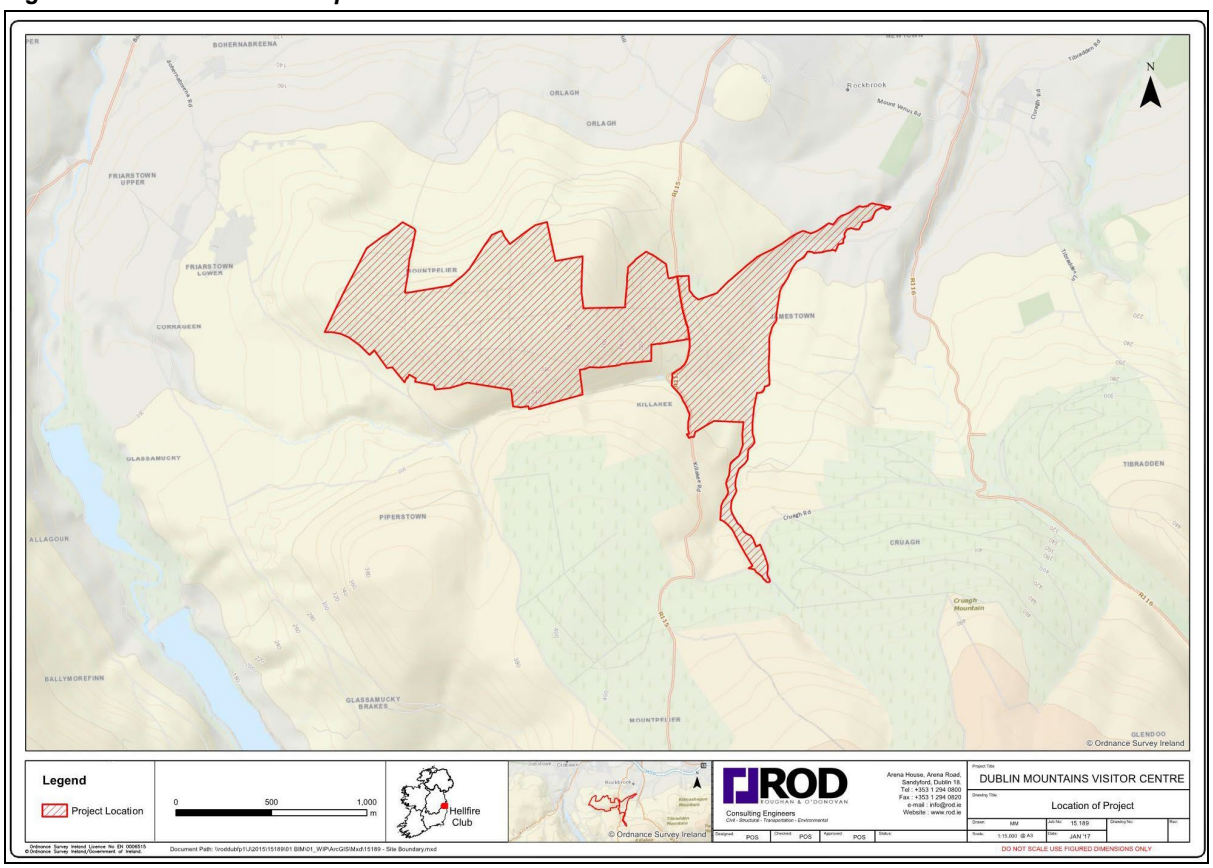
8.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) assesses the hydrological impacts of the proposed construction and operational activities of the proposed visitor centre, car park and circulation roads at the Hell Fire Club, Dublin. The chapter sets out the methodology used in the assessment (Section 8.2), describes the existing hydrological environment (Section 8.3), describes the proposed development (Section 8.4), details the likely significant hydrological impacts associated with the construction and operational phase of the proposed development (Section 8.5), describes remedial and mitigation measures (Section 8.6) and details residual impacts post mitigation (Section 8.7) and proposed monitoring (Section 8.8). No difficulties were encountered during the preparation of this chapter.

This Chapter was prepared by Andrew Thomson of Roughan & O'Donovan Consulting Engineers. Andrew is a highly qualified Chartered Engineer with over 15 years practical experience. Andrew has an Honours degree in Civil Engineering from Trinity College Dublin, as well as a degree in general engineering also. In 2001, Andrew completed a PhD in Structural Engineering. Andrew became a Chartered Member of the Institute of Engineers of Ireland in 2005. In 2009, Andrew completed a Higher Diploma in Project Management, obtaining a second class honours qualification.

The location of the proposed development is presented in Figure 8.1.

Figure 8.1 Site Location Map



8.2 METHODOLOGY

The assessment of the potential hydrological impacts of the proposed construction and operational activities was carried out according to best practice and the methodology specified in the following guidance documents.

- Environmental Protection Agency Guidelines on the Information to be contained in Environmental Impact Statements (2002);
- Environmental Protection Agency Advice Notes on Current Practice in the Preparation of EIS (2003);
- Draft Environmental Protection Agency Guidelines on the Information to be Contained in Environmental Impact Statements, Draft (2017~~5~~);
- Draft Environmental Protection Agency Advice Notes on Current Practice in the preparation of Environmental Impact Statements, Draft (2015).
- DoEHLG (Nov 2009) Flood Risk Management and the Planning System Guidance document.

Additional sources of information were also consulted. Acquisition and compilation of all available regional information on the hydrology aspects of the study area, including:

- Interrogation of the Geological Survey of Ireland's (GSI) online mapping service, national well databases and groundwater body descriptions;
- Examination of the Office of Public Works (OPW) online flood and hydrometric mapping service;
- Examination of the Water Framework Directive River Basin Management Plans;
- Examination of the Environmental Protection Agency's online hydrological and land use mapping service;
- Identification of possible karst features on OSI 1:50,000 and 1:10,560 scale maps and aerial photography;
- A walkover survey of the entire site; and
- Consultation with statutory bodies.

8.3 EXISTING ENVIRONMENT

A detailed description of the site is provided in Chapter 2 of this EIAR. This section provides information on the existing local and regional hydrological environment

The topography on the site is steep with a level of 302.0m OD (Malin) at the proposed visitor centre and a level of 262.0m OD (Malin) at the existing entrance. There is a steep fall to the east from the Hell Fire Club to the Massy Estate. Surface water run-off is directed eastward, following the slope of the hill, to the R115 Killakee Road and to the north of the Massy Estate catchment area before flowing to an open stream known as the Glendoo Brook. This river flows through Massy's Wood at the eastern boundary of the site. It is a tributary of the Owendoher River which discharges into the River Dodder adjacent to Bushy Park.

~~Inland Fisheries Ireland have indicated that the Owendoher is the most important nursery and recruitment tributary in the Dodder system, as identified in Chapter 6 Biodiversity of this EIAR. Chapter 6 of the EIAR indentifies the Glendoo Brook as a Key Ecological Receptor.~~

~~Chapter 6 of the EIAR also describes various Natura 2000 sites and Proposed Natural Heritage Areas (pNHAs) within the Zone of Influence. There is one pNHA within the Zone of Influence; the Glenasmole Valley pNHA (Site Code: 001209) located c. 1.5 km to the west of the site. The nature of the works in~~

~~combination with their proximity and lack of hydrological connectivity to the Glenasmole Valley pNHA meant that this site was not considered as a Key Ecological Receptor in its own right. This Appropriate Assessment Screening report objectively concluded that the proposed development would not be likely to have significant effects on the Conservation Objectives or ecological integrity of any European site.~~

8.3.1 Hydrological Setting

The site falls into the Rockbrook Catchment (IE_EA_09_1866) under the EU Water Framework Directive. This is part of the Owendoher & River Dodder Catchment. The nearest identified stream is in the Massy Estate to the east of the site. This is known locally as the Glendoo Brook. This stream flows in a north easterly direction for approximately 3 km before discharging in to the Owendoher River.

Under the EU Water Framework Directive, each of the river basin districts prepared a review of the status of the waterways and a risk assessment of potential pressures on the water body. The overall status of the Rockbrook Catchment is Moderate and the overall risk is 2a (Probably Not At Risk).

Details of the Water Framework Directive risk assessments and quality status for the Rockbrook Catchment are given in Table 8.1.

Table 8.1 Water Frameworks Directive (WFD) Risk Tests

Risk Report

Water Management Unit:	IE_EA_Dodder
WaterBody Category:	River Waterbody
WaterBody Name:	Rockbrook
WaterBody Code:	IE_EA_09_1866
Overall Risk Result:	2a Probably Not At Risk
Heavily Modified:	No

	Risk Test Description		Risk
	Diffuse Risk Sources		
RD1	EPA diffuse model (2008)	2b	Not At Risk
RD2a	Road Wash - Soluble Copper	2b	Not At Risk
RD2b	Road Wash - Total Zinc	2b	Not At Risk
RD2c	Road Wash - Total Hydrocarbons	2b	Not At Risk
RD3	Railways	2b	Not At Risk
RD4a	Forestry - Acidification (2008)	2a	Probably Not At Risk
RD4b	Forestry - Suspended Solids (2008)	2b	Not At Risk
RD4c	Forestry - Eutrophication (2008)	2a	Probably Not At Risk
RD5	Overall Unsewered (2008)	2b	Not At Risk
RD5a	Unsewered Areas - Pathogens (2008)	2a	Probably Not At Risk
RD5b	Unsewered Phosphorus (2008)	2b	Not At Risk
RD6a	Arable	2b	Not At Risk
RD6b	Sheep Dip	2b	Not At Risk
RD6c	Forestry - Dangerous Substances	2a	Probably Not At Risk
RDO	Diffuse Overall -Worst Case (2008)	2a	Probably Not At Risk
	Hydrology		
RHY1	Water balance - Abstraction	2b	Not At Risk
	Morphological Risk Sources		
RM1	Channelisation (2008)	2b	Not At Risk
RM2	Embankments (2008)	2b	Not At Risk
RM3	Impoundments	2b	Not At Risk
RM4	Water Regulation	2b	Not At Risk
RM5	Intensive Landuse		N/A
RMO	Morphology Overall - Worst Case (2008)	2b	Not At Risk
	Overall Risk		
RA	Rivers Overall - Worst Case (2008)	2a	Probably Not At Risk
	Point Risk Sources		
RP1	WWTPs (2008)	2b	Not At Risk
RP2	CSOs	2b	Not At Risk
RP3	IPPCs (2008)	2b	Not At Risk
RP4	Section 4s (2008)	2b	Not At Risk
RP5	WTPs/Mines/Quarries/Landfills		N/A
RPO	Overall Risk from Point Sources - Worst Case (2008)	2b	Not At Risk
	Q Value		
Q	EPA Q rating and Margaritifera Assessment		N/A
	Q/RDI or Point/Diffuse		
QPD	Q class/EPA Diffuse Model or worst case of Point and Diffuse (2008)	2a	Probably Not At Risk
	Rivers Direct Impacts		
RDI1	Rivers Direct Impacts - Dangerous Substances		N/A

The objective of the water management body is to restore an overall ecological status of 'good quality' by 2021.

The EPA mapping tool shows that the Water Framework Directive has a River Waterbody Approved Score of 'At risk' for the Rockbrook Waterbody (also known as the Glendoo Brook). However, it has a River Waterbody Score of 'Expected to achieve good status'.

The study area is not serviced by a mains water supply. There are no historic wells identified within the national well database compiled by the GSI.

The site is not located within a zone of contribution and/or groundwater source protection area for any public groundwater supply source.

River water quality in Ireland has traditionally been assessed on the basis of macroinvertebrate community composition in association with aquatic plants (macrophytes and algae) and water chemistry. The EPA carries out quality assessments on rivers and streams under the Q-rating system (Q-values). Q-ratings range from 1 – 5 with good quality indicated by Q5, Q4-5 and Q4 and poor quality Q1.

There are no EPA monitoring stations within the Rockbrook catchment, however, there is one sampling point along an adjacent tributary to the Owendoher River approximately 1km to the east of the Massy Estate (Station Code RS09O11100).

Details of the EPA sampling programme indicate clean waters for the Owendoher River, as shown in Table 8.2 below.

Table 8.2 Environmental Protection Agency Q Rating Monitoring

OWENADOHER **09O01**

Date Surveyed (last survey year only): 09/09/16

Biological Quality Rating (Q Values)

Station Code	1988	1991	1996	1998	2002	2005	2007	2010	2013	2016
RS09O011100	5	4-5	4-5	4-5	4	4-5	4-5	4	4	4
RS09O011300	4-5	4	4-5	3-4*	4	3/0	3	4		
RS09O011700	4	3/0	3	1/0	3-4	3	3-4	3-4	3-4	4

Most Recent Assessment:

The Owenadoher River at station 1100 was in a satisfactory condition (Q4) in September 2016. A welcome improvement to satisfactory ecological condition (Q4) was noted in the lowermost reaches (1700), the first time since 1988.

Station Details

Station Code	Station Location	WFD Waterbody Code	Easting	Northing	Local Authority
RS09O011100	Br SW of Delamaine Cottage	IE_EA_09O011700	313411	224053	South Dublin County Council
RS09O011300	Scholarstown Road Br	IE_EA_09O011700	313591	226942	South Dublin County Council
RS09O011700	Br u/s Dodder R confl	IE_EA_09O011700	314144	228977	South Dublin County Council

Q4: Good Quality
Q3-4 Moderate Quality

8.4 PROPOSED DEVELOPMENT

Chapter 2 of the EIAR contains a full description of the proposed development.

The construction of the new visitor centre, car park and circulation roads creates a new hardstanding area of approximately 12,000 m^2 within the site and will result in increased volume of vehicles and an increased volume of foul / waste water generated on the site.

Although the car park is increasing in size, a portion of this is to facilitate the cars that currently park on the roadside.

Surface water run-off from the development will be collected and stored on site prior to being discharged to an open stream to the east of the site. Ponds, swales and streams will be used to reduce flow from the impermeable areas and to store the run off. Permeable paving is proposed for areas of new car parking for storage and filtration only prior to discharge to the surface water system.

Water is proposed to be supplied from a new mains system and no surface water harvesting is proposed for the development.

Some fuel storage will be required on site for the provision of generators in the event of power loss for the development.

8.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

This section identifies potential impacts of the construction and operational phases of the development on the surrounding hydrology in the study area.

8.5.1 Construction Phase

During the construction phase there will be a number of personnel based on site who will require canteen and toilet facilities, which will discharge to the new foul drainage system via a temporary connection. At no time during construction will foul sewerage be allowed to discharge to surface water.

There are a number of potential impacts to surface water from the construction stage of the project. These include:

- Ground excavation solids;
- Accidental spillage of hydrocarbons from the construction plant;
- Foul waste from contractor's welfare facilities if not properly contained on site;
- Waste from cementitious products and other construction debris;
- Ground water from surface excavations;
- Vehicle wheel wash water;
- Inappropriate handling and storage of materials and waste.

The magnitude of these potential contaminants is dependent on the site management practices during the works. The contractor will be required to submit and implement a construction management plan detailing surface water management strategy during the works. This process will also be consistent with the Outline Construction and Traffic Management Plan, which is submitted separately as part of the Planning process.

During the construction of the development there will be an increase in hard standing areas. This may affect the permeability of the site and will result in additional surface water runoff of 792 cu. m in the 1 in 100 year event to the Glendoo Brook in the Massy Estate to the east of the site.

There are no predicted significant impacts arising from the proposed development. This is due to the relatively small scale and temporary nature of the construction activities and the expected use of temporary facilities by a competent contractor.

8.5.2 Operational Phase

During the operational phase of the development the following potential risks to surface water have been identified:

- Accidental spillage of hydrocarbons from the visitor centre café / restaurant;
- Accidental spillage of hydrocarbons from the car park;
- Foul waste and surface water discharging to ground through leakage in the drainage systems.

8.5.3 'Do Nothing' Scenario

If the proposed development does not proceed, there will be no additional impacts to the existing hydrology aspects of the site.

Along with the existing car park, a large number of cars park on the existing road. There are currently no measures in place to control spillages of pollutants.

8.6 REMEDIAL AND MITIGATION MEASURES

Mitigation measures follow the principles of avoidance, reduction and remedy. The most effective measure of avoidance is dealt with during the site selection and design stage, by ensuring that the development does not traverse or come in close proximity to sensitive hydrological attributes.

Where avoidance of the feature has not been possible, consideration has been given to locally modify the proposed development so as to reduce / minimise the extent of the impact. If any modifications are proposed to reduce hydrological impacts, it is necessary to also consider any associated impacts to the hydrological and ecological regimes.

8.6.1 Construction Phase

Bunded storage units for oil/fuel/hydrocarbons/chemical are to be provided on impermeable surfaces with a minimum 110% capacity. There will be designated refuelling points selected which will be located on hard standing areas with no pathway to the surface water drainage system. Oil interceptors will be provided in order to prevent runoff of pollutants to the river. The use of interceptors will be in compliance with Pollution Prevention Guidelines (PPG) 3. No detergents will be discharged to interceptors as this practice renders the interceptor useless. A designated vehicle wash down area will be identified with consideration to drainage arrangements and will be located away from surface water discharge point. Wash water will be collected and contained for disposal off site. Concrete washout will not be permitted to enter the surface water system. All new drainage systems will require pressure testing by the contractor and a CCTV survey to discover any possible defects.

The surface water drainage system will be developed as part of the works with sufficient storage capacity for any additional runoff.

A new surface water drainage system has been designed to cater for the new hardstanding areas additional surface water runoff of 792 cu. m in the 1 in 100 year event. Runoff will be stored on site with an allowable outflow of 2 l/s/ha and to limit the flow into the open stream in the Massy Estate. The existing site has a low permeability and runoff from the non-hardstanding areas currently flows into the stream.

Construction activities will take cognisance of the following guidance documents for construction work on, over or near water.

- CIRIA C532D Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors;
- CIRIA C648 Control of water pollution from linear construction projects: technical guidance~~.Control of Water Pollution from Constructional Sites.~~
- Guidelines for the Crossing of Watercourses during the Construction (TII, 2008);
- Adherence to the contractor's Construction Management Plan; and,
- Adherence to the ~~Optional~~ Outline Construction and Traffic Management Plan that is submitted separately as part of the Planning process.

8.6.2 Operational Phase

All new drainage on site will be pressure tested and have a CCTV survey carried out prior to being made operational. All fuel tanks will be required to be double bunded and leak detection measures to be put in place to prevent any accidental discharge.

A petrol interceptor will be used to capture any pollutants arising from vehicles in the car park.

A range of mitigation measures have been proposed for the operational phases of the project. These measures, as detailed on the drawings DMVC-ROD-C-DR-XX-ZO-0030-32, seek to ensure that all discharges from the development are controlled to prevent impacts to receiving systems.

8.5.3 'Do Nothing' Scenario

As there will be no impact on hydrology and water quality if the development does not proceed, no measures are proposed.

8.7 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

8.7.1 Construction Phase

There are no predicted significant impacts arising from the proposed development. This is due to the relatively small scale and temporary nature of the construction and the expected use of temporary facilities by a competent contractor.

8.7.2 Operational Phase

A range of mitigation measures have been proposed for the operational phases of the project. These measures, as detailed on the drawings, seek to ensure that all discharges from the development are controlled to prevent impacts to receiving systems.

8.7.3 'Do Nothing' Scenario

If the proposed development does not proceed, there will be no additional impacts to the existing hydrology and hydrological aspects of the site.

8.8 RESIDUAL IMPACT AND PROPOSED MONITORING

There are no predicted residual impacts expected due to the construction or operation of the proposed visitor centre, car park and circulation roads once the identified mitigation measures are implemented.

Monitoring during construction will consist of the following:

- Normal quality control inspection of the works during excavation of materials down to acceptable bearing stratum;
- All excavations will be visually assessed for signs of possible contamination such as staining or strong odours;
- Review of any water encountered during excavation.

8.9 CUMULATIVE IMPACTS

Cumulative impacts to the hydrology due to the proposed development with those of previous developments, current developments in planning and proposed future developments which are reasonably foreseeable were assessed. No cumulative impacts are predicted to the hydrology of the area due to the scale of the works and the implementation of effective environmental control measures.

8.10 MAJOR ACCIDENTS AND DISASTERS, CLIMATE CHANGE AND NATURAL RESOURCES

It is considered unlikely that the proposed development will result in an increased risk of major accidents or disasters. The risk of significant effects to Water or Hydrology arising from major accident or natural disaster at the site are considered highly unlikely and indeterminable.

Impacts on climate change during the construction and operational phases are considered to be imperceptible and therefore no residual impacts are predicted. There will be no negative residual impact on Natural Resources as a result of the proposed development.

9.0 AIR, NOISE AND VIBRATION

9.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) assesses the air, noise and vibration impacts of the proposed construction and operational activities of the proposed visitor centre at the Hell Fire Club, Dublin. The chapter sets out the methodology used in the assessment (Section 9.2), describes the existing environment (Section 9.3), details the likely significant impacts associated with the construction and operational phase of the proposed development (Section 9.4), describes mitigation measures (Section 9.5) and details residual impacts post mitigation and proposed monitoring (Section 9.6). No difficulties were encountered during the preparation of this chapter.

The location of the proposed development is presented in Figure 9.1.

Figure 9.1 Site Location Map

9.2 METHODOLOGY

The assessment of the potential impact to the air and noise climate was undertaken by a specialist sub-consultant AWN Consulting. A copy of their report is provided in Volume 2 of the EIAR, Section 9 Appendices. The traffic noise impact assessment was carried by Stephen Smyth. Stephen is an Associate with AWN Consulting specialising in Architectural Acoustics, 3D Acoustic Modelling and Environmental Noise. Stephen holds a Bachelor's Degree and Doctorate in Mechanical Engineering and is a member of both Engineers Ireland (IEI) and the Institute of Acoustics (IoA). His Doctorate, funded by the Irish Research Council for Science, Engineering and Technology, was in the field of environmental acoustics and in particular was a study of the noise generated by friction between a rolling tyre and the road using Nearfield Acoustic Holography.

Since joining AWN Consulting in 2007 as an Acoustic Consultant, Stephen has gained experience in a wide variety of acoustic projects including the noise assessment of infrastructure development, noise mapping and action planning and large number of environmental and architectural acoustic assessments. Stephen has also been involved in delivering the Institute of Acoustics Diploma in Acoustics and Noise Control by giving tutorials as part of the distance learning centre in Dublin, Ireland. He has also been part of the project team aiding the Environmental Protection Agency in Ireland to deliver the requirements of the European Noise Directive and has provided input into the preparation of several publications on noise guidance in Ireland.

An environmental noise survey was conducted in general accordance with ISO 1996: 2007: *Acoustics – Description, measurement and assessment of environmental noise.* The results of this survey were benchmarked against Section 3 of the UK's *Design Manual for Roads and Bridges* (DMRB) Volume 11 which provides guidance on assessing the magnitude of impacts associated with changes in road traffic noise.

The predicted increase in noise level has been calculated in accordance with the approach outlined in the Calculation of Road Traffic Noise (CRTN) which is the preferred calculation methodology for assessing road traffic noise in Ireland.

In order to provide context for evaluating the potential impacts of the additional traffic as a result of the proposed development, the UK's Design Manual for Roads and Bridges, Volume 11, Section 2 provided guidance on assessing the magnitude of impacts associated with changes in road traffic noise. The document suggests that during the year of opening, the magnitude of impacts between the Do Minimum and the Do Something scenarios are likely to be greater compared to the longer term when people become more immune to the source. In order to assess the magnitude of impacts during the initial opening of the road, therefore, the change in noise levels between the two scenarios for the year of opening are compared and categorised in line with Table 9.1 below.

Table 9.1 Classification of Magnitude of Noise Impacts in the Short Term

Noise Change [dB(A)]	Magnitude of Impact
0	No Change
01-0.9	Negligible
1-2.9	Minor
3-4.9	Moderate
5+	Major

Attended measurements were made using an Bruel & Kjaer 2250 Sound Level Meter over sample periods of 15-minutes. A Brüel & Kjær Type 4231 Sound Level Calibrator was used before and after the survey to ensure the measurement instrument was calibrated.

The UK Design Manual for Roads and Bridges (DMRB) guidance (UK Highways Agency 2007), on which Transport Infrastructure Ireland guidance is based, states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in a local air quality assessment:

- Road alignment change of 5 metres or more;
- Daily traffic flow changes by 1,000 AADT or more;
- HGVs flows change by 200 vehicles per day or more;
- Daily average speed changes by 10 km/h or more; or
- Peak hour speed changes by 20 km/h or more.

The proposed development causes changes to traffic / roads less than the criteria indicated above, this is not considered to have a significant impact on local air quality and therefore, no detailed study is required.

9.3 EXISTING ENVIRONMENT

A detailed description of the site is provided in Chapter 2.

The existing noise climate along the R115 Killakee Road was found to be dominated by road traffic. A detailed description of the road traffic can be found in the Traffic Impact Assessment which is submitted as a separate planning document.

9.4 PROPOSED DEVELOPMENT

Chapter 2 of the EIAR contains a full description of the proposed development. This section provides information on the characteristics of the proposed development with regard to air quality and noise.

The new visitor centre and car park are the main construction aspects of the development that will require civil / construction works and the operation of the construction plant. The development is a tourist facility that is anticipated to attract approximately 300,000 visitors per year.

9.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

An analysis of the potential impacts of the proposed development on air and noise environment during the construction and operation is outlined in this section.

9.5.1 Construction Phase

During the construction phase of the works, there will be a small increase in general traffic noise from construction traffic. However, this is considered negligible in the overall context of the current traffic volumes and predicted traffic levels.

There will also be noise and air impacts form the construction work itself including but not limited to excavations works and rock breaking. This may in turn lead to an increase in dust from the construction works.

9.5.2 Operational Phase

Traffic flow date for the peak hour period, which is determined to be mid-afternoon on a Sunday, have been assessed and the calculated change in noise levels during the period is summarised in Table 9.2. The predicted increase in noise level has been calculated in accordance with the approach outline the Calculation of Road Traffic Noise (CRTN) which is the preferred calculation methodology for assessing road traffic noise in Ireland.

Making reference to Table 9.1, it can be seen that the proposed development is expected to have a negligible impact on the noise environment.

Table 9.1 Peak Hour Traffic Volumes

Road	Opening Year Peak Hour		
	Without development	With Development	Change In Noise Level dB(A)
Killakee Road	244	300	+0.9

9.5.3 'Do Nothing' Scenario

In the event that the development does not proceed, it is still predicted that the traffic volume will rise in the area in line with the traffic impact assessment and hence the potential impacts of the 'do nothing' scenario are identical to the operational phase.

9.6 REMEDIAL AND MITIGATION MEASURES

9.6.1 Construction Phase

Air and noise impacts from the construction works will be mitigated via the following measures to be incorporated in the Works Requirements

- Appointment of competent contractor and use of standard construction practices;
- Noise and vibration monitoring at key receptors and along neighbouring property boundaries;
- The contractor will be required to use off-site parking and provide shuttle service to the site;
- Construction will be limited to 07:00-19:00 Monday to Friday and 08:00-13:00 on Saturday. No works will be allowed to take place on Sundays and bank holiday weekends which are the busiest times at the Hellfire Club.

In addition, the car park and building levels have been carefully chosen to prevent significant rock and ground excavation

9.6.2 Operational Phase

The change in traffic volume is not considered to have a significant impact on the local air quality and therefore no remedial measures are proposed.

As per the Traffic Noise Impact Assessment prepared by AWN, the proposed development will have a negligible impact on the existing noise environment as a result of additional road traffic, therefore, no mitigation measures are considered during the operational phase.

9.6.3 'Do Nothing' Scenario

In the event that the development does not proceed, it is still predicted that the traffic volume will rise in the area in line with the traffic impact assessment. However, no further

9.7 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

The future traffic volumes associated with the development are not expected to increase the existing noise levels by any noticeable amount. Furthermore, given that the existing noise climate along Killakee Road is dominated by road traffic movement, the proposed development will not alter the existing soundscape.

9.8 RESIDUAL IMPACT AND PROPOSED MONITORING

As noted above, there are no significant changes predicted to the existing noise soundscape from the development. During the construction phase, noise and vibration monitoring is proposed at key receptors and along neighbouring property boundaries.

9.9 CUMULATIVE IMPACTS

Cumulative impacts to the air and noise environment due to the proposed development with those of previous developments, current developments in planning and proposed future developments which are reasonably foreseeable were assessed. No cumulative impacts are predicted to the air and noise environment of the area due to the scale of the works and the implementation of effective environmental control measures.

9.10 MAJOR ACCIDENTS AND DISASTERS, CLIMATE CHANGE AND NATURAL RESOURCES

It is considered unlikely that the proposed development will result in an increased risk of major accidents or disasters. The risk of significant effects to Air, Noise and Vibration arising from major accident or natural disaster at the site are considered highly unlikely and indeterminable.

Impacts on climate change during the construction and operational phases are considered to be imperceptible and therefore no residual impacts are predicted. The impact of the proposed development on climate change, through greenhouse gas emissions either directly or indirectly is considered insignificant as the building works associated with the project will be constructed to NZEB standards. The proposed development is not considered vulnerable to future changes in climate and has the capacity to adapt to the future impacts of climate change. There will be no negative residual impact on Natural Resources as a result of the proposed development..

10.0 LANDSCAPE AND VISUAL RESOURCES

10.1 INTRODUCTION

~~This chapter has been prepared by Declan O'Leary B.Agr.Sc (Land Hort), Post Grad Dip Landscape Architecture MILI, CMLI, of Cunnane Stratton Reynolds Ltd.~~ This chapter has been prepared by Declan O'Leary B.Agr.Sc. Landscape Horticulture, (University College, Dublin) 1986, Post Graduate Diploma Landscape Architecture (University of Central England) 1993, Chartered Landscape Architect, MLI (UK) 1994, Member of the Irish Landscape Institute MILI 1997.

Declan has over 30 years' experience in development, landscape design, urban and environmental renewal. This includes masterplanning and design to implementation of a broad range of strategic environmental improvement schemes to industrial, highway and urban regeneration sites as well as reclamation, amenity, rural/countryside, educational and housing projects. He is experienced in working closely with developers, community organisations and statutory agencies to deliver local environmental, social and economic development.

The Landscape and Visual Impact Assessment (LVIA) was informed by a desktop study and a survey of the site and receiving environment in April 2017 and a familiarisation with the project since inception.

The report identifies and discusses the landscape and visual constraints and opportunities in relation to the proposed development of a forest and cultural heritage park with visitor facilities, located on the eastern flank of Montpelier Hill, to the south of the Woodlawn and Rockbrook areas in South Dublin. There were no issues encountered in the formation of this chapter.

10.2 METHODOLOGY

10.2.1 Definition of Landscape

Ireland is a signatory to the European Landscape Convention (ELC). The ELC defines landscape as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'. This definition is important in that it expands beyond the idea that landscape is only a matter of aesthetics and visual amenity. It encourages a focus on landscape as a resource in its own right - a shared resource providing a complex range of cultural, environmental and economic benefits to individuals and society.

As a cultural resource the landscape functions as the setting for our day-to-day lives, also providing opportunities for recreation and aesthetic enjoyment and inspiration. It contributes to the sense of place experienced by individuals and communities and provides a link to the past as a record of historic socio-economic and environmental conditions. As an environmental resource the landscape provides habitat for fauna and flora. It receives, stores, conveys and cleans water, and vegetation in the landscape stores carbon and produces oxygen. As an economic resource the landscape provides the raw materials and space for the production of food, materials (e.g. timber, aggregates) and energy (e.g. carbon-based fuels, wind, solar), living space and for recreation and tourism activities.

10.2.2 Forces for Landscape Change

Landscape is not unchanging. Many different pressures have progressively altered familiar landscapes over time and will continue to do so in the future, creating new landscapes. For example, within the receiving environment, the parkland of Montpelier Hill has changed

dramatically over the centuries, from wilderness surrounding sacred passage tombs, to agriculture and commercial forestry with recreational amenities.

Many of the drivers for change arise from the requirement for development to meet the needs of a growing population and economy. The concept of sustainable development recognises that change must and will occur to meet the needs of the present, but that it should not compromise the ability of future generations to meet their needs. This involves finding an appropriate balance between economic, social and environmental forces and values.

The reversibility of change is an important consideration. If change must occur to meet a current need, can it be reversed to return the resource (in this case, the landscape) to its previous state to allow for development or management for future needs.

10.2.3 Guidance

Landscape and Visual Impact Assessment (LVIA) is a tool used to identify and assess the significance of and the effects of change resulting from development on both the landscape as an environmental resource in its own right and on people's views and visual amenity.

The methodology for assessment of the landscape and visual effects is informed by the following key guidance documents:

- Guidelines for Landscape and Visual Impact Assessment, 3rd Edition 2013, published by the UK Landscape Institute and the Institute of Environmental Management and Assessment (hereafter referred to as the GLVIA);
- Guidelines on the Information to be Contained in Environmental Impact Statements, 2002, published by the Environmental Protection Agency (and the Revised Guidelines on the Information to be Contained in Environmental Impact Statements, Draft 2015).

10.2.3.1 Key Principles of the GLVIA

Use of the Term 'Effect' vs 'Impact'

The GLVIA advises that the terms 'impact' and effect' should be clearly distinguished and consistently used in the preparation of an LVIA.

'Impact' is defined as the action being taken. In the case of the Dublin Mountains Visitor Centre development, the impact would include the construction of the visitor centre, improved road access to the site; an expanded parking area and an improved network of trails, including a footbridge over the R115 linking the Hellfire and Massy's Wood forests. In addition, there is also the localised change on the Hellfire property from the existing commercial forestry plantation, and the works required to facilitate this change.

'Effect' is defined as the change or changes resulting from those actions, e.g. a change in landscape character, or changes to the composition, character and quality of views in the receiving environment. This report focusses on these effects.

10.2.3.2 Assessment of Both 'Landscape' and 'Visual' Effects

Another key distinction to make in a LVIA is that between landscape effects and the visual effects of development.

'Landscape' results from the interplay between the physical, natural and cultural components of our surroundings. Different combinations of these elements and their spatial distribution create distinctive character of landscape in different places. 'Landscape character assessment' is the method used in LVIA to describe landscape, and by which to understand the potential effects of a development on the landscape as 'a resource'. Character is not just about the physical elements and features that make up a landscape, but also embraces the aesthetic, perceptual and experiential aspects of landscape that make a place distinctive.

Views and 'visual amenity' refer to the interrelationship between people and the landscape. The GLVIA prescribes that effects on views and visual amenity should be assessed separately from landscape, although the two topics are inherently linked. Visual assessment is concerned with changes that arise in the composition of available views, the response of people to these changes and the overall effects on the area's visual amenity.

10.2.4 Methodology

In Section 10.5 of this report the landscape effects of the development are assessed. The nature and scale of changes to the landscape elements and characteristics are identified, and the consequential effect on landscape character and value are discussed. Trends of change in the landscape are taken into account. The assessment of significance of the effects takes account of the sensitivity of the landscape resource and the magnitude of change to the landscape which resulted from the development.

Sensitivity of the Landscape Resource

The sensitivity of the landscape is a function of its land use, landscape patterns and scale, visual enclosure and the distribution of visual receptors, and the value placed on the landscape. The nature and scale of the development in question is also taken into account. For the purpose of assessment, five categories are used to classify the landscape sensitivity of the receiving environment.

Table 10.1 Categories of Landscape Sensitivity

Sensitivity	Description
Very High	Areas where the landscape exhibits a very strong, positive character with valued elements, features and characteristics that combine to give an experience of unity, richness and harmony. The character of the landscape is such that its capacity for accommodating change in the form of development is very low. These attributes are recognised in landscape policy or designations as being of national or international value and the principle management objective for the area is protection of the existing character from change.
High	Areas where the landscape exhibits strong, positive character with valued elements, features and characteristics. The character of the landscape is such that it has limited/low capacity for accommodating change in the form of development. These attributes are recognised in landscape policy or designations as being of national,

	regional or county value and the principle management objective for the area is conservation of the existing character.
Medium	Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong or has evidence of alteration to / degradation / erosion of elements and characteristics. The character of the landscape is such that there is some capacity for change in the form of development. These areas may be recognised in landscape policy at local or county level and the principle management objective may be to consolidate landscape character or facilitate appropriate, necessary change.
Low	Areas where the landscape has few valued elements, features or characteristics and the character is weak. The character of the landscape is such that it has capacity for change; where development would make no significant change or would make a positive change. Such landscapes are generally unrecognised in policy and where the principle management objective is to facilitate change through development, repair, restoration or enhancement.
Negligible	Areas where the landscape exhibits negative character, with no valued elements, features or characteristics. The character of the landscape is such that its capacity for accommodating change is high; where development would make no significant change or would make a positive change. Such landscapes include derelict industrial lands or extraction sites, as well as sites or areas that are designated for a particular type of development. The principle management objective for the area is to facilitate change in the landscape through development, repair or restoration.

Magnitude of Landscape Change

The magnitude of change is a factor of the scale, extent and degree of change imposed on the landscape with reference to its key elements, features and characteristics (also known as 'landscape receptors'). Five categories are used to classify magnitude of landscape change.

Table 10.2 Categories of Landscape Change

Magnitude of Change	Description
Very High	Change that is large in extent, resulting in the loss of or major alteration to key elements, features or characteristics of the landscape and/or introduction of large elements considered totally uncharacteristic in the context. Such development results in fundamental change in the character of the landscape.
High	Change that is moderate to large in extent, resulting in major alteration to key elements features or characteristics of the landscape and/or introduction of large elements considered uncharacteristic in the context. Such development results in change to the character of the landscape.
Medium	Change that is moderate in extent, resulting in partial loss or alteration to key elements features or characteristics of the landscape, and/or introduction of elements that may be prominent but not necessarily substantially uncharacteristic in the context. Such development results in change to the character of the landscape.
Low	Change that is moderate or limited in scale, resulting in minor alteration to key elements features or characteristics of the landscape, and/or introduction of elements that are not uncharacteristic in the context. Such development results in minor change to the character of the landscape.
Negligible	Change that is limited in scale, resulting in no alteration to key elements features or

	characteristics of the landscape key elements features or characteristics of the landscape, and/or introduction of elements that are characteristic of the context. Such development results in no change to the landscape character.

10.2.4.1 Significance of Effects

In order to classify the significance of effects (both landscape and visual), the predicted magnitude of change is measured against the sensitivity of the landscape/viewpoint, using the following guide. There are seven classifications of significance, namely: (1) imperceptible, (2) not significant, (3) slight, (4) moderate, (5) significant, (6) very significant, (7) profound.

Table 10.3 Guide to Classification of Significance of Landscape Effects

		Sensitivity of the Landscape Resource				
		Very High	**High**	**Medium**	**Low**	**Negligible**
Magnitude of Change	**Very High**	*Profound*	*Profound-Very Significant*	*Very Significant-Significant*	*Moderate*	*Slight*
	High	*Profound-Very Significant*	*Very Significant*	*Significant*	*Moderate-Slight*	*Slight-Not Significant*
	Medium	*Very Significant-Significant*	*Significant*	*Moderate*	*Slight*	*Not Significant*
	Low	*Moderate*	*Moderate-Slight*	*Slight*	*Not significant*	*Imperceptible*
	Negligible	*Slight*	*Slight-Not Significant*	*Not significant*	*Imperceptible*	*Imperceptible*

The matrix above is used as a guide only. The assessor also uses professional judgement informed by their expertise, experience and common sense, to arrive at a classification of significance that is reasonable and justifiable.

Landscape effects are also classified as adverse, neutral or beneficial. Development has the potential to improve the environment as well as damage it. In certain situations, there might be policy encouraging a type of change in the landscape, and if a development achieves the objective of the policy the resulting effect might be positive, even if the landscape character is profoundly changed.

10.2.5 Methodology for Visual Assessment

In Section 10.5 of this report the visual effects of the development are assessed. Visual assessment considers the changes to the composition of views, the character of the views, and the visual amenity experienced by visual receptors. The assessment is made for a number of viewpoints selected to represent the range of visual receptors in the receiving environment. The

significance of the visual effects experienced at these locations is assessed by measuring the viewpoint sensitivity against the magnitude of change to the view resulting from the development.

Table 10.4 Categories of Viewpoint Sensitivity

Sensitivity	Description
Very High	Iconic viewpoints - towards or from a landscape feature or area - that are recognised in policy or otherwise designated as being of national value. The composition, character and quality of the view are such that its capacity for accommodating change in the form of development is very low. The principle management objective for the view is its protection from change.
High	Viewpoints that that are recognised in policy or otherwise designated as being of value, or viewpoints that are highly valued by people that experience them regularly (such as views from houses or outdoor recreation features focussed on the landscape). The composition, character and quality of the view may be such that its capacity for accommodating compositional change in the form of development may or may not be low. The principle management objective for the view is its protection from change that reduces visual amenity.
Medium	Viewpoints representing people travelling through or past the affected landscape in cars or on public transport, i.e. viewing but not focused on the landscape.
Low	Viewpoints reflecting people involved in activities not focused on the landscape e.g. people at their place of work or engaged in similar activities such as shopping, etc. The view my present an attractive backdrop to these activities but is not regarded as an important element of these activities.
Negligible	Viewpoints reflecting people involved in activities not focused on the landscape e.g. people at their place of work or engaged in similar activities such as shopping where the view has no relevance or is of poor quality.

10.2.5.1 Magnitude of Change to the View

Classification of the magnitude of change takes into account the size or scale of the intrusion of development into the view (relative to the other elements and features in the composition, i.e. its relative visual dominance), the degree to which it contrasts or integrates with the other elements and the general character of the view, and the way in which the change will be experienced (e.g. in full view, partial or peripheral, or glimpses). It also takes into account the geographical extent of the change, the duration and the reversibility of the visual effects.

Five categories are used to classify magnitude of change to a view:

Table 10.5 Categories of Visual Change

Magnitude of Change	Description
Very High	Full or extensive intrusion of the development in the view, or partial intrusion that obstructs valued features or characteristics, or introduction of elements that are completely out of character in the context, to the extent that the development becomes the dominant element of the composition and defines the character of the view and the visual amenity.
High	Extensive intrusion of the development in the view, or partial intrusion that obstructs valued features, or introduction of elements that may be considered uncharacteristic in the context, to the extent that the development becomes co-dominant with other

	elements in the composition and affects the character of the view and the visual amenity.
Medium	Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity.
Low	Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity.
Negligible	Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.

10.2.5.2 Significance of Visual Effects

As for landscape effects, in order to classify the significance of visual effects, the magnitude of change to the view is measured against the sensitivity of the viewpoint, using the guide in Table 10.3 above.

10.2.6 Quality and Timescale

The predicted impacts are also classified as beneficial, neutral or adverse. This is not an absolute exercise; in particular, visual receptors' attitudes to development, and thus their response to the impact of a development, will vary. However, the methodology applied is designed to provide robust justification for the conclusions drawn. These qualitative impacts/effects are defined as:

- Adverse – Scheme at variance with landform, scale, and pattern. Would degrade, diminish or destroy the integrity of valued features, elements or their setting or cause the quality of the landscape(townscape)/view to be diminished;
- Neutral – Scheme complements the scale, landform and pattern of the landscape/view and maintains landscape quality;
- Beneficial – improves landscape/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses.

Impacts/effects are also categorised according to their longevity or timescale:

- Temporary – Lasting for one year or less;
- Short Term – Lasting one to seven years;
- Medium Term – Lasting seven to fifteen years;
- Long Term – Lasting fifteen years to sixty years;
- Permanent – Lasting over sixty years.

A statement is made as to the appropriateness of the proposed development based on the combined assessment of the predicted landscape and visual effects. This methodology, in accordance with the various guidelines for LVIA, results in a conclusion as to the appropriateness of the proposed development based on objective assessment of its likely landscape and visual impacts.

10.3 RECEIVING ENVIRONMENT

This section of the chapter looks at the planning policy context of the site, before describing the site and its environs**.** The site of the proposed development is Coillte's Hell Fire and Massy's Wood forest properties. The properties have a combined area of 152ha. The two properties are located on opposite sides of the R115 Killakee Road, on the eastern flank of Montpelier Hill, in the rural environment to the south of the Woodlawn and Rockbrook/Mountvenus areas in South Dublin. Thus, the site is situated on the threshold between the city and the rural environs.

See Relevant Locational, Context and Policy Maps in the EIAR Volume 2.

The following statutory and non-statutory documents are referenced in this section, owing to their relevance to the site location and its proposed development:

- South Dublin County Council Development Plan 2016 – 2022;
- Landscape Character Assessment of South Dublin County (2015)
- Dublin City Development Plan 2016-2022;
- Dun Laoghaire-Rathdown Development Plan 2016-2022;
- Dublin Mountain Partnership Strategic Plan.

10.3.1 Relevant Planning Policy

10.3.1.1 South Dublin County Council Development Plan (2016 – 2022)

The SDCC Development Plan contains a range of policies relevant to establishing the landscape values and sensitivities for the study area/and site environs. These are set out below.

Chapter 3 Community Infrastructure

C Policy 12 Open Space states: "*It is the policy of the Council that a hierarchical network of high quality open space is available to those who live, work and visit the County, providing for both passive and active recreation, and that the resource offered by public open spaces, parks and playing fields is maximised though effective management."*

Objectives of SDCC's Community Infrastructure policy include:

C12 Objective 1: "*To support a hierarchy of open space and recreational facilities based on settlement size and catchment."*

C12 Objective 3: *"To develop parks and open/green spaces that cater for the diverse needs of the County's population, in particular different age groups and abilities, through the facilitation of both active and passive recreational activities and universal access."*

C12 Objective 8: "*To retain lands with established recreational uses as open space unless proximate alternatives can be agreed by the Council."*

C12 Objective 13: "*To support and facilitate the provision of coffee shops at appropriate locations in parks in the County."*

Chapter 4 Economic Development & Tourism

It is the policy of the SDCC to develop tourism and increase visitor numbers to the county, and there are various objectives and actions to improve tourism potential, infrastructure and products in the county.

Objectives of SDCC's Economic Development & Tourism policy include:

ET Policy 5 states: "*It is the policy of the Council to support the development of a sustainable tourism industry that maximises the recreational and tourism potential of the County, through the implementation of the South Dublin Tourism Strategy 2015."*

ET5 Objective 1: "*To support the development of tourism infrastructure, attractions, activities and facilities at appropriate locations subject to sensitive design and environmental safeguards."*

ET5 Objective 3: *"To support the development of a visitor facility in or adjacent to the High Amenity – Dublin Mountains zone (HA-DM), subject to an appropriate scale of development having regard to the pertaining environmental conditions and sensitivities, scenic amenity and availability of services."*

ET Policy 6 states: "*It is the policy of the Council to support and facilitate the development of an integrated network of Greenways and Trails (combined off road cycle and walking routes) along suitable corridors, including natural linear open spaces such as river banks and canals, with local connections to villages and attractions and to take account of the environmental sensitivities along these corridors."*

ET6 Objective 1: *"To support and facilitate the development of an integrated network of Greenways and Trails, including blueways/water trails, along suitable corridors, including the River Liffey, Dublin Mountains Way, Grand Canal, River Dodder and Slade Valley."*

ET7 Objective 1: *"To promote the active use of managed forests for tourism and leisure related activities subject to an appropriate scale of development having regard to the pertaining environmental conditions and sensitivities, scenic amenity and availability of services."*

ET Policy 8 states: *"It is the policy of the Council to support the development of heritage, cultural and events tourism."*

ET8 Objective 1: "*To support the sensitive restoration of heritage buildings and sites and operate flexibility with regard to the use of converted buildings to facilitate heritage tourism."*

ET8 Objective 2: "*To support tourism projects that seek to showcase and promote the County's geological heritage and cultural heritage."*

ET Policy 9 states: *"It is the policy of the Council to support sustainable rural enterprises whilst protecting the rural character of the countryside and minimising environmental impacts."*

ET9 Objective 4: "*To support sustainable forestry development at suitable locations in the County, subject to the protection of the rural environment, sensitive areas and landscapes."*

Chapter 8 Green Infrastructure

Green infrastructure refers to an interconnected network of waterways, wetlands, woodlands, wildlife habitats, greenways, parks and conservation lands, commercial forests and other open spaces that adjoin and are threaded through urban areas. It supports native plants and animal species and provides corridors for their movement, maintains and enhances biodiversity and provides crucial amenity and recreational spaces for urban communities.

The CDP sets out SDCC's commitment to proactively promoting and developing Green Infrastructure and ecological connectivity in the County by requiring the retention and enhancement of substantial networks of biodiversity in urban and rural areas through a range of interrelated Policies and Objectives.

G Policy 1 Overarching: *"It is the policy of the Council to protect, enhance and further develop a multifunctional Green Infrastructure network by building an interconnected network of parks, open spaces, hedgerows, grasslands, protected areas, and rivers and streams that provide a shared space for amenity and recreation, biodiversity protection, flood management and adaptation to climate change".*

G1 Objective 1: "*To establish a coherent, integrated and evolving Green Infrastructure network across South Dublin County with parks, open spaces, hedgerows, grasslands, protected areas, and rivers and streams forming the strategic links and to integrate the objectives of the Green Infrastructure Strategy throughout all relevant Council plans, such as Local Area Plans and other approved plans".*

G2 Objective 1: *"To reduce fragmentation of the Green Infrastructure network and strengthen ecological links between urban areas, Natura 2000 sites, proposed Natural Heritage Areas, parks and open spaces and the wider regional Green Infrastructure network."*

G2 Objective 2: "*To protect and enhance the biodiversity value and ecological function of the Green Infrastructure network."*

G2 Objective 3: "*To restrict development that would fragment or prejudice the Green Infrastructure network."*

G2 Objective 4: "*To repair habitat fragmentation and provide for regeneration of flora and fauna where weaknesses are identified in the network."*

G2 Objective 5: "*To integrate Green Infrastructure as an essential component of all new developments."*

G2 Objective 7: "*To incorporate items of historical or heritage importance in situ within the Green Infrastructure network as amenity features."*

G2 Objective 8: *"To provide for the incorporation of Eco-ducts and/or Green Bridges at ecologically sensitive locations on the County's road and rail corridors that will facilitate the free movement of people and species through the urban and rural environment."*

G2 Objective 9: *"To preserve, protect and augment trees, groups of trees, woodlands and hedgerows within the County by increasing tree canopy coverage using locally native species and*

by incorporating them within design proposals and supporting their integration into the Green Infrastructure network."

G2 Objective 10: *"To promote a network of paths and cycle tracks to enhance accessibility to the Green Infrastructure network, while ensuring that the design and operation of the routes responds to the ecological needs of each site."*

G2 Objective 12: "*To seek to control and manage non-native invasive species and to develop strategies with relevant stakeholders to assist in the control of these species throughout the County."*

G4 Objective 1:*"To support and facilitate the provision of a network of high quality, well located and multifunctional public parks and open spaces throughout the County and to protect and enhance the environmental capacity and ecological function of these spaces."*

G4 Objective 2: "*To connect parks and areas of open space with ecological and recreational corridors to aid the movement of biodiversity and people and to strengthen the overall Green Infrastructure network."*

G4 Objective 3: "*To enhance and diversify the outdoor recreational potential of public open spaces and parks, subject to the protection of the natural environment."*

G4 Objective 4: *"To minimise the environmental impact of external lighting at sensitive locations within the Green Infrastructure network to achieve a sustainable balance between the recreational needs of an area, the safety of walking and cycling routes and the protection of light sensitive species such as bats."*

G4 Objective 5: "*To promote the planting of woodlands, forestry, community gardens, allotments and parkland meadows within the County's open spaces and parks."*

Chapter 9. Heritage, Conservation and Landscapes

In its introduction to this chapter of CDP, SDCC states:

> *"There are many benefits to protecting the heritage and landscapes of the County including archaeological heritage. A key challenge for the Plan is to balance the protection of built and natural heritage and landscapes with the management of change in a manner that enhances rather than diminishes heritage and landscape features, structures, buildings, sites and places of special interest."*

The proposed development location does not contain, nor adjoin, any Natural Heritage Sites, Natura 2000 sites, NHAs or Special Amenity Areas.

However, HCL Policy 15 in relation to Non-Designated Areas is relevant:

> *"It is the policy of the Council to protect and promote the conservation of biodiversity outside of designated areas and to ensure that species and habitats that are protected under the Wildlife Acts 1976 and 2000, the Birds Directive 1979 and the Habitats Directive 1992 are adequately protected."*

Supporting objectives relate to the avoidance of adverse impacts on rare species, and the protection of existing trees, hedgerows, and woodlands which are of amenity or biodiversity value

and/or contribute to landscape character and ensure that proper provision is made for their protection and management in accordance with Living with Trees: South Dublin County Council's Tree Management Policy 2015-2020.

HCL Policy 1 Overarching: *"It is the policy of the Council to protect, conserve and enhance natural, built and cultural heritage features, and to support the objectives and actions of the County Heritage Plan."*

HCL1 Objective 1: "*To protect, conserve and enhance natural, built and cultural heritage features and restrict development that would have a significant negative impact on these assets."*

HCL2 Objective 3: "*To protect and enhance sites listed in the* Record of Monuments and *Places and ensure that development in the vicinity of a Recorded Monument or Area of Archaeological Potential does not detract from the setting of the site, monument, feature or object and is sited and designed appropriately."*

HCL3 Objective 3: "*To address dereliction and encourage the rehabilitation, renovation, appropriate use and re-use of* Protected Structures."

HCL7 Objective 1: *"To protect and enhance the landscape character of the County by ensuring that development retains, protects and, where necessary, enhances the appearance and character of the landscape, taking full cognisance of the Landscape Character Assessment of South Dublin County (2015)."*

HCL7 Objective 2: *"To ensure that development is assessed against Landscape Character, Landscape Values and Landscape Sensitivity as identified in the Landscape Character Assessment for South Dublin County (2015) in accordance with Government guidance on Landscape Character Assessment and the National Landscape Strategy."*

HCL8 Objective 1: *"To protect, preserve and improve Views and Prospects of special amenity, historic or cultural value or interest including rural, river valley, mountain, hill, coastal, upland and urban views and prospects that are visible from prominent public places."*

Specific prospects in the plan that are of relevance to this development include Montpelier Hill. The county's 2015 Landscape Character Assessment, which is assessed for relevant policy later in this chapter, sets-out a number of such views "for consideration" for protection, preservation or improvement.

HCL9 Objective 1: *"To restrict development within areas designated with Zoning Objective 'HA – DM' (To protect and enhance the outstanding natural character of the Dublin Mountains Area) and to ensure that new development is related to the area's amenity potential or to its use for agriculture, mountain or hill farming and is designed and sited to minimise environmental and visual impacts."*

HCL9 Objective 2: "*To ensure that development above the 350 metre contour in the Dublin Mountains will seek to protect the open natural character of mountain heath, gorse lands and mountain bogs."*

HCL9 Objective 3: "*To ensure that development within the Dublin Mountains will not prejudice the future expansion and development of a National Park, the County's Green Infrastructure Network and local and regional networks of walking and cycling routes."*

HCL9 Objective 4: "*To ensure that development proposals within the Dublin Mountains maximise the opportunities for enhancement of existing ecological and geological features and archaeological landscapes."*

HCL9 Objective 5: "*To support the re-routing of the Dublin Mountains Way from public roads and to improve access to publicly owned lands in the upland area."*

HCL16 Objective 1: *"To promote the preservation of public rights of way that give access to mountain, lakeshore, riverbank or other places of natural beauty or recreational utility such as parklands, geological and geo-morphical features of heritage value and to identify and map such public rights of way as they come to the attention of the Council."*

HCL16 Objective 3: *"To promote and facilitate the continued development of the Dublin Mountains Way and the Wicklow Way in association with the Dublin Mountains Partnership, particularly Permissive Access Routes that provide access to regional and local networks of walking, running, hiking and mountain bike trails and other recreational facilities. The routing of new trails and rerouting of existing trails off public roads is encouraged."*

HCL16 Objective 4: "*To promote and improve access, in partnership with the relevant landowners, to all the historic sites in the County and seek to maximise their tourism potential in partnership with the relevant landowners."*

HCL16 Objective 5: "*To bring mountain amenities closer to residential communities by promoting the establishment of a network of formal footpaths, off-road paths and cycle ways that facilitate casual walkers and cyclists*."

Chapter 11. Implementation

Section 11.1.0 of the Development Plan sets-out the land use zoning objects to all lands in the county, which identifies the classes of development and uses that are permitted in principle or open for consideration.

According to the Plan, the Hell Fire property and the most western/elevated part of Massy's Wood are zoned "High Amenity Dublin Mountains," Objective HA-DM: *"To protect and enhance the outstanding natural character and amenity of the Dublin Mountains area."*

Much of the Massy's Wood property, however, is zoned "Rural and Agriculture," Objective RU: *"To protect and improve rural amenity and to provide for the development of agriculture."*

10.3.1.2 Landscape Character Assessment

It is the policy of South Dublin County Council, as set out in its 2016-2022 Development Plan, to:

> *"Preserve and enhance the character of the County's landscapes, particularly areas that have been deemed to have a medium to high Landscape Value or medium to high Landscape Sensitivity and to ensure that landscape considerations are an important factor in the management of development."*

The Landscape Character Assessment of South Dublin County (2015) highlights the high value and sensitivity of the Mountain Area. The Landscape Character Area (LCA) consists of the mountains and uplands of South Dublin and is called Dodder and Glenasmole.

The characteristics of this area are as follows:

- Highly scenic and distinctive glacial valley;
- Extensive views over the greater Dublin area;
- Attractive and diverse topography and land use;
- Field patterns and agricultural use contrasts with open blanket bog areas;
- Distinctive cluster of stone built cottages along the valley;
- Important archaeological clusters including Neolithic and Bronze Age cluster at Piperstown.

Extent: western boundary of the regional road R114 to foothills around Bohernabreena to Oldcourt, comprising the eastern and southern county boundary.

Views and prospects of south County Dublin are also set-out in SDCC's Landscape Character Assessment. It states that prospects are to be preserved and protected, as they "relate to prominent landscapes or areas of special amenity value or special interest that are widely visible from surrounding areas." Montpelier Hill is identified as the seventh such prospect in Table 9.1 of the Assessment.

The assessment also sets-out a number of views that have been "put forward for consideration" owing to their value and importance in the country. These views include:

- Views to the Dublin Mountains from major parks;
- View from any point along the Grand Canal (all canal length);
- View from M50 interchange at Knocklyon, towards the Dublin mountains and Orlagh Retreat Centre;
- Ridge line of the Dublin Mountains, Montpelier to Tallaght Hills e.g. From Dodder Valley Park, Oldbawn and others;
- Views to and within Glenasmole;
- Views across Ballinascorney valley, Dublin Bay, Wicklow Mountains, Co. Kildare.

10.3.1.3 Dublin City Development Plan (2016-2022)

The Dublin City Council (DCC) Development Plan 2016 - 2022 contains a range of policies relevant to complementary tourism, heritage and landscape values and sensitivities for the study area/and site environs.

With regards to visual assessment Chapter 4 (Shape and Structure of the City) of the Development Plan, in SC7 the Council states it is its policy: "*To protect and enhance important views and view corridors into, out of and within the city, and to protect existing landmarks and their prominence*."

There is a reference to undertaking a "Views and Prospects" study.

10.3.1.4 Dun Laoghaire-Rathdown Development Plan (2016-2022)

Similarly the Dun Laoghaire-Rathdown County Council contains a range of policies relevant to complementary tourism, heritage and landscape values and sensitivities for the study area/and site environs.

According to the Development Plan:

> *"The Dublin Mountains have long been a place of public recreation and enjoyment forming a distinct southern edge to the Dublin conurbation. Continuing growth of the Metropolitan Dublin area in terms of, not only population, but also extension of the geographical land area being developed for residential, business and industrial uses has been accompanied by increasing recreational pressures on the Dublin Mountains as an accessible resource for both active and passive recreational pursuits.*
>
> *It is Council policy to support the vision and objectives of the Dublin Mountains Strategic Plan for Development of Outdoor Recreation (2007- 2017) including the continued development and enhancement of the Dublin Mountains Way and its rerouting off public roads wherever possible."*

There are no listed Prospects (the preservation of which is an objective of the Council) of the site location and/or Montpellier Hill in the Development Plan.

10.3.1.5 Dublin Mountain Partnership Strategic Plan

As a relevant non-statutory document that deals with many relevant contextual issues to the proposed development, the Dublin Mountain Partnership Strategic Plan (2007-2017) is also reviewed in this section.

Set up in 2008, the Dublin Mountains Partnership (DMP) was established to develop an integrated outdoor recreation plan for forests and other public/state-owned lands, with the ultimate aim of improving the recreational experience for users of the Dublin Mountains, whilst recognising the objectives and constraints of the various landowners.

The partner organisations involved are Coillte, South Dublin County Council, Dun Laoghaire-Rathdown County Council, Dublin City Council, National Parks and Wildlife Service and the Dublin Mountains Initiative, an umbrella group representing the recreation users of the Dublin Mountains.

The establishment of the DMP addresses the key need to manage the area as an integrated entity and also provides for commitments on funding and resources to underpin the DMP's work. The long-term strategy is to manage recreation in the Dublin Mountains on a more sustainable basis, and a strategic plan has been put in place.
The following benefits are proposed:

- Easy access to the countryside within the Dublin area, including access by public transport;
- An increased recreational value of the forest recreation resource owned;
- Opportunities to promote health and well-being;
- Improving the tourism appeal of the capital;
- Managing interactions between recreation users;
- Providing services to land managers in managing recreational use and misuse;
- Discouraging unwelcome forms of recreation for the hills and developing specifically designed sites for motorised recreation.

The DMP strategy shares the following views:

- A shared recognition of the importance and value of the Dublin Mountains area as a resource for sustainable outdoor recreation access and activities participation.
- A stated commitment by a range of partners to work together in providing, developing and managing sustainable (and responsible) recreational activity in the Dublin Mountains area;
- Access to, and responsible outdoor recreational use of, the Dublin Mountains should be available to all and reflected in both the quality and scope of recreational facility and infrastructure provision;
- Recognition that the Dublin Mountains have important economic value for the main landowner Coillte and this needs to be recognised;
- Shared recognition that outdoor recreation promotion and provision in the Dublin Mountains area requires to respect the landscape, natural and cultural heritage value of the upland location and be harmonious with the legitimate, economic and other objectives of the landowners;
- Outdoor recreation in the Dublin Mountains provides a spectrum of "non-market value" benefits, such as health and well-being gains, as well as "market value" benefits and development opportunities embracing local and wider direct/indirect economic benefits, tourism spend etc. These collectively strengthen the justification for capital and revenue funding support at Government level.

The DMP's stated Vision for the Dublin Mountains is as follows.

According to the DMP strategy, the Dublin mountains is a well-resourced and well managed area of significant scenic and high nature conservation value that provides:

- A high-quality recreation amenity and experience;
- Breathing space for the people of Dublin and responsible visitors;
- Sustainable economic activity for those who own or manage the land.

The aspirations for the development of outdoor recreation in the Dublin Mountains provided five themes for the strategy. Theme 2, which concerns improving the quality and safety of recreational facilities and visitor services and promoting sustainable use, entails:

> *"Recreational facilities in the Dublin Mountains need to provide a more comprehensive service to visitors including information, toilet facilities, guided walks and areas set aside for a wider range of activities. Only when effective management of current issues and improved facilities are in place, should there be an aspiration to invite more visitors to enjoy the area."*

DMP's "Priority 1" objective of Theme 2 is: *"To provide a 'flagship' welcome and orientation point for the Dublin Mountains (e.g. on Three Rock with viewing platform) and its management programme."*

The strategic action plan for the objective is to:

> *"Include concept proposals for a welcome and orientation focal point (also providing local information) or resource hub building in relevant local authority development plan draft. Develop a welcome and orientation focal point for visitors to the Dublin Mountains."*

10.3.1.6 Summary of Planning Policy and Guidance

The above review of relevant local development plan policy of South Dublin and adjoining counties highlights a range of policies supportive of

- Enhanced quality open, recreational, space and green infrastructure with appropriate services and facilities;
- Tourism development, recognising the importance and potential of the Dublin Mountains and associated natural and cultural heritage both locally in South Dublin and strategically for the Greater Dublin Region;
- The development of Visitor Facility in the Dublin Mountains;
- The development of networks of trails and ongoing development of the Dublin Mountains Way;
- Improved access to the Dublin Mountains;
- Enhanced biodiversity and associated habitat networks;
- Increased tree planting particularly native species;
- Protection of trees and wood of amenity, biodiversity or landscape value;
- Protection of Archaeology and Cultural heritage;
- Protection Landscape Character;
- Protection of views and prospects and scenic routes including to and from the mountains and proposed site;
- Protection of High Amenity Dublin Mountains Area;
- Continued improvement of access, recreation and tourism in the Dublin Mountains.

10.4 THE PROPOSED DEVELOPMENT

This section should be read with Figures 1 – 5 contained in Volume 2 of the EIAR, Chapter 10 Appendices.

10.4.1 The Site of the Proposed Development

10.4.1.1 Location and Overview

The site is comprised of two Coillte-owned forest properties, the Hellfire Forest property and the Massy's Wood property, located on opposite sides of the R115 Killakee Road, on the eastern flank of Montpelier Hill, in the rural environment to the south of the Woodlawn and Rockbrook areas in South County Dublin.

The two forest properties are integral to the forested upland landscape of South Dublin and have a significant concentration of landscape and visual amenity resources, cultural and natural heritage, and recreational use between them, which is representative of the Dublin Mountains High Amenity area.

The Hell Fire Wood is located on Montpelier Hill which, as the most north westerly outlying hill of the Dublin Mountains, offers spectacular panoramic views from various locations across the city and Dublin Bay.

Massy's Wood is separated from Hell Fire Wood by the R115, a single lane carriageway from the city to the north leading south to Killakee, Glencree and Sally Gap. It lies in a low-lying area or

valley falling away from the R115 and Montpelier Hill to the west and partly enclosed or formed by the slopes of Cruagh Mountain to the east.

The slopes around Montpelier Hill to the north and west comprise rural fields in pasture eventually giving way to the city suburbs at Kiltipper / Oldbawn, Ballycullen and Emondstown. Approximately 3km from Montpelier Hill lies the M50 corridor.

South of Montpelier Hill lies Killakee Mountain giving way further south, south east and south west to the extensive upland landscape of the Dublin and Wicklow mountains. Between Montpelier Hill and Killakee Mountain lies Piperstown Glen, a steeply sloped valley separating the two mountains.

The east of the site is dominated by a lowland agricultural valley, centred upon the sparsely-populated townland of Jamestown and rural settlement along the R116, beneath Tibradden and Kilmashogue Mountains.

10.4.1.2 Topography & Drainage

Montpelier Hill ascends from 250m at its eastern boundary on the R115, to rise to 383m elevation at the Hell Fire Club summit. A number of small forest ditches drain the east face of Montpelier Hill in the direction of the R115 and the Glendoo Brook which flows through Massy's Wood.

Massy's Wood forest property is located to the east of the R115 Killakee Road. Its gradient ascends from about 170m elevation in the northeast of the property, to about 310m in the southwest of the property, where it adjoins the R115. Nearly all of the Massy's Wood property is east-facing, occupying the lower slopes of Montpelier Hill and the valley with Cruagh Mountain. The woods contain a number of small stream that collect in the Glendoo Brook which feeds the Owendoher River at Rockbrook. The Glendoo Brook runs close to and parallel to the eastern boundary of the woods and creates a small corridor running from south to north from Cruagh Mountain.

10.4.1.3 Access & Trails

The main access to the Hell Fire property is through the pedestrian and vehicular entrance to the carpark off the R115, with a capacity of c. 80 cars. The network of forest roads and trails are mostly used for walking/hiking, running, cycling and horse riding, as well as forest vehicle access and maintenance.

Plates 1 & 2: Entrance to Hell Fire Property (left) and Massy's Wood (right) from the R115.

At Hell Fire Wood visitor vehicles have no access beyond the carpark. A forestry road zig-zags up Montpelier Hill, but is also used for foot traffic across the site. A range of forest trails and other routes formal and informal criss-cross the hill. Some of these have caused erosion and scarring of the landscape.

Plates 3 & 4: A network of natural pathways and desire lines through the Hell Fire Forest property.


The main access to the Massy's Wood property is through the pedestrian entrance off the R115, through a forestry road (restricted to service vehicles) that travels down through the property in the direction of Glendoo Brook, a tributary of the Owendoher River. There is also restricted local access in the northeast of the property.

Otherwise, a series of rough tracks and desire lines are also evident around the property, particularly to either side of Glendoo Brook and the walled garden on its east bank. There is no parking provided specifically for the Massy's Wood property, despite its extensive recreational usage. Visitors use the Hell Fire Forest parking area and cross the R115 on foot. Combined with on-street parking which occurs at peak times this can cause a hazard on the R115 between the woods.

10.4.1.4 Vegetation and Natural Heritage

The Hell Fire Forest is almost entirely coniferous, with a range of ages present, including areas recently clear-felled and replanted, areas of mature forest due for harvesting/clear-felling in the near future and middle-age forest in management.

Plates 5 & 6: Clear-felled area of the Hell Fire Forest on the subject site (left). Douglas fir snap and wind blow evident in the Hell Fire Forest adjacent to the carpark.


Along the western side of the car-park, mature conifers have been retained and contribute to the character of the location, however, this may not be feasible into the future, due to many being over-tall and prone to wind throw as surrounding forest plots are harvested.

An area of commercial conifer plantation on the east face of the hill, between the parking area and the Hell Fire Club, was clear-felled in 2016. However, many middle aged and mature broad-leafed trees (mostly beech) were purposefully left standing, these are believed to have predated the commercial plantation and historical maps indicated a broadleaved woodland in this location.

Plates 7 & 8: Mature deciduous woodland of Massy's Wood.

Massy's Wood, by contrast, is predominantly broadleaved woodland of beech and oak, ash, fir, larch and spruce. There are some areas of coniferous plantations and specimen trees from the original Killakee demesne, such as Giant Sequoia, Monkey Puzzle, West Himalayan spruce, Monterey Pine, and Western red cedar.

In places, exotic invasive species such as Cherry laurel and rhododendron have a strong hold and are being cleared and reduced. It is ecologically rich in flora and wildlife.

10.4.1.5 Built & Cultural Heritage

The existing attractions for visitors to the Hell Fire Forest property include a forested upland landscape, spectacular panoramic views, and the cultural heritage features of the property. Most prominent among these is the ruins of the Hell Fire Club building, which is located at the top of Montpelier Hill overlooking Dublin and Dublin Bay. The building, a protected structure (South Dublin Record of Protected Structures ref. 388) constructed in 1725, has iconic status in the cultural history of Dublin.

Plates 9 & 10: The derelict Hell Fire Club building enjoys panoramic views across Dublin City.


In addition to its prominent location and panoramic views over the city, the building has a unique architectural form and a cultural history that lend the place some notoriety. These characteristics combine to make the Hell Fire Club attractive to visitors and locals.

The remains of two passage tombs are located to the south of the Hell Fire Club. Both are protected under the National Monuments Acts 1930-2004.The cairns and stone passages of the two passage tombs on Montpelier Hill were largely destroyed in in 1725 when many of the stones were used in the construction of the Hell Fire Club.

The presence of archaeological features on Montpelier Hill, adjacent the summit and elsewhere on the hill, has required professional interpretation. Recent research and excavations have revealed that one of the passage tombs is believed to be a large 5,000-year-old megalithic tomb similar in nature to those at Bru na Boinne in County Meath.

A standing stone half way up the path on the east face of Montpelier Hill collapsed on its side in the recent past and is now in a recumbent position and is prone to graffiti.

Plates 11 & 12: Entrances to the large, multi-roomed walled garden at Massy's Wood (left and right).


Massy's Wood is also rich in cultural heritage features. Most notable is the large, multi-roomed walled garden, the walls of which are predominantly intact. The plinths and foundations of a Turner[8] designed glasshouse remain at the northern end of the garden. The garden is now overgrown with scrub.

Other architectural features of the property include an ice house, the ruins of a cottage on the river bank, a stone well and watermill and bridge. These are collectively a protected structure (South Dublin Record of Protected Structures ref. 384).

[8] [8] Richard Turner was the designer of the glasshouses of the National Botanic Gardens, Glasnevin, the Palm House at Kew Gardens, London and the glasshouse in the Winter Garden at Regent's Park in London.

A 750m stretch of the Military Road (RPS ref. 385) traverses the Massy's Wood property inside the western boundary. The Military Road was built in 1802 in the wake of the 1798 Rebellion to open up the Dublin and Wicklow Mountains to the British army. This 750m stretch of the road, with adjacent retaining walls, is the only section of the road that has not been tarmacked and retains its original cobblestones.

10.4.1.6 Character

Forest and trees in differing form, maturity and species is what defines the character of the site. Although considerable overlap does occur, the Hell Fire forest and Massy's Wood can be roughly divided into two types: amenity woodland to the east (Massy's Wood) of the R115, and commercial forests (Hell Fire forest) to its west.

The Hell Fire property's coniferous forests are commercial plantations and are subject to potentially significant change as harvesting and replanting progress – this process is already evident on site and can be quite drastic in prominent locations. However forest works, planting, managing and harvesting are part of its story and character. They can create a dynamic landscape over time with a strong upland character, however they can also be dark, dull and monotonous and screen the very panoramas which are a feature of Montpelier Hill.

Plate 13: Massy's Wood has retained the mature trees and woods of the Killakee demesne

The character of Massy's Wood, by contrast, is of a mature, broad-leaved woodland, with pockets of coniferous plantations and specimen trees from the original Killakee demesne; a planting and management structure that defines the woodland's tone and character to this day.

Massy's Wood is characterised by its child friendly feeling, and its romantic and idyllic sense of magic and fun. These qualities coupled with its ease of access for all ages ensure it has been a firm destination for Dubliners for generations.

Whilst predominantly a recreational forest with a high ecological value, in Massy's Wood, woodland management works are ongoing with areas of beech woods thinned in 2016.

10.3.1.7 Recreation & Amenity

Hosting an estimated 100,000 visitors a year, recreation and landscape amenity add a significant contribution to the character of the Hell Fire Forest property on Montpelier Hill, and is likely to do

so even more into the future, owing to its proximity to Dublin city and its high visibility from its southern and western suburbs.

Montpelier Hill offers the visitor a mini-mountain experience with a summit destination, forests, taster views to the mountains further south, panoramic city views and capacity to accommodate parking and other amenities in a relatively robust landscape setting.

Plate 14: Montpelier Hill offers panoramic views of Dublin City

Along its extensive western face, the Hell Fire property's substantial and uniform coniferous forest can be particularly enclosing and dark, with little to attract many walkers, runners, cyclists or horse riders. Its perimeter trails to Piperstown Glen offer views to Killakee, and there are also views south to the Dublin and Wicklow mountains from the southern perimeter.

Plate 15 & 16: Massy's Wood provides a compelling sense of nature and woodland romance.

With its own atmospheric network of trails and walks, Massy's Wood has a very traditional and much-loved, child-friendly sense of nature and romance of the "idyllic woodland." This helps lend the woods a popular and timeless sense of place. This characteristic is further enhanced by the serene Glendoo Brook corridor, with its romantic ruins and the stories and lore behind them.

Massy's Wood offers no real external views. Its broadleaved woods, whilst enclosing is also inviting to the walker to explore the woods off trail, as the Beachwoods, in particular, having little undergrowth.

10.4.1.8 Summary

Both the Hell Fire forest property and Massy's Wood are representative of the forested upland landscape of South County Dublin.

While the former is an upland working coniferous forest and the latter a broadleaved forest, both have a significant concentration of landscape and visual amenity resources and recreational use between them, typical of a Dublin Mountains High Amenity area.

In addition, while the Hell Fire property's robust, commercial character differs greatly to the more sensitive and magical character of Massy's Wood, both properties contain highly-valued character, tracks and trails, cultural and natural heritage; and general recreational uses and opportunities.

10.4.2 The Environs of the Proposed Development

10.4.2.1 Contextual Overview

The Dublin Mountains gently rise from the most southern suburbs of South County Dublin into what soon becomes the Wicklow Mountains. Consequently, both terms are often used interchangeably by Dubliners to describe the one range. Thus, the site is situated on the threshold between the city and the rural environs.

The highest point along the Dublin Mountains Way, a 42-km long popular public trail running approximately east-west, is Fairy Castle at 536m, approximately 5km southeast of the subject site. However, Kippure Mountain, which straddles from its peak in County Wicklow into South Dublin, reaches 757m elevation.

The northern slopes of Montpelier Hill comprise of rural fields in pasture, eventually giving way to the city suburbs at Kiltipper/Oldbawn, Ballycullen and Emondstown.

Plate 17: Typical Dublin mountains upland view; looking south and east towards Kippure and Seefingan from Killakee.

South of Montpelier Hill lies Killakee Mountain, giving way further south, southeast and southwest to the extensive upland landscape of the Dublin and Wicklow mountains. Between Montpelier Hill and Killakee Mountain lies Piperstown Glen; a steeply-sloped valley separating the two mountains.

Combined, the Dublin and Wicklow mountain range is the largest area of continuous high ground in Ireland, with over 500 km2 above 300m covering the southern extent of County Dublin, a sizeable proportion of County Wicklow and smaller parts of east Carlow and north Wexford. The general direction of the mountain range is from northeast to southwest.

10.4.2.2 Geology, Topography & Drainage

In terms of geology, the Dublin/Wicklow mountain range is chiefly composed of granite, as well as some mica-schist and quartzite.

The large mass of resistant granite uplands form their own distinctive landform, and include incised river valleys that add further interest to the landform as they rise steeply from the Dodder River. Glenasmole itself comprises two valleys, the upper valley being formed by glaciation, whilst the lower valley is a river valley where the River Dodder eroded the glacial debris.

Once the bedrock changes to the more common shales and greywackes found in the hills and foothills, the landform alters again, comprising gentler hills of lower elevations and more rounded landform. This landform and changing bedrock gives rise to a very interesting and diverse topography with mountains and hills enclosing the valley on all aspects except to the north towards Dublin. The range's upland soils are peaty and poorly drained in places.

In terms of topography, to the east of the site is a gentle lowland (i.e. beneath 300m) agricultural valley between and beyond the R115 and R116, defined by the Owendoher River originating from the mountains to the south.

South, southeast and southwest of the site are the extensive upland landscape of the Dublin and Wicklow mountains. While the form of individual mountains naturally vary, most are rounded peaks under 700m elevation.

To the north, the topography gradually lowers to the Woodlawn, Firhouse, Edmondstown and suburbs of South Dublin, before it nearly flattens closer to the city centre. To the west, form Montpelier Hill the land drops down into the stepper incline of the upper Dodder River Valley and the Glenasmole Reservoir.

10.4.2.3 Landcover, Field Patterns & Vegetation

The steep slopes and occasional rocky outcrops, along with peaty and poorly drained soils in places, limit land use capability across the Dublin Mountains. As a result, coniferous forest generally remains beneath the 500m contour, leaving the uplands covered predominantly in unenclosed blanket bog, heath and upland grassland.

Common heather and bell heather are the predominant moorland plants, followed by Bilberry/Fraughan, Bog cotton/ Common cottongrass, Deergrass and Purple moor grass.

The dominant tree is the Sitka spruce, accounting for most forest plantations across the range, with Lodgepole pine, Norway spruce, Scots pine, Larch and Douglas fir also evident. Biodiversity is, consequently, low in these commercial plantations, owing to the lack of native and/or broadleaf tree species. Like other large-scale working forests, areas of clear-fell and replanting are visible, as are young, semi-mature and mature plantations.

Plate 18: Killakee forest looking north along R115.

In the more sheltered valleys, there is more of a mixture of coniferous and deciduous woodland. Farmland is also evident there in places, with generally small, irregularly-shaped grassland fields divided by mature hedgerows and/or small (and often dilapidated) stone walls.

By contrast, in the 2-3km wide area northwest, north and northeast of Montpelier Hill is largely defined by low (i.e. less than 200m), arable and productive farmland. Field patterns remain quite strong on these lower, gentler slopes, with generally medium sized fields enclosed by stone walls or hedgerows, before reaching the most southerly suburbs of County Dublin and/or the M50.

10.4.2.4 Settlements

In terms of the built environment of the site environs, a concentration of rural houses and businesses are in the vicinity of the site, mostly to its north along the R115. In addition to these properties, there are several houses fronting the R115 to the north and south of the site, forming a distinct concentration of 'one-off' rural development.

In the wider environment, there is a concentration of rural (though partly urban-generated) housing in the Jamestown area to the east of Massy's Wood, and along Cruagh Road, between Montpelier Hill and Cruagh Mountain.

Plate 19 & 20: Entrances to settlement along R115, north of the site (left). Rural settlements visible from Tibradden Mountain, looking towards site (right).


To the northeast of the site, there is the more urbanised area of Rockbrook, which lies outside of the M50 (passing within 3km to the northeast of the site) and is somewhat removed from the city to the north. The relationship of this area to the Dublin Mountains landscape is less direct than the communities in the immediate vicinity of the site, but Rockbrook residents would be among the existing users of the site for recreation, and enjoy views of the site in places.

Further to the north, on the southern edge of the city, are the recently developed suburban areas of Ballycullen and Firhouse. In these areas, there are existing users and numerous potential users of recreation facilities on the site.

Piperstown Road and Mountain Road pass to the west of Montpelier Hill, on the side of the Glenasmole River Valley, somewhat removed from where the proposed development is concentrated off the R115. These roads have a relatively dense concentration of housing dispersed along them, but are separated from the site by the bulk of Montpelier Hill and the extensive coniferous forest on its west flank.

These concentrations of settlement in the site environs are effectively the southern outlying areas of urban generated development beyond the edge of Dublin city. The settlement patterns in the area can be summarised as sparse.

10.4.2.5 Built and Cultural Heritage

In terms of cultural heritage of the site environs, there is evidence of human activity from the Neolithic and Bronze Ages, including standing stones and passage tombs, wedge tombs and portal tombs. Evidence of medieval activity within this area is less strong with a ringfort at the most northern tip at Bohernabreena and a holy well at Glassmucky Brakes.

The neighbouring Killakee, Massy and Cobbe estates were the major landholding estates within the locale, which saw the appropriation of the wilderness landscape into a contrived vision of wilderness in line with the naturalistic fashions of estate design in the eighteenth and nineteenth century. These estates are still legible today although often the extent is eroded.

10.4.2.6 Visual Amenity

The site environs represent a centuries-old visual amenity for local residents and the people of south County Dublin in particular. The foothills to the Dublin Mountains have provided an aesthetic backdrop to Dublin's evolution and development, particularly over the last half century, as the southern suburbs of the city have extended to within 2-3km of the site.

Because of its highly visible, upland and picturesque setting on the fringe of a European capital and its proximity and accessibility for so many residents across south County Dublin, the visual amenity of the site environs is of high value and importance to the wider city and the county.

10.4.3 Summary of Landscape Characteristics

The analysis of local policy and the receiving environment identifies a range of characteristics and values of the receiving environment that might be affected by the proposed development. Accordingly, the conservation and enhancement values of the Hell Fire Forest property and Massy's Wood are set out in this section.

Conservation values include:

- Forested upland "mini-mountain" landscape;
- Broadleaf/native trees and woodlands and its distinct character ;
- Access, tracks and trails;
- Built and Cultural Heritage - archaeology and the Hell Fire Club; patterns and remnant structures;
- Panoramic views from the site and prospect from city and suburbs;
- Nearby scenic routes;
- Flora and fauna, biodiversity and ecological health of the property;
- Policy protective of natural, built and cultural heritage including landscape;
- Much loved and popular recreation amenities.

Enhancement values include:

- Robust working landscape capable of absorbing change;
- Accessibility and proximity to city;

- Threshold location;
- Landscape capacity created by tree cover;
- Network and quality of tracks and trails;
- Existing visitor facilities, including site entrance and carpark;
- Need for improved parking, traffic and pedestrian management;
- Policy supportive of improved access, recreation and tourism;
- Proximity to the Dublin Mountains Way and the Wicklow National Park;
- Policy to develop tourism in the mountains and a visitor orientation facility;
- Nearby complementary land uses and enterprises.

10.4.4 Characteristics of the Proposed Development

10.4.4.1 Overview

The proposal is described in detail in Chapter 3. Key elements relevant to this assessment are:

10.4.4.2 Access and Parking Improvements

It is proposed to expand the existing car parking capacity on the Hell Fire property from c. 80 spaces to c. 275 spaces, and to provide some coach parking spaces.

This would require the felling of approximately 1.2ha. (3acres) of mature conifer trees above the existing car park, as well as extensive earthworks (as the site is steeply sloped). The existing conifer trees are approaching end of life and due for felling, and would be replaced by new planting/landscaping to integrate the expanded parking area.

The entrance to the Hell Fire Forest property will be modified, by a new gateway feature and improvements to the R115 at the site entrance. A new footpath will extend north along the R115.

10.4.4.3 Trails Improvements and Heritage Interpretation

The project is intended to provide an improved walking experience for visitors to the Hell Fire and Massy's site, and the wider Dublin Mountains.

Proposals include upgrading and/or realignment of some of the existing trails and forest roads, where required, and new trails, to provide a safe, accessible network through the forest park, giving access to the heritage features, the landscape and views, the new visitor facilities, and linking to the Dublin Mountains Way. Designated equestrian routes are also envisaged to maintain this established use.

A range of interpretation materials (signage, panels, etc.) will be provided at points along the trails network, to discretely explain the natural and cultural heritage of the site, or a view, etc.

10.4.4.4 Tree Canopy Walk/Bridge

In order to provide a pedestrian link between the two parts of the site safely across the R115, and also to provide a unique experience for visitors, it is proposed to develop a feature tree canopy walk/bridge linking the lower flank of Montpelier Hill across the R115 to Massy's Wood.

10.4.4.5 Proposed Visitor Centre

Two buildings (total of 980 sqm envisaged) housing visitor facilities are proposed on the lower eastern flank of Montpelier Hill, linked by a courtyard area. The buildings are designed to provide both an iconic architectural structure taking advantage of the panoramic views from the site across the city and Dublin bay as well as to integrate sensitively in the location through the use of local materials – stone and timber cladding. The building and its surrounding terraces will be a hub for visitors on the site and an orientation point for the wider Dublin Mountain area.

A series of ramps will link the building to the parking area, tree canopy walk and site entrance.

The construction of the building and access routes will involve disturbance to the scrub vegetation of its immediate environs. These areas will be restocked with similar native vegetation on completion.

10.4.4.6 Architectural and Archaeological Heritage

The Hell Fire Club building will be conserved with minimal interventions as a ruin. A circular path will be developed around the cluster formed by the Hell Fire Club and the adjacent archaeological monuments.

Other built and cultural heritage features will be retained and conserved. In Massy's Wood the walled garden, will also be conserved as a ruin with minimal intervention other than necessary conservation repair work on the walls and some clearance of scrub vegetation to protect structures and restore legibility to the garden.

10.4.4.7 Managed Landscape Change

It is proposed to replace, over time, the current coniferous plantations and clear-felled areas on the north eastern slopes of Montpelier Hill with permanent, mixed predominantly broadleaved forest. This would complement the amenity woodland in Massy's Wood property, forming an extensive woodland park managed for recreation, biodiversity and cultural heritage access/conservation objectives. Over time this would change the landscape character of the hill in a positive manner leaving a sustainable landscape overlooking the city which will not experience future clear felling as it matures.

10.4.4.8 Lighting

The site will operate predominantly in day time conditions however discrete lighting will be provided in the car-park area and within the building itself for periods of night-time use and/or after hours servicing.

10.5 POTENTIAL IMPACTS AND EFFECTS

The potential impacts of the proposed development are:

- Landscape and Visual Impacts of the Access and Car-Parking improvements / expansion;
- Landscape and Visual impact of the construction of the new buildings visitor centre;

- Landscape and Visual impact of trails developments and related facilities on Montpelier Hill and Massy's Wood;
- Landscape and Visual impact of the tree Canopy Walk/Bridge over the R115;
- Landscape and Visual Impacts as a result of enhanced presentation of archaeological and cultural features;
- Landscape and Visual Impacts as a result of the managed change on the northern east slopes of Montpelier Hill from coniferous forest to broadleaved woodland over time;
- Landscape and Visual night time impacts of lighting around the visitor centre.

The effects of these will be on the landscape character and visual amenity of the two sites themselves, the immediate environs and middle distance (including neighbouring residences), and the wider receiving environment of the city, suburbs and adjacent hills.

10.6 REMEDIAL AND MITIGATION MEASURES

10.6.1 Hell Fire Forest Property

Remedial and mitigation measures include:

- Planting and development, on Montpelier Hill, of a mixed predominantly broadleaved forest landscape over a 10 year period to enhance landscape capacity, compose a new sustainable landscape, and maximise biodiversity and habitat whilst facilitating access and trails to the new woodland park;
- The retention, where feasible, of existing mature broadleaved specimen trees currently within the forest canopy and setting a precedent for the new woodland landscape;
- Management of woodland to enhance panoramic views;
- Management including removal of woodland / forest to enhance views towards Montpelier Hill including the restoration of the legibility of the Hell Fire Club on the summit in distant views;
- Planting to screen site infrastructure and integrate built development;
- Use of materials appropriate to location and place;
- Sensitive and simple presentation of site heritage and culture – the idea of conserved ruins retaining mystery and romantic character;
- Trails and walkways will generally follow existing routes and be surfaced in traditional quarry dust / rolled gravel, or simple grassed / earthen tracks;
- Existing uses will be maintained and enhanced.

10.6.2 Massy's Wood

Interventions in Massy's Wood will be minimal. Existing management of the area as an amenity woodland and habitat will be enhanced and invasive species programmes accelerated to improve habitat further. Existing trails will be improved and new trails provided to manage access through the site – away from more sensitive ecological features with rest points provided with suitable surfacing and seating.

The overall design and management intention is to maintain and enhance the character of the woodland whilst improving access and providing some interpretation and restoration or enhancement of its main features. Sensitive heritage features will be retained and conserved and the main structure – the walled garden – represented as a conserved and legible ruin.

As all of these objectives are intended to sensitively and suitably enhance the existing biodiversity, ecological health, access, appearance and architectural/archaeological heritage of the woodland, no remedial or mitigation measures are proposed.

10.7 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

10.7.1 Landscape Impacts and Effects

10.7.1.1 Landscape Sensitivity

The landform of the site is highly varied traversing 170 to 250m from the lowest point of Massy's to the summit of Montpelier Hill, as well as the varied topography of the receiving environment from sea-level in Dublin Bay to the outer city suburbs and to the south, the higher ranges of the Dublin and Wicklow mountains.

The sites are heavily wooded – Massy's – or afforested – Montpelier – creating differing landscapes in views as well as localised character, where they are experienced in different ways. The commercial nature of the coniferous plantations in Hell Fire Wood are robust landscapes capable of absorbing change. In many ways change is part of their character as the cycle of harvesting, clearfelling and replanting create generational, often dramatic, change to the landscape already evident. As an elevated location such change is highly visible across the receiving environment to the north and east.

Massy's Wood is a permanent broadleaved amenity woodland. It has a very distinctive character which is sensitive to change. Its low lying location means that its visibility is limited in the wider environment and this sensitivity is therefore local to the wood itself.

It is therefore appropriate to classify the sensitivities differently.

Montpelier Hill is classified as being of **Medium Sensitivity** –

> "*Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong or has evidence of alteration to / degradation / erosion of elements and characteristics. The character of the landscape is such that there is some capacity for change in the form of development. These areas may be recognised in landscape policy at local or county level and the principle management objective may be to consolidate landscape character or facilitate appropriate, necessary change*."

Massy's Wood is classified as being of **High Sensitivity** –

> "*Areas where the landscape exhibits strong, positive character with valued elements, features and characteristics. The character of the landscape is such that it has limited/low capacity for accommodating change in the form of development. These attributes are recognised in landscape policy or designations as being of national, regional or county value and the principle management objective for the area is conservation of the existing character."*

10.7.1.2 Magnitude of Landscape Change

The proposed development consists of:

- New Visitor Centre, associated parking and infrastructure including the tree canopy bridge located on the lower slopes of Montpelier Hill;
- Enhanced Amenities, trails, interpretation and presentation of built and cultural heritage – throughout both Montpelier and Massy's Wood;
- Landscape change to the northeast slopes of Montpelier Hill seeing the phased transformation of the commercial forestry plantations to native broadleaved woodland.

Section 10.4.3 sets out the receiving environment's and site's Conservation Values and Enhancement Values. The Enhanced Amenities and Landscape Change are complementary to the conservation values described. The Visitor Centre and associated proposals are designed to be sensitive to the Conservation Values whilst responding the site's Enhancement Values – particularly given the siting on Montpelier Hill.

A lengthy process of site selection and concept development and design has ensured a development proposal that complements all the values of the landscape including site sensitivities whilst maximising site opportunities. The extent of change is limited in scale and appropriate to the context.

The **Magnitude of Landscape Change** is categorized as **Low** - Change that is moderate or limited in scale, resulting in minor alteration to key elements features or characteristics of the landscape, and/or introduction of elements that are not uncharacteristic in the context. Such development results in minor change to the character of the landscape.

In Massy's Wood the Magnitude of Landscape Change should be regarded as **Negligible** - Change that is limited in scale, resulting in no alteration to key elements features or characteristics of the landscape, and/or introduction of elements that are characteristic of the context. Such development results in no change to the landscape character.

The Significance of the Landscape Change is **Low to Moderate.**

The construction of new buildings and parking facilities could be regarded as intrusive in such a location. However the values associated with the receiving environment, the sensitive design of the new centre and its infrastructure, and the context of Enhanced Amenities and the long term landscape development proposed suggest the **Quality of Landscape Change is Beneficial** – "I*mproves landscape quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses*." **The landscape change will be Permanent**

10.7.2 Visual Impacts and Effects

The assessment of a development's potential effect on views and visual amenity involves assessment of numerous viewpoints selected to represent key visual receptors in the receiving environment.

Based on the analysis of the receiving environment and potential visual receptors above, a range of viewpoints were selected. These are classified as being:

- Within the Site;
- Site Environs and Middle Distance Views;
- Long Distance Views.

For each viewpoint assessment below, the existing view is described by identifying its key elements and characteristics; the sensitivity of the view is discussed; the proposed change to the view is described; and a conclusion is drawn as to the significance of the potential visual effects.

10.7.2.1 Visibility

The proposed development consists of:

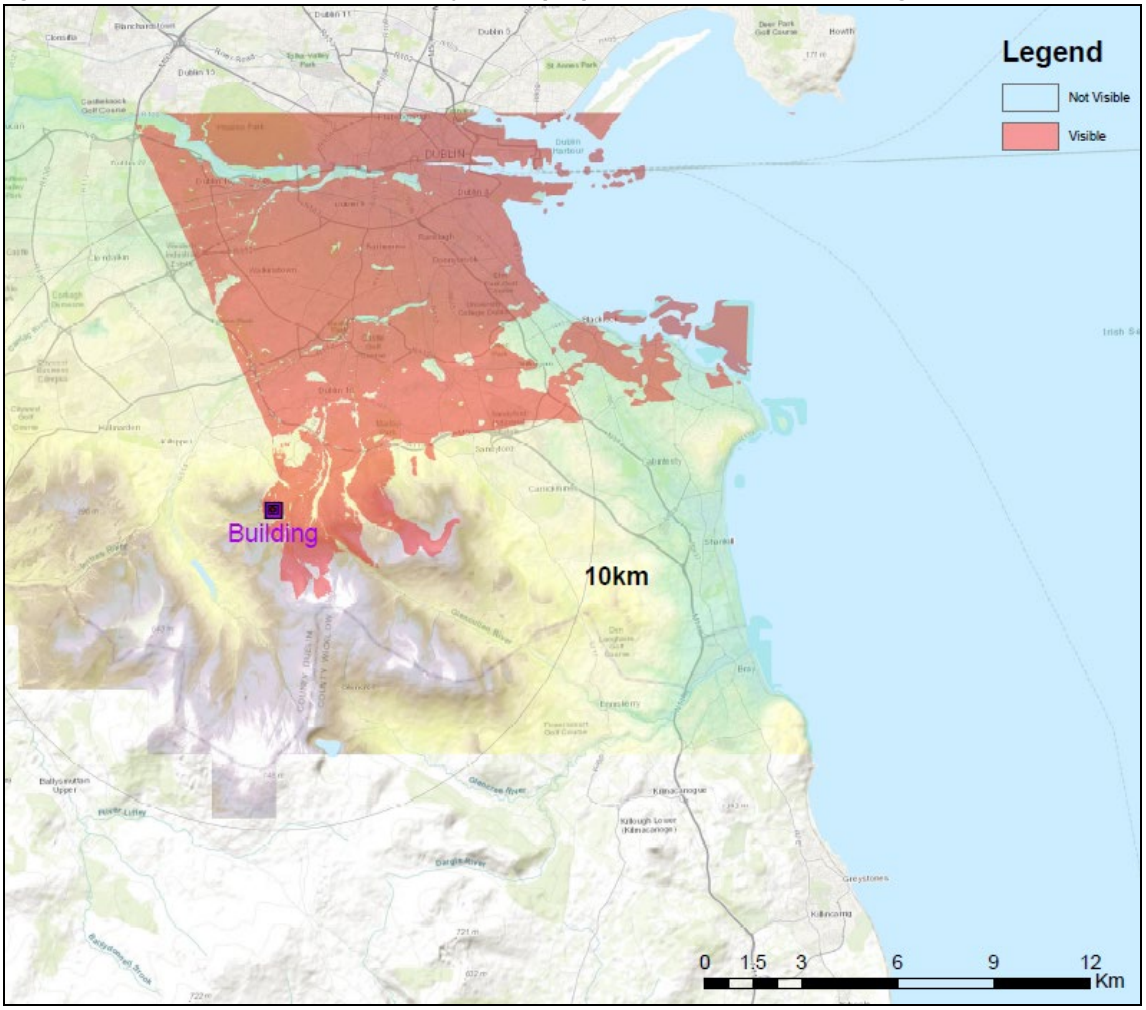
- New Visitor Centre, associated parking and infrastructure including the tree canopy bridge located on the lower slopes of Montpelier Hill;
- Enhanced Amenities, trails, interpretation and presentation of built and cultural heritage – throughout both Montpelier and Massy's Wood;
- Landscape change to the northeast slopes of Montpelier Hill seeing the phased transformation of the commercial forestry plantations to native broadleaved woodland.

Of these only the new buildings and associated infrastructure, and the landscape change to the north east of Montpeiler Hill will have visual effects. The Enhanced Amenities relate to the character of the site at a very local/detailed level and are improvements to what is already there rather than change, with beneficial effects.

A Zone of Theoretical Visibility has been prepared by Chris Shackleton Consulting based on the location of the proposed visitor centre. As the main new structure proposed on the site, this represents the other development elements and facilitates the identification of potential representative viewpoints in the local environs, middle and long distance.

The figure below indicates a zone of visibility defined by topography running in a line north west from Montpelier Hill to the Phoenix Park and through a 90 degree ark to Dun Laoghaire. This corresponds to the view from the site itself. The figure also highlights visibility to the south east to Cruagh till stopped by the rising mountains themselves i.e. visibility is primarily to the north and east and only bounded by the mountains to the south and west. This underlines the threshold position of the proposed site between the city and the mountains.

Figure 10.7: Zone of Theoretical Visibility of the proposed visitor centre building.



The above figure relates to theoretical visibility, based upon topography, and takes no account of the built environment, vegetation or other multiple factors that will, in reality, preclude visibility of the building.

In addition in the Chris Shackleton Consulting document, the theoretical issue of prominence of the proposed new visitor centre over distance is discussed. The proposed new building is not high but is relatively long. The analysis illustrates that the building could only be theoretically perceivable up to 10km distance. Unlike the Hell Fire Club itself which was traditionally seen in silhouette and was very prominent (this effect is planned to be restored) the new visitor centre would be seen against the hillside and trees behind and around it and, like the Hell Fire Club today, would be very difficult to perceive in middle and long distance views. Other elements of the scheme e.g. the car-park area would be deliberately screened with new planting. The landscape changes from commercial forest to broadleaved wood would be visible over distance but are benign in character and would be seen as complementary to existing landscape change / patterns.

Representative viewpoints have been grouped and mapped as follows:

- Zone A Viewpoints within site;
- Zone B Viewpoints within the local environs and middle-distance;
- Zone C Viewpoints within the wider landscape/long distance.

These Viewpoints are mapped and Existing Viewpoints and Proposed Changes (Photomontages) are included in the photomontage book prepared by Chris Shackleton Consulting and provided under separate cover.

10.7.3 Visual Assessment

Zone A – Viewpoints within the site

10.7.3.1 A1 Entrance – approaching new car-park;

Existing View: This is the view of the existing Hell Fire Club car-park on arriving at the site from the R115. The parallel lines of parking can be seen either side of the central drive. To the left (west) extensive forest runs right to the car-park edge. Although predominantly spruce there are intermittent Beech and other broadleaves present giving an attractive mixed mature character. It is an attractive car-park setting with links ahead via the main road to the hill or via the trail visible by the fence running more directly up the hill.

Viewpoint Sensitivity: The viewpoint is of **high** sensitivity, owing to its location at the entrance to the forest recreation area.

Proposed Change and Impacts: This view will be changed dramatically as many of the forest trees in the immediate view will be removed to accommodate the terraced expansion of the car-park uphill to the left (west). In the short and medium term the area will be opened up and loose its current enclosed character, however where feasible selected trees will be retained and the wider mountain landscape and forest will still exist beyond the expanded car-park footprint (to the left of the view and further uphill). It should be noted that many of these trees are over-mature and would normally have been harvested by now. Wind-throw and snapping is evident amongst the trees. New broadleaved woodland planting within and around the new car-park will be established to integrate the expanded facility into the landscape and new paths and access routes will be laid out here. In the long term the mature wooded context will re-establish around the expanded car-park.

The **magnitude** of change would be **High** - *Extensive intrusion of the development in the view, or partial intrusion that obstructs valued features or characteristics*.

The effect would be **Very Significant**

The **quality** of the change would be **adverse** in the short term - *Would degrade, diminish or destroy the integrity of valued features, elements or their setting* - changing to **neutral** in the medium - *Scheme complements the scale, landform and pattern of the landscape view and maintains landscape quality* - and **beneficial** in the long term -. *the restoration of valued characteristic features or repairs / removes damage caused by existing land uses*. This reflects the drastic but inevitability of the tree removal as part of the forestry cycle and their stability, the need for improved parking and the associated native woodland planting scheme as part of the works which will restore the landscape over time.

Although the change would be incremental and its quality improve over time it would also be **Permanent**.

10.7.3.2 A2 View along R115 toward new bridge;

Existing View: This is of the approach towards the site coming from the city and looking south along a stretch of the R115. Most visitors would use this to access the site and the entrance to the site can be seen in the middle of the view. The road is heavily enclosed by local vegetation – typically beech trees on both sides. Stone boundary walls are visible either side. On Hell Fire Wood side this is a low feature and clothed in vegetation. The roads bends to the left heading south past the entrance to the site. What is visible is a typical rural road in the area vegetated on both side with an apparent gap where the Hell Fire Wood is accessed and a small finger post points the way.

Viewpoint Sensitivity: The viewpoint is of **Medium** sensitivity, people travelling along the road – it is not a designated scenic route at this location.

Proposed Change and Impacts: The main impacts visible here would be the formalisation / regularisation of the entrance with new low walls, a raised threshold area on the road and a new footpath along the Hell Fire Wood boundary The new tree canopy walk would thread itself through the boundary trees on either side announcing the entrance and becoming a unique feature along the road. The Hell Fire Wood boundaries would become more defined in character.

The **magnitude** of change would be **Medium** - *introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity.*

The **significance** of this would be **moderate**.

The **quality** of the change would be **beneficial** - *improves landscape view quality and character*. The view reflects improvement to the existing working of this area – improved pedestrian facilities, an enhanced entrance, better edge definition of the Hell Fire Wood and introduction of a distinctive new feature reflecting the enhanced role of the twin sites and linking them. In addition the normally chaotic parking and traffic issues here will be removed with the increase in parking provision internally within the site.

The change would be **Permanent**.

10.7.3.3 A3 Corner of road turning up towards DMVC – near adjacent property boundary

Existing View: This is the view of the bend at the norther corner of the site adjacent a residential property boundary looking at the large old Sycamore tree in this location, along the forest road heading uphill, and to the left and behind the Sycamore tree the area of proposed parking at this location. What is visible is a dense area of mixed trees, predominantly spruce but with intermittent Beech and other broadleaves present giving an attractive mixed mature character. To the right (west) of the forest road a stand of conifer trunks can be seen rising up the hill.

Viewpoint Sensitivity: The viewpoint is of **high** sensitivity, owing to its location in the forest recreation area, at the start of trails and close to a residential boundary.

Proposed Change and Impacts: At this location there will be a partial view towards the new terraced parking areas and access road. The stone filled gabion walls can be seen and the reinforced grass parking bays. Further uphill another wall can be seen. In the immediate view to the centre and right the existing vegetation would be retained, including the mature Sycamore and the realigned roads allow further planting to this corner. Although the construction of the car-park will result in the loss of many of the existing conifer trees, these would be due to be harvested anyway and new planting will quickly re-establish a woodland setting.

The **magnitude** of change would be **Medium** - *Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity.*

The effect would be **Significant**.

The **quality** of the change would be **adverse** in the short term - *Would degrade, diminish or destroy the integrity of valued features, elements or their setting* - changing to **neutral** in the medium - *Scheme complements the scale, landform and pattern of the landscape view and maintains landscape quality* - and **beneficial** in the long term -. *the restoration of valued characteristic features or repairs / removes damage caused by existing land uses*. This reflects the drastic but inevitability of the tree removal as part of the forestry cycle and their stability, the need for improved parking and the associated permanent native woodland planting scheme as part of the works.

Although the change would be incremental and its quality improve over time it would also be **Permanent**.

10.7.3.4 A4 Approaches To New Building

Existing View: This is the view midway up the forest road as it crosses the direct eroded trail from the car-park. It looks directly at the proposed location of the new visitor centre. IN the foreground the stoned forest road can be seen veering to the right around the topography of the hill. Timber posts carrying electrical cables can be seen running parallel. To the right in what is actually the recent area of clear felling, the retained beech trees come down to meet the forest road. To the left the landscape is partially open with some scattered conifers visible. In the distance the mountains further south can be seen. It is a landscape typical of the increasing elevation of Hell Fire Wood and Montpelier Hill.

Viewpoint Sensitivity: The viewpoint is of **high** sensitivity, owing to its location in the forest recreation area.

Proposed Change and Impacts: The main change or impact in this view will be the insertion of the new building centrally in the view. The wooded setting either side will remain and be enhanced with more broadleaved species. Views to the mountains to the south will be partially obscured from this location. The new visitor centre in granite and wood will provide a distinctive new element. Although its materiality will be of the mountain and forest setting it will also be nestling in the surrounding evolving woodland when viewed from this location which will be brought close to and around the building with trees adjacent and in the courtyard. The forest road will be regularised as a rustic tarmac surface to facilitate access to the new building. Low bollards lights will mark the road edge.

The **magnitude** of change would be **High** – *Partial - Extensive intrusion of the development in the view.*

The effect would be **Very Significant**.

The **quality** of the change would be **Neutral** and **Permanent** - *Scheme complements the scale, landform and pattern of the landscape view and maintains landscape quality.*

Although a prominent and new element in the view with significant effects, the new building is also well considered in terms of location and scale, and sensitively designed of local materials. Its function is also appropriate to the location. Although a prominent feature in views currently enjoyed, it will also be a destination or location for enjoying those views and provide facilities for visitors.

10.7.3.5 A5 Looking down at centre from main forest road;

Existing View: This is a view the from the forest road as it meanders up the mountain above the proposed visitor centre. It looks directly downhill at the proposed location of the new visitor centre. In the foreground the area of forest that has been recently felled can be seen with rocks and brash from the cutting operations visible. To the right (south) some of the retained stands of mature beech can be seen. Further downhill younger mixed forest trees are visible. In the middle of the view to the left (north west) the mature conifers around the car-park are visible and to the centre and right, Massy's Wood. Beyond these the city plain rolls out and distant views to Dublin Bay and Howth. This is one of a number of typical panoramas that open up as one passes through areas with open views out from the hill.

Viewpoint Sensitivity: The viewpoint is of **high** sensitivity, owing to its location in the forest recreation area.

Proposed Change and Impacts: The main change or impact in this view, in the short term, will be the insertion of the new building centrally in the view. The wooded setting either side will remain and be enhanced with more broadleaved species. Views to the city and bay will not be affected. The new visitor centre in granite and wood will provide a distinctive new element. Although its materiality will be of the mountain and forest setting, including its green roof, it will also be nestling in the surrounding evolving woodland when viewed from this location which will be brought close to and around the building with trees adjacent and in the courtyard. This view of the new visitor centre and wider panorama will gradually disappear from this location as new planting in the foreground on the clear felled lands gradually establishes. However these panoramas are dynamic features on the hill and the new woodland will be managed to maintain areas of open views as well as enclosure.

The **magnitude** of change would be **Medium** – *Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity*.

The effect would be **Significant**.

The **quality** of the change would be **Neutral** in the short term - *Scheme complements the scale, landform and pattern of the landscape view and maintains landscape quality*. This will improve to **Beneficial** in the Medium and Long Term - *enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses*.

Although initially prominent in the view the visitor centre is also well considered in terms of location and scale, and sensitively designed of local materials. Its function is also appropriate to the location. Over time however from this and other views on Montpelier Hill the regenerating new woodland will enclose, screen and obscure views to the new centre until the walker / visitor comes immediately adjacent to it. In this view, the visibility of the visitor centre will be obscured by the intervening woodland.

10.7.3.6 A6 Approaches to Hell Fire Club building;

Existing View: This is a view the from the forest trail that runs directly and steeply up Montpelier Hill from the existing car-park and arrives at the clearing around the Hell Fire Club. In the foreground the trail is visible and the eroded grassy track across the clearing. The clearing itself is mostly upland an upland flowery meadow ad the Hell Fire Club visible as a ruin centrally within this. To the left (south) the existing conifer plantations can be seen, and to the right(north) the more open and traditional landscape of the hill. The view is of the main heritage focal point on the summit of the hill and the location of wide panoramas. The archaeological features are not visible in this view.

Viewpoint Sensitivity: The viewpoint is of **High** sensitivity, owing to its location in the forest recreation area.

Proposed Change and Impacts: The main change or impact in this view, would be the removal of the forest plantation to the rear of the Hell Fire Club restoring the traditional open setting of the building, the introduction of a circular path around the central ruins/monuments with low interpretative panels and the regularisation of trails in the foreground. Although the removal of the forest would be a noticeable change this is part of the normal forest cycle. Other changes are subtle and minor.

The **magnitude** of change would be **Low** – *introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity.*

The significance of the effect would be **Slight.**

The **quality** of the change would be **Beneficial** and **Permanent** - *enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses*.

10.7.3.7 A7 Bridge from Main Ride – Massy's North;

Existing View: This is a view from the main Woodland ride from the entrance down through Massy's Wood approximately parallel to the R115. It looks south along the road and it is a classic view of the mature tall Beech trees and woods in the Massy's estate. The simple elements of the woodland and forest road and relative lack of understorey composing an elegant and majestic view. The beginning of the walk through Massy's is an introduction to the key characteristics of the woodland, its atmosphere, romance and magic.

Viewpoint Sensitivity: The viewpoint is of **high** sensitivity, owing to its location in the forest recreation area.

Proposed Change and Impacts: None of the existing elements in the view would be removed – the woodland and walks and romantic and magical character would remain. Into the composition would be inserted the new tree canopy walk from Montpelier Hill and its long ramp can be seen running through and around the trees. The detailed design of the ramp will require minor adjustments to minimise impacts on the trees coupled with localised spot foundations for the columns. The materials of the canopy walk – corten steel – are at home in the woodland and appropriate.

The **magnitude** of change would be **Low** – *Minor intrusion of the development into the view …. resulting in minor alteration to the composition and character of the view but no change to visual amenity.*

The significance of the effect would be **Slight**.

The **quality** of the change would be **Neutral** and **Permanent** - *Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality;*

10.7.3.8 A8 Bridge from Main Ride – Massy's South.

Existing View: As View A7 this is a view the from main Woodland ride from the entrance down through Massy's Wood approximately parallel to the R115. It looks north along the road and is a classic view of the mature tall Beech trees and woods in the Massy's estate. The simple elements of the woodland and forest road and relative lack of understorey composing an elegant and majestic view. The beginning (and near end) of the walk through Massy's is representative of the key characteristics of the woodland, its atmosphere, romance and magic.

Viewpoint Sensitivity: The viewpoint is of **high** sensitivity, owing to its location in the forest recreation area.

Proposed Change and Impacts: None of the existing elements in the view would be removed – the woodland and walks, and the romantic and magical character would remain. Into the composition would be inserted the new tree canopy walk from Montpelier Hill and its ramp can be seen meandering through and around the trees. The detailed design of the ramp will require minor adjustments to minimise impacts on the trees coupled with localised spot foundations for the columns. The materials of the canopy walk – corten steel – are at home in the woodland and appropriate.

The **magnitude** of change would be **Low** – *Minor intrusion of the development into the view …. resulting in minor alteration to the composition and character of the view but no change to visual amenity.*

The significance of the effect would be **Slight**.

The **quality** of the change would be **Neutral** and **Permanent** - Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality.

ZONE B – Viewpoints Within The Local Environs And Middle Distance

10.7.3.9 B1 R115 near Woodtown, looking south towards the site

Existing View: This is of the approach towards the site from near Woodtown, coming from the city and looking south along a stretch of the R115 designated by South Dublin County Council (SDCC) to "Protect and Preserve Significant Views" from it (i.e. a scenic route). Most visitors would use this to access the site. As the road rises with the topography moving towards the site, the skyline of Montpelier Hill repeatedly comes in to the direct line of vision. The road has an attractive tree / hedge-lined rural character.

Viewpoint Sensitivity: The viewpoint is of **high** sensitivity, owing to its location along a designated scenic route.

Proposed Change and Impacts: In the medium to long term the conifers visible on the hill will be replaced with broadleaf/native trees, however the intention would be to retain continuous tree cover and some conifers as features. In addition, the small number of conifers around the Hell Fire Club building which are currently visible above the skyline will be removed, to allow greater visibility of the building from the north and west. The core built elements – visitor Centre, tree canopy bridge and parking - would not be visible from this location.

The **magnitude** of change would be **Negligible** - *introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.*

The significance of this would be **slight.**

The **quality** of the change would be **beneficial** – *improves landscape(townscape)/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features.*

Although the change would be incremental it would also be **Permanent**.

10.7.3.10 B2 Neighbouring Property To South

Existing View: This is of the southern boundary of Hell Fire Wood from a small cluster of properties to the south of the site off the R115. The view looks north in the direction of the site boundary and proposed new visitor centre. Mature trees within Hell Fire Wood are visible along the site boundary and younger trees further internally. These screen views into the site but containing mature broadleaved trees (Beech) also create an attractive edge to the woods.

Viewpoint Sensitivity: The viewpoint is of **high** sensitivity, representing adjacent residences.

Proposed Change and Impacts: None of the trees visible in the view along the boundary will be affected by the development. Those internally will be retained and along the boundary more densely planted screen planting will be established with a boundary paladin type fence to deter trespass onto the private housing land. The proposed new visitor centre will be partly visible amongst the trees in the short term.

Visual Effects: At this distance, the **magnitude** of change would be **medium** in the short term (*Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity),* falling to **low in the medium and long term** *(Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity*).

This would be **significant in the short term** and **slight in the medium and longer term**.

The **quality** of the change would be **neutral in the short term**, and remain so **in the medium and long term** - maintains landscape quality.

10.7.3.11 B3 Timbertrove Entrance on R115

Existing View: This is from the Timbertrove entrance on the R115, looking south in the direction of the site entrance. Roadside properties, whose rear boundary adjoins the site, occupy a significant portion of this frame. Visible behind those properties are mature conifers, which adjoin the carpark on the site. This is the route most visitors use to access the site, although this stretch of the R115 is not designated as a scenic route.

Viewpoint Sensitivity: The viewpoint is of **Medium** sensitivity, people travelling along the road as well as adjacent residences and businesses.– it is not a designated scenic route at this location.

Proposed Change and Impacts: None of the site changes will be visible from this location other than the long term transition and management of the conifer plantations to broadleaved woodland. Along the road in the foreground a new footpath will be constructed to facilitae pedestrian access to the site.

Visual Effects: The **magnitude** of change would be **low** - *Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity* - and **Permanent.**

The **significance** would be **slight in the short, medium and longer term.**

The **quality** of the change would be **neutral**.

10.7.3.12 B4 Cruagh Wood car-park

Existing View: This view is from Cruagh Road, looking northwest towards the site on Montpelier Hill. As it offers significant views out over the city, the road is designated by SDCC to “Protect and Preserve Significant Views” from it (i.e. a scenic route). Due to the openness of the viewpoint, the forest on Montpelier Hill (both mature planting and clear fell areas), and the lower lying Massy’s Wood is the focus of the view. The city plain stretches to the right (north) of the hill.

Viewpoint Sensitivity: The viewpoint is of **high** sensitivity, owing to its location along a designated scenic route and recreation area, and the elevated status.

Proposed Change and Impacts: Many of the conifers visible on the site are proposed to be replaced, in time, with broadleaf/native trees, while the clear fell areas will be planted similarly. The proposed visitor centre building will also be partially visible upon construction.

Visual Effects: At this distance, the **magnitude** of change would initially be **medium in the short term** - *Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity* - falling to **low in the medium and long term** - *Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity*.

This would **be significant to very significant in the short term** and **slight in the medium and longer term.**

The **quality** of the change would be **neutral in the short ter**m - *Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality* - reducing to **beneficial in the medium and long term** - *improves landscape(townscape)/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features.*

10.7.3.13 B5 Private Residence on R116

Existing View: This view is from a private entrance on the R116, looking northwest towards the site on Montpelier Hill. While Montpelier Hill occupies a large part of this frame, the site itself does not. Areas of the Hellfire forest property that were clear felled in 2016 are visible, as are the broadleaf trees that were left standing during that harvesting. However, higher up Montpelier Hill, remaining mature conifers partially obscure views of the Hell Fire Club building.

Viewpoint sensitivity: The viewpoint is of **high** sensitivity, as is from the entrance to a private residence.

Proposed Change and Impacts: Many of the conifers visible on the site are proposed to be replaced, in time, with broadleaf/native trees, while the clear fell areas will be planted similarly. The proposed visitor centre building will also be visible upon construction nestling initially prominently in the wooded hillside.

Visual Effects: At this distance, the **magnitude** of change would be initially **medium in the short term** - *introduction of elements that may be prominent but not necessarily uncharacteristic in the context* - falling to **low in the medium and long term** - *introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity.*

The **significance** of this would be **significant to very significant in the short term** and **slight in the medium and longer term**.

The **quality** of the change would be **neutral in the short term** - *maintains landscape quality,* reducing to **beneficial in the medium and long term** - *improves landscape(townscape)/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs*.

10.7.3.14 B6 Third Class Road (cul de sac) at Jamestown

Existing View: This is from a third-class road (cul de sac) at Jamestown looking west towards the site. Montpelier Hill occupies a large part of middle of the view with lowland pasture in the foreground. A small house can be seen nestling in the field boundaries, otherwise there is no built development visible other than the Hell Fire Club itself on the summit west (to the right) of the topmost conifer plantation. Massy's Wood lies between the field and the hill.

Viewpoint sensitivity: The viewpoint is of **medium** sensitivity, representing a local road albeit serving a number of local residences.

Proposed Change and Impacts: Some of the conifers visible on the right side of the view (lower north facing slope) are proposed to be removed to facilitate the construction of the car-park but will be replaced with broadleaf/native trees, while the clear fell areas will be planted similarly. The proposed visitor centre building will be visible upon construction, in the centre of the view, although increasingly less prominent as the new trees and shrubs mature. Over time conifers rising up the rest of the hill will be transformed into mixed broadleaved woodland and the Hell Fire Club itself exposed on the summit of the hill.

Visual Effects: The **magnitude** of change would be **medium in the short term and medium term** - *introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity* - falling to **low in the long term** - *minor alteration to the composition and character of the view.*

The effect would be **significant in the short term** and **moderate/slight in the medium and longer term.**

Changes to the conifer presence on the hill is part of the plantation life cycle and inevitable. They would be replaced with a more desirable and sustainable broadleaved woodland across the hillside albeit over time, integrating the new centre. The building itself is designed to be built of the materials found in the landscape – wood and stone and therefore sit comfortably in its setting.

As a result the **quality** of change would be **neutral in the short term and medium term** - *Scheme complements the scale, landform and pattern of the landscape* - improving to **beneficial in the long term** - *improves landscape view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses*.

10.7.3.15 B7 Third Class Road (cul de ac) at Jamestown

Existing View: As B6 this is from a third-class road (cul de sac) at Jamestown looking west towards the site. Montpelier Hill is partly hidden behind trees and vegetation in middle of the view with lowland pasture in the foreground. As B7 there is no built development visible other than the foreground gates and fences. The clear felld areas and forest plantations on Montpelier Hill can be seen and the open fields on the north facing slopes. Massy's Wood lies partly hidden between the field and the hill above.

Viewpoint sensitivity: The viewpoint is of **medium** sensitivity, representing a local road albeit serving a number of local residences.

Proposed Change and Impacts: Some of the conifers visible on the right side of the view (lower north facing slope) are proposed to be removed to facilitate the construction of the car-park but will be replaced with broadleaf/native trees, while the clear fell areas will be planted similarly. The proposed visitor centre building will be partly visible upon construction, in the centre of the view, although increasingly less prominent as the new trees and shrubs mature. Over time conifers rising up the rest of the hill will be transformed into mixed broadleaved woodland and the Hell Fire Club itself exposed on the summit of the hill.

Visual Effects: The **magnitude** of change would be **medium in the short term and medium term** - *Partial intrusion of the development in the view resulting in change to the composition but not necessarily the character of the view or the visual amenity* - falling to **low in the long term** - *minor alteration to the composition and character of the view.*

The effect would be **significant in the short term** and **moderate/slight in the medium and longer term**.

Changes to the conifer presence on the hill is part of the plantation life cycle and inevitable. They would be replaced with a more desirable and sustainable broadleaved woodland across the hillside albeit over time, integrating the new centre. The building itself is designed to be built of the materials found in the landscape – wood and stone and therefore sit comfortably in its setting.

As a result the **quality** of change would be **neutral in the short term and medium term** - *Scheme complements the scale, landform and pattern of the landscape* - improving to **beneficial in the long term** - *improves landscape view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses.*

10.7.3.16 B8 Mount Venus Cemetery

Existing View: is from Mount Venus Cemetery, looking southwest towards Montpelier Hill, which form the central focus of the view. Beyond the cemetery there are large fields in pasture occupying the rising ground in the middle-distance, as well as Cruagh Mountain to the south (i.e. the left). Massey' Wood can be seen spreading down the valley between Cruagh and Montpelier. The recently clear felled areas on Montpelier Hill can be partly seen including some of the remnant historic Beech trees. Bypon this extending to the summit are conifer plantations. The Hell Fire Club itself is visible to the right (west) of these plantations overlooking open ground.

Viewpoint sensitivity: The viewpoint is of **high** sensitivity, as it is from a designated scenic route although the direction of significant views are north over the city, however given the nature of visitors to a graveyard it would be an important as setting to the cemetery.

Proposed Change and Impacts: Some of the conifers in the middle of the view on the lower part of the hill are proposed to be removed to facilitate the construction of the car-park but will be replaced with broadleaf/native trees. Many of the conifers visible over the rest of the site are proposed to be replaced, in time, with broadleaf/native trees, while the clear fell areas will be replanted similarly. The proposed visitor centre building would be partially visible upon construction although over time would be increasingly obscured by maturing vegetation. In

addition, the conifers around the Hell Fire Club building at the summit would be removed, to allow restore greater visibility of the building as a landmark from the northeast.

Visual Effects: At this distance, the **magnitude** of change would be initially **low to medium in the short term,** falling to **low in the medium and long term** – *Minor - Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity.*

The **significance** of this would be **moderate to significant in the short term** and **slight in the medium and longer term**.

The **quality** of the change would be **neutral in the short term** - *Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality* - reducing to **beneficial in the medium and long term** - *improves landscape/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses.*

10.7.3.17 B9 Car-Park of Merry Ploughboy pub on R116

Existing View: This view is located adjacent the car park of the Merry Ploughboy pub on the R116, looking south-west. Montpelier Hill forms the focus of the view. There are fields and mature trees occupying the foreground and middle distance lowlands. A number of buildings are visible nestling within this landscape, and are present in the immediate context. Massy's Wood can be seen forming a skirt to the base of Montpelier Hill and conifers rising to the summit on the left (north east) of the hill, to the right of the hill (north west) the traditional; field pattern is evident. Mid way up the hill to the left (north east) of the hill can be seen the clear felled forest and some of the historic beech stands. At the summit, the Hell Fire Club is discernible but its visibility and legibility obscured by the conifers behind and around it.

Viewpoint sensitivity: The viewpoint is of **high** sensitivity, representing a local social destination. The road has protected views / routes although these views are generally orientated over the city.

Proposed Change and Impacts: Some of the conifers on the lower part of the hill are proposed to be removed to facilitate the construction of the car-park but will be replaced with broadleaf/native trees. Many of the conifers visible over the rest of the site are proposed to be replaced, in time, with broadleaf/native trees, while the clear fell areas will be replanted similarly. The proposed visitor centre building would be visible upon construction although over time would be increasingly obscured by maturing vegetation. In addition, the conifers around the Hell Fire Club building at the summit would be removed, to allow restore greater visibility of the building as a landmark from the northeast.

Visual Effects: At this distance, the **magnitude** of change would be **low in the short term** - *Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity* - falling to **negligible to low in the medium and long term** - *Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity*.

The **significance** of this would be **slight – moderate in the short term** and **not significant in the medium and longer term**.

The **quality** of the change would be **neutral in the short term**, *Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality* - reducing to **beneficial in the medium and long term** – *improves landscape/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses*.

Zone C – Viewpoints Within the Wider Landscape/Long Distance

10.7.3.18 C1 Halfway up Kilmashogue Lane

Existing View: is from Kilmashogue Lane, looking west towards Montpelier Hill which form a distinct outlier of the mountains to the left (south) overlooking the city plain to the right (north). The foreground is occupied by a mixed lowland landscape of fields, hedgerows, and small woods merging at the base of Montpelier Hill with Massy's Wood. On Montpelier Hill conifers can be seen rising to the summit on the left (east) of the hill, to the right of the hill (north west) the traditional; field pattern is evident. Mid way up the hill to the left (east) of the hill can be seen the clear felled forest and some of the historic beech stands and the main forest road zig zagging up from the stand of conifers adjacent the existing car-park. At the summit, the Hell Fire Club is visible just beyond the adjacent conifers. A number of other buildings are visible in the view including the cluster of buildings on the R115 north of the entrances to both woods (including the Timbertrove complex).

Viewpoint sensitivity: The viewpoint is of **medium** sensitivity, a local road, albeit accessing a recreational forest area on Kilmashogue Mountain.

Proposed Change and Impacts: Some of the conifers on the lower part of Montpelier Hill to the right are proposed to be removed to facilitate the expansion of the car-park but will be replaced with broadleaf/native trees. Many of the conifers visible over the rest of the site are proposed to be replaced, in time, with broadleaf/native trees, while the clear felled areas will be replanted similarly. The proposed visitor centre building would be visible upon construction nestling in the new landscape although over time would be increasingly obscured by maturing vegetation. In addition, the conifers around the Hell Fire Club building at the summit would be removed, to allow restore greater visibility of the building as a landmark from the northeast.

Visual Effects: At this distance, the **magnitude** of change would be **low in the short, medium and long term** - *Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity.*

The **significance** of this would be **slight – moderate and permanent.**

The **quality** of the change would be **neutral in the short term**, *Scheme complements the scale, landform and pattern of the landscape/view and maintains landscape quality* - reducing to **beneficial in the medium and long term** – *improves landscape/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses.*

10.7.3.19 C2 End of Kilmashogue Lane

Existing View: is from near the end of Kilmashogue Lane on Kilmashogue Mountain, looking west towards the site. The view is very similar to Viewpoint C1 with a similar content of elements but at this longer distance Montpelier Hill is one of a range of landforms, landscapes and natural features in the view overlooking the plain of the city just visible to the north.

Viewpoint sensitivity: The viewpoint is of **medium** sensitivity, a local road, albeit accessing a recreational forest area on Kilmashogue Mountain.

Proposed Change and Impacts: As in Viewpoint C1 change will see some of the conifers on the lower part of the hill to the right are proposed to be removed to facilitate the expansion of the car-park but will be replaced with broadleaf/native trees. Many of the conifers visible over the rest of the site are proposed to be replaced, in time, with broadleaf/native trees, while the clear felled areas will be replanted similarly.

The proposed visitor centre building would be visible upon construction nestling in the new landscape although over time would be increasingly obscured by maturing vegetation. In addition, the conifers around the Hell Fire Club building at the summit would be removed, to allow restore greater visibility of the building as a landmark from the northeast.

Visual Effects: At this distance, the **magnitude** of change would be **low in the short term** - *Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity* - falling to **negligible to low in the medium and long term** - *Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.*

The **significance** of this would be **slight – moderate in the short term** and **not significant in the medium and longer term.**

The **quality** of the change would be **neutral in the short term**, *Scheme complements the scale, landform and pattern of the landscape/view and maintains landscape quality* - reducing to **beneficial in the medium and long term** – *improves landscape/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses.*

10.7.3.20 C2 St Columbas School Grounds / Entrance To Kilmashogue Golf Course

Existing View: This view looks southwest towards site from the entrance to Kilmashogue Golf Club, on the St. Columba school grounds. At this distance, Montpelier Hill is still a prominent feature in the view. The sports fields are visible in the foreground however, typically as viewpoints progress further into the city plain and suburbs the lower half of the hill is largely obscured by vegetation/trees in the middle-distance. Houses can be seen nestling in these trees beyond the grounds of the school. Nonetheless the conifers around the car-park area and the clear felled areas on the hill can be seen and the remaining plantations rising to the summit and the open field pattern to the north west of the hill. Upon the summit of Montpelier Hill, the Hell Fire Club is very difficult to distinguish from the established conifers behind it.

Viewpoint sensitivity: The viewpoint is of **high** sensitivity, the setting forming an important backdrop to the sports and recreation in the foreground.

Proposed Change and Impacts: Some of the conifers located to the rear of the existing car-park are to be removed to facilitate the expansion of the car-park but will be replaced with broadleaf/native trees Many of the conifers visible on the site are proposed to be replaced, over time, with broadleaf/native trees, while the clear fell areas will be planted similarly. Owing to the mature deciduous trees in the middle-distance, the proposed visitor centre building will not be visible upon construction. In addition, the conifers around the Hell Fire Club building on the summit of Montpelier Hill will be removed, to restore greater visibility of the landmark building from the north and east.

Visual Effects: At this distance, the **magnitude** of change would be **negligible to low in the short, medium and long term** - *Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.*

The effect would be **not significant and permanent**.

The main impact visible at this distance will be the change to the tree cover as some conifers are removed to accommodate the car-park area. This will reflect ongoing change to the coniferous plantations already underway. Therefore the **quality** of the change would be **neutral in the short term**, *Scheme complements the scale, landform and pattern of the landscape/view and maintains landscape quality* - reducing to **beneficial in the medium and long term** – *improves landscape/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses*.

10.7.3.21 C4 Marley Park

Existing View: This view is from the south western part of Marley Park, looking southwest towards the site. It is typical of views from this regional urban park towards the mountains and Montpelier Hill. Despite large open spaces within the park the view of Montpelier Hill, is typically only visible between gaps in the trees and in this view through a line of poplar trees in the foreground which allows a partial view of the summit and north western fields on the hill.

Viewpoint sensitivity: The viewpoint is of **high** sensitivity, the setting forming an important backdrop to the sports and recreation in the foreground.

Proposed Change and Impacts: In this view the change to the conifers around the Hell Fire Club building on the summit of Montpelier Hill would be visible. These are to be removed to allow greater visibility of the Hell Fire Club restoring its former landmark role. Changes to the remainder of the site would not be visible due to the intervening tree cover.

Visual Effects: At this distance, the **magnitude** of change would be **negligible in the short term, medium and long term** - *introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.*

The **significance** of this would be **imperceptible in the short, medium and long term**.

Although the overall change would be negligible the restoration of the Hell Fire Club as a landmark would be a positive feature. The **quality** of the change would be **beneficial in the short, medium and long term** - *improves landscape(townscape)/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses*.

10.7.3.22 C5 Dundrum Luas stop

Existing View: is looking southwest towards the site from the elevated (i.e. equivalent to the height of a three-storey building) platform of Dundrum Luas Stop. This location is approximately 6km from the site. Thus, Montpellier Hill, let alone the site, constitutes a small proportion of the view towards the Dublin Mountains. Nonetheless the existing tree cover and pattern on the hill is visible from around the existing car-park area to the summit. Typically within the city suburbs the lower half of the hill is obscured by intervening houses and trees.

Viewpoint sensitivity: The viewpoint is of **low** sensitivity, representing a location where people are focused on travelling or other activities.

Proposed Change and Impacts: The main change perceivable here would be to the composition of the tree cover over time as many of the conifers visible on the site are to be replaced with broadleaf/native trees, while the clear fell areas will be planted similarly. In addition, the conifers around the Hell Fire Club building on the summit of Montpelier Hill will be removed, to allow greater visibility of the building from the north and east. Owing to the mature deciduous trees in the middle-distance, the proposed visitor centre building will not be visible upon construction.

Visual Effects: At this distance, the **magnitude** of change would be **negligible in the short term**, **medium and long term** - *introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity*.

This change would be **imperceptible in the short, medium and long term**.

The **quality** of the change would be **beneficial in the short, medium and long term** - *improves landscape (townscape) /view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses.*

10.7.3.23 C6 Loreto Park, Nutgrove

Existing View: is looking southwest across Loreto Park (beside Nutgrove Shopping Centre) towards the site. As this viewpoint is almost 6km from Montpellier Hill, it constitutes a small proportion of the view towards the Dublin Mountains. The existing tree cover and pattern on the hill is only partly visible as typically within the city suburbs much of the hill is obscured by intervening houses and trees. Upon the summit, the Hell Fire Club is very difficult to distinguish from the mature conifers behind it.

Viewpoint sensitivity: The viewpoint is of **high** sensitivity, the setting forming an important backdrop to the park in the foreground.

Proposed Change and Impacts: The main change visible would be the removal of the conifers around the Hell Fire Club building on the summit of Montpelier Hill to allow greater visibility of the building from the north and east. Little else on the proposed changes to the hill will be visible from this viewpoint

Visual Effects: At this distance, the **magnitude** of change would be **negligible in the short term**, **medium and long term** - *Barely discernible intrusion of the development into the view or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.*

The **significance** of this would be **slight in the short, medium and long term.**

The **quality** of the change would be **beneficial in the short, medium and long term** – *restoration of valued characteristics and features.*

10.7.3.24 C7 Kilmashogue Cemetery / M50

Existing View: Although taken from Kilmashogue cemetery, this view is representative of the bend in the M50 at Whitechurch. The M50 in this area offers open views looking southwest across the lowlands of Whitechurch, Rockbrook towards the hills at Montpelier and Cruagh. The composition of the hills, forests, woods and patchwork agricultural landscape is typical of the prospect of the Dublin Mountains to be protected in the SDCC Development plan.

The foreground is occupied by a mixed lowland landscape of fields, hedgerows, and small woods merging at the base of Montpelier Hill with Massy's Wood. On Montpelier Hill conifers can be seen rising to the summit on the left (north east) of the hill, to the right of the hill (north west) the traditional; field pattern is evident. Mid way up the hill to the left (north east) of the hill can be seen the clear felled forest and some of the historic beech stands and the main forest road zig zagging up from the stand of conifers adjacent the existing car-park. At the summit, the Hell Fire Club is partly visible amongst adjacent conifers. A number of other buildings are visible in the view including the cluster of buildings on the R115 north of the entrances to both woods (including the Timbertrove complex) and around Rockbrook and Mount Venus Road various residential dwellings and some larger structures including the DSPCSA cluster of buildings. The view is an attractive rural and working landscape with the hills forming an attractive backdrop to the south.

Viewpoint sensitivity: The viewpoint is of **medium** sensitivity, representing road users on the M50.

Proposed Change and Impacts: Some of the conifers on the lower part of the hill to the right will be removed to facilitate the expansion of the car-park but will be replaced with broadleaf/native trees. Many of the conifers visible over the rest of the site will be replaced, in time, with broadleaf/native trees, while the clear felled areas will be replanted similarly. The proposed visitor centre building would be visible upon construction nestling in the new landscape although over time would be increasingly obscured by maturing vegetation. In addition, the conifers around the Hell Fire Club building at the summit would be removed, to restore greater visibility of the building as a landmark from the northeast.

Visual Effects: Given the direct view to Montpelier Hill, the **magnitude** of change would be **medium in the short term** - *Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in*

change to the composition but not necessarily the character of the view or the visual amenity - falling to **low in the medium and long term** - *Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity.*

The **significance** of this would be **moderate in the short term** and **slight in the medium and longer term.**

Some of the changes reflect the ongoing forestry cycle, the new building would reflect the materials around it – wood and granite - therefore the **quality** of the change would be **neutral in the short term**, *Scheme complements the scale, landform and pattern of the landscape/view and maintains landscape quality* - reducing to **beneficial in the medium and long term** – *improves landscape/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses.*

10.7.3.25 C8 Ballyboden / St Enda's GAA Club

Existing View: This view is from the GAA club at Ballyboden looking south towards the site. Montpelier Hill is partially visible in the view however as elsewhere in the city suburbs and lowlands is substantially screened by nearby house and trees. The landscape patterns on the hill are partially visible – conifer plantations and fields to the west.

Viewpoint sensitivity: The viewpoint is of **high** sensitivity, the setting forming an important backdrop to the sports and recreation in the foreground.

Proposed Change and Impacts: The conifers around the Hell Fire Club building at the summit would be removed, to allow restore greater visibility of the building as a landmark viewed from the north-west. The changes to the conifer plantations would be visible over time however the proposed visitor centre buildings and related infrastructure would not be visible in this view. The visibility of these changes would be limited at this viewpoint due to the intervening trees.

Visual Effects: The **magnitude** of change would be **negligible in the short, medium and long term** - *Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.*

The **significance** of this would be **slight in the short, medium and longer term**.

The visible changes would reflect the transition of the conifer forest to broadleaf and the restoration of the Hell Fire Club landmark and would therefore be **Beneficial and Permanent** – *improves landscape/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses*.

10.7.3.26 C9 Junction 12, M50, Knocklyon

Existing View: is from the Junction 12 (Knocklyon) overpass on the M50, looking south towards the site. Montpelier Hill is prominent in the view above the lowland fields and woods. The face of the hill visible is mostly the north and western side consisting primarily of fields in pasture outside

the site area. Conifers running up the slopes of the hill to the summit are visible and lying to the rear, mask the prominence of the Hell Fire Club which is barely discernible at the summit.

Viewpoint sensitivity: The viewpoint is of **medium** sensitivity, representing road users on the M50.

Proposed Change and Impacts: The conifers around the Hell Fire Club building at the summit would be removed, to allow restore greater visibility of the building as a landmark viewed from the north west. The changes to the conifer plantations would be visible over time however the proposed visitor centre buildings and related infrastructure would not be visible in this view.

Visual Effects: Given the direct view to Montpelier Hill, the **magnitude** of change would be **low in the short, medium and long term** - *Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity.*

The **significance** of this would be **slight in the short, medium and longer term**.

Some of the changes reflect the ongoing forestry cycle and coupled with the enhanced broadleaved woodland planting and restoration of the Hell Fire Club as a landmark would represent a **beneficial quality of change** – *improves landscape/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses* - that would be **permanent**

10.7.3.26 C10 Artificial Mound at Spawell end of Tymon Park

Existing View: This is taken from a feature mound in Tymon park overlooking the Spawell junction on the M50, looking south towards the site. Montpelier Hill is prominent in the view above the lowland fields and woods. The face of the hill visible is mostly the north and western side consisting primarily of fields in pasture outside the site area. Conifers running up the slopes of the hill to the summit are visible and lying to the rear, mask the prominence of the Hell Fire Club which is barely discernible at the summit.

Viewpoint sensitivity: The viewpoint is of **High** sensitivity, representing recreational users of the park.

Proposed Change and Impacts: The conifers around the Hell Fire Club building at the summit would be removed, to allow restore greater visibility of the building as a landmark viewed from the north west. The changes to the conifer plantations would be visible over time however the proposed visitor centre buildings and related infrastructure would not be visible in this view.

Visual Effects: Given the direct view to Montpelier Hill, the **magnitude** of change would **be low in the short, medium and long term** - *introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity*.

The **significance** of this would be **slight in the short, medium and longer term**.

Some of the changes reflect the ongoing forestry cycle and coupled with the enhanced broadleaved woodland planting and restoration of the Hell Fire Club as a landmark would

represent a **beneficial quality of change** – *improves landscape/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses* - that would be **permanent**

10.7.3.27 C11 Rathfarnham Shopping Centre

Existing View: This view is from a shopping centre in the residential suburb of Rathfarnham. Montpelier Hill is partially visible in the view however as elsewhere in the city suburbs and lowlands is substantially screened by nearby house and trees. The landscape patterns on the hill are partially visible – conifer plantations to the east and fields to the west.

Viewpoint sensitivity: The viewpoint is of **medium** sensitivity, representing a mix of residential and shopping location.

Proposed Change and Impacts: The conifers around the Hell Fire Club building at the summit would be removed, to allow restore greater visibility of the building as a landmark viewed from the north-west. The changes to the conifer plantations would be visible over time however the proposed visitor centre buildings and related infrastructure would not be visible in this view. The visibility of these changes would be limited at this viewpoint due to the intervening houses and trees.

Visual Effects: The **magnitude** of change would be **negligible in the short, medium and long term** - *Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity*.

The effect would be **Not Significant** .

The visible changes would reflect the transition of the conifer forest to broadleaf and the restoration of the Hell Fire Club landmark and would therefore be **Beneficial and Permanent** – *improves landscape/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses*.

10.7.3.28 C12 Phoenix Park

Existing View: This is taken from the elevated bunds around the Magazine Fort in the Phoenix Park and represents a national park / area of recreation, a heritage site and a historic viewing point (Malton Views of Dublin). Montpelier Hill is visible in the view as part of the Dublin Mountains prospect that forms a backdrop to the city. The landscape pattern on the hill is clearly visible but at this distance little detail.

Viewpoint sensitivity: The viewpoint is of **High** sensitivity, representing recreational users of the park and a heritage location.

Proposed Change and Impacts: The conifers around the Hell Fire Club building at the summit would be removed, to restore greater visibility of the building as a landmark viewed from the north west. The changes to the conifer plantations would be visible over time however the proposed visitor centre buildings and related infrastructure would not be visible in this view.

Visual Effects: The **magnitude** of change would be **negligible in the short, medium and long term** - *Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.*

The **significance** of this would be **slight in the short, medium and longer term**.

Some of the changes reflect the ongoing forestry cycle and coupled with the enhanced broadleaved woodland planting and restoration of the Hell Fire Club as a landmark would represent a **beneficial quality of change** – *improves landscape/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses* - that would be **permanent**

10.7.3.29 C13 Ringsend

Existing View: This is taken from the south wall and represents a long distance vista of Dublin from the sea with the mountains as a backdrop. Montpelier Hill is visible in the view as part of the Dublin Mountains. However partly due to light conditions and distance the landscape pattern on the hill is not legible.

Viewpoint sensitivity: The viewpoint is of **Medium - High** sensitivity, representing recreational users of the seaside location as well as other users.

Proposed Change and Impacts: The changes would be difficult to perceive at this distance.

Visual Effects: The **magnitude** of change would be **negligible in the short, medium and long term** - *Barely discernible intrusion of the development into the view.*

The **significance** of this would be **slight – not significant in the short, medium and longer term**.

Due to distance the effects would be perceived as **neutral** - *maintains landscape quality*.

10.7.4 Summaries of Visual Impacts in Zones A, B, C

The following Tables summarise the visual effects for the different Zones:

Table 10.6 Summary of Visual Impact / Effects Assessment Zone A Viewpoints

No.	Location / Description	Viewpoint Sensitivity	Magnitude of Change	Significance			
				Short Term	Medium Term	Long Term	Permanent
Zone A – Within the Site							
1	Entrance – approaching new car-park;	High	High	**Very Significant / Adverse**	**Very Significant / Neutral**	**Very Significant / Beneficial**	
2	View along R115 toward new bridge	Medium	Medium	**Moderate / Beneficial**			
3	Corner of road turning up towards DMVC – near adjacent property boundary	High	Medium	**Significant / Adverse**	**Significant / Neutral**	**Significant / Beneficial**	
4	Approaches to new building	High	High	**Very Significant / Neutral**			
5	Looking down at centre from main forest road	High	Medium	**Significant / Neutral**	**Significant / Beneficial**		
6	Approaches to Hell Fire Club building	High	Low	**Slight / Beneficial**			
7	Bridge from Main Ride – Massy's North	High	Low	**Slight / Neutral**			
8	Bridge from Main Ride – Massy's South	High	Low	**Slight / Neutral**			

Table 10.7 Summary of Visual Impact / Effects Assessment Zone B Viewpoints

No.	Location / Description	Viewpoint Sensitivity	Magnitude of Change	Significance			
				Short Term	Medium Term	Long Term	Permanent
Zone B – Immediate Environs and Middle Distance							
1	R115 near Woodtown, looking south towards the site	High	Negligible	**Slight / Beneficial**			
2	Neighbouring property to south	High	Medium falling to Low	**Significant / Neutral**	**Slight / Neutral**		
3	Timbertrove Entrance on R115	Medium	Low	**Slight / Neutral**			
4	Cruagh Wood car-park	High	Medium falling to Low	**Very Significant / Neutral**	**Slight / Beneficial**		
5	Private Residence on R116	High	Medium falling to Low	**Significant / Neutral**	**Slight / Beneficial**		
6	Third Class Road (cul de sac) at Jamestown	Medium	Medium falling to Low	**Significant / Neutral**		**Moderate – Slight / Beneficial**	
7	Third Class Road (cul de ac) at Jamestown	Medium	Medium falling to Low	**Significant / Neutral**	**Moderate – Slight / Beneficial**		
8	Mount Venus Cemetery	High	Low-Medium falling to Low	**Moderate / Neutral**	**Slight / Beneficial**		
9	Car-Park of Merry Ploughboy pub on R116	High	Low falling to Negligible	**Slight / Neutral**	**Not Significant / Beneficial**		

Table 10.8 Summary of Visual Impact / Effects Assessment Zone C Viewpoints

No.	Location / Description	Viewpoint Sensitivity	Magnitude of Change	Significance			
				Short Term	Medium Term	Long Term	Permanent
Zone C – Viewpoints within the wider landscape/long distance.							
1	Halfway up Kilmashogue Lane	Medium	Low	**Slight – Moderate / Neutral**	**Slight-Moderate / Beneficial**		
2	End of Kilmashogue Lane	Medium	Low falling to Negligible	**Slight – Moderate / Neutral**	**Not Significant / Beneficial**		
3	St Columbas School Grounds / Entrance to Kilmashogue Golf Course	High	Negligible - Low	**Not Significant / Neutral**	**Not Significant / Beneficial**		
4	Marley Park	High	Negligible	**Imperceptible / Beneficial**			
5	Dundrum Luas stop	Low	Negligible	**Imperceptible / Beneficial**			
6	Loreto Park Nutgrove	High	Negligible	**Slight / Beneficial**			
7	Kilmashogue Cemetery / M50	Medium	Medium falling to Low	**Moderate / Neutral**	**Slight / Beneficial**		
8	Ballyboden / St Enda's GAA Club	High	Negligible	**Slight / Beneficial**			
9	Junction 12, M50, Knocklyon	High	Medium	**Slight / Beneficial**			
10	Artificial Mound at Spawell end of Tymon Park	High	Low	**Slight / Beneficial**			
11	Rathfarnham Shopping Centre	Medium	Negligible	**Not Significant / Beneficial**			
12	Phoenix Park	High	Negligible	**Slight / Beneficial**			
13	Rinsend	Medium - High	Negligible	**Slight – Not Significant / Neutral**			

10.7.5 Night Time Assessment

Five representative views were assessed for the visual effects at night from the new building due to lighting in the evening time. Although it is proposed that the visitor centre operate during daylight hours only (up to 8pm in the summer and 5pm in the winter months), it is possible that the building would remain internally lit occasionally after dark. The viewpoints were all in Zone B – Immediate Environs and Middle Distance which currently enjoy generally dark views to the mountains.

For all these views the magnitude is regarded as Negligible to Low, and the significance of effects Slight.

10.8 RESIDUAL IMPACT AND PROPOSED MONITORING

Residual impacts which may arise from a landscape and visual perspective may include unforeseen and localised intrusion in views or local / residential amenity. Landscape and visual effects have been mitigated throughout the design development process through site selection, materials selection and extensive landscape development to create a new and long term context / amenity for the new centre. Unresolved visual impacts that may arise post construction or through the lifetime of the project can be addressed through further planting of native trees and shrubs, either close to the viewer, boundary or the new structures, including evergreen species if appropriate.

10.9 MAJOR ACCIDENTS AND NATURAL DISASTERS, CLIMATE CHANGE AND NATURAL RESOURCES

It is considered unlikely that the proposed development will result in an increased risk of major accidents or disasters. It is more likely that the removal of coniferous forest and, over time, the conversion of the forest to broadleaved woodland with more day to day management will reduce the risk of forest fire which is always a risk in coniferous forest.

There will be no negative residual impact on Natural Resources as a result of the proposed development. Impacts on climate change during the construction and operational phases are considered to be imperceptible and therefore no residual impacts are predicted. In the long term the creation of permanent broadleaved woodland will create a carbon store and enhanced biodiversity.

10.10 CUMULATIVE IMPACTS

No cumulative effects have been identified.

11.0 ARCHAEOLOGY AND CULTURAL HERITAGE

11.1 INTRODUCTION

This chapter has been prepared by Julia Crimmins of Cathal Crimmins Architects. Julia Crimmins is a qualified archaeologist and has several years of experience as a field archaeologist having worked on both commercial and research excavations in Ireland the UK and France has previously carried out desk based archaeological assessments .

The Dublin/Wicklow Mountains are an area of huge archaeological significance and contains a multitude archaeological sites and remains which date from the Neolithic to the early modern period.

11.2 METHODOLOGY

Initial analysis focused on the immediate areas of Montpelier Hill and Massy's Estate. The Archaeological Survey of Ireland (ASI) Sites and Monuments Record (SMR), the Record of Monuments and Places (RMP), Irish Antiquities Division, National Museum of Ireland Topographical Files and the Excavations Bulletin were all consulted to determine known archaeological sites in the area. Historic maps of the area and local historical sources were also consulted.

Particular thanks should be extended to Neil Jackman of Abarta Heritage for providing a 1950s aerial photograph of Montpelier Hill which comes from the Coillte archives and shows the area prior to the present Coillte tree plantation and for supplying archaeological reports on recent excavations which he carried out on Montpelier Hill.

The site was visited on a number of occasions and photographs were taken in late 2016.

Because of the immense significance of the site several archaeological publications were also consulted in relation to the archaeology of the wider Dublin/Wicklow mountains region and its national/international context. Bradley's *The Prehistory of Britain and Ireland* (2007), Cooney's, *Landscapes of Neolithic Ireland* (2000 and 2012 revised edition) and Cummings *the Neolithic of Britain and Ireland* (2017).

Thanks must also be extended to Rosaleen Dwyer, the Heritage Officer in South Dublin County Council for providing a copy of the recent Ní Lionáin and Davis' *The Dublin Uplands – Past, Present, and Future* which was a project commissioned by South Dublin County Council (SDCC) and Dun Laoghaire Rathdown County Council (DLR), part funded by the Heritage Council and undertaken by Dr. Clíodhna Ní Lionáin and Dr. Steve Davis of UCD School of Archaeology in 2014. Articles on specific sites and the National Monuments Acts 1930-2004 were also consulted.

The area is well known for its folklore, particularly in relation to the Hell Fire Club itself. In parallel with the archaeological research in to the area, several historical and folklore sources were consulted including local historical sources, published histories of the Hell Fire Clubs and the National Folklore Archive.

Having inspected the various sites and established both their significance and current condition, recommendations for the conservation, repair and ongoing management of these sites were formulated. The various proposals for the site were assessed in terms of their impacts. Mitigating measures were identified, including inputs in to the design process in consultation with other members of the team.

11.3 EXISTING ENVIRONMENT

A preliminary program prepared by Paul Keogh Architects identified six National Monuments within Coillte's Massy's Wood, and Hell Fire Club land holdings which are protected under the National Monuments Acts 1930-2004 and which are included in the Sites and Monuments Record (SMR):

11.3.1 Passage Tomb SMR # DU025-001001

Figure 11.1 The Passage Tomb (SMR No. DU025-001001) as seen from the ground with the Hell Fire Club (SMR No. DU025-001003) in the background

To the south of the early 18th century Hell Fire Club building lie the remains of two Neolithic passage-tombs (SMR # DU025-001001 & DU025-001002). The tombs were said to have been largely demolished when William Connolly constructed the Hell Fire Club reputedly using masonry from the above ground cairns of the passage-tombs[9].

11.3.1.1 Background

A passage-tomb is defined as *'a round mound, usually surrounded by a kerb of large stones, enclosing a burial chamber, usually with a corbelled roof, which is entered by a passage, usually lintelled. Many tombs have side and end recesses opening off a central chamber, resulting in a cruciform plan. Cremation was the predominant burial rite in passage tombs which primarily date from 3300–2900 BC, though some simpler tombs in Carrowmore, County Sligo, have produced radiocarbon dates suggesting use even earlier in the Neolithic, circa 4000 BC'*[10].

[9] Byrne, P. (1976), p 29; Handcock, W. D. (1899), p 87; Joyce, W. S (1921), p124-6; Jackman, N. (2015) , p 7.
[10] Jackman, N. (2015), p 9; National Monuments Service; Scope Note, www.archaeology.ie

The antiquarian Austin Cooper who visited Montpelier Hill in 1779, and described the larger of the two passage tombs (SMR # DU025-001001) as follows[11]:

> *'Upon the top of this Hill formerly stood a kairn, which was removed to make room for the house… behind the house are still the remains of the kairn, the limits of it, were composed of large stones set edgeways, which made a sort of a wall or boundary of about. 18 Inches high & within side those, were the small stones heaped up. It is 34 yards Diameter or 102 in circumference. In the very centre, is a large stone 9 feet long, 6 feet broad & abt. 3 feet thick, not raised upon large stones but lying low, with the stones cleared away from about it. There are several other large stones lying upon the heap'.*

The description indicates that there were kerbstones, not apparent today, visible along the perimeter in the SE. It has been suggested that many of the stones were taken away and used in the construction of the Military Road at the start of the nineteenth century[12].

Geraldine Stout of the National Monuments Service visited the site in the 1990s and described it as follows[13]:

> *'what survives today south of the Hell Fire Club is a horse-shoe shaped embankment or mound with a hollowed interior, opening to the North-North-East. There is evidence for a recent fire in the interior. There are two stones visible along the perimeter in the south-east'.*

[11] from the diaries of Austin Cooper, Montpelier eighteenth July 1779, in Price, L. (ed.) (1942)
[12] Fewer, M (2007), p 70
[13] Stout, G. (1993) National Monuments Service, Archaeological Survey of Ireland, Sites and Monuments Record file DU025-001001.

Archaeological investigations:

Figure 11.2 Aerial view of the passage tombs during the 2016 excavation of the larger tomb (SMR No. DU025-001001). The smaller one (SMR No. DU025-001002) is marked ordnance pillar. Image courtesy of Abarta Heritage.

In spite of the destruction in the 18th and 19th centuries, the site is still considered of high archaeological potential. The Hell Fire Archaeology Project is being carried out on a phased basis and is funded by funded by Dublin South County Council. The project aims to highlight the archaeological landscape of Montpelier Hill. Three of the four phases have been completed as of July 2017[14]. The final phase which consists of post excavation analysis of the findings of phases 2 and 3 and is currently underway[15].

Phase 1 of the project consisted of an investigation of the site using non-intrusive methods, including a desk-based assessment, a LiDAR survey by Dr. Steve Davis of University College Dublin and a geophysical survey of the top of Montpelier Hill that had been carried out in 2014 by Dr. James Bonsall of Earthsound Archaeological Geophysics, under license 14R0033[16]. The history of the Hell Fire Club was also explored.

Phase 2 consisted of preliminary archaeological testing at the Hell Fire Club, carried out by by Neil Jackman in April 2015[17]. Testing was carried out by hand on the lager of the two tombs (SMR#: DU025-001001) 2015 under license 15E0101 and was conducted in order to clarify the results of the geophysical survey[18]. The excavation focused on investigating the nature of two

[14] Jackman, N. (2015), p 8.
[15] Jackman, N. (2015), p 8.
[16] Jackman, N. (2015), p 8; Gimson, H. & Bonsall, J. (2014).
[17] Jackman, N. (2015).
[18] Jackman, N. (2015), p 3, 7, 8; Gimson, H. & Bonsall, J. (2014).

sites at the Hell Fire Club which were thought to be Neolithic passage-tombs (SMR # DU025-001001 & DU025-001002) and obtaining a better understanding the physical remains[19].

Four 2m x 2m test-pits were excavated and were located at specific features of archaeological potential that had been revealed by the geophysics[20].Of the features identified in in the test excavation, those in trenches 1, 3 and 4 proved to be of no archaeological significance[21]. Trench 2 revealed a possible outer berm or enclosing element for passage tomb DU025-001001[22]. A quartzite layer similar to that found at Newgrange was identified.

Phase 3 involved a more focused excavation by experienced professional archaeologist, students and local community groups and was carried out in 2016. Two trenches were excavated.

Trench 1:
A large linear trench, 15m x 2m, orientated N-S and running from the centre of the monument towards the external edge was excavated[23]. Trench 1 revealed that part of the mound and cairn still exists, particularly on the southern side of the monument. The oldest layer encountered in Trench 1 was a clay layer, sealed beneath the cairn from which two potential pieces of worked flint and charcoal samples were taken in order to determine the construction date of the tomb. The surviving cairn material consisted of 2-3 courses of large stones, loosely stacked. On the southern side of the cairn remnant there was a series of 6 potentially prehistoric layers of gravels and silty clays in alternating mid-brown and bluish grey layers, interspersed with layers of iron-pan. Jackman thought that these layers may have been an original part of the construction, and possibly represent layers of cut sods that were piled around the outer edge of the cairn to help to prevent the loose stone from slipping outwards at the base.

Trench 2:
a trench 10m x 2m was was located to the north and orientated E-W[24]. This trench ran at right angles to trench 1 and was situated in the centre of the of the most disturbed part of the monument but also indicated that there is significant potential for the survival of buried archaeological contexts. In situ original cairn material was identified relating to the tomb construction. The enclosing fosse which follows the edge of the monument was identified and is thought to be a late robber trench probably associated with the quarrying of kerbstones as building material for the construction of the nearby Old Military Road at the beginning of the 19th century.

Prior to the 2016 excavation Jackman hoped that the excavation of the north-eastern quadrant of the tomb would reveal the stone sockets that held the orthostats upright. This will allow the orientation of the passageway to be identified, and could lead to information about whether the tomb was aligned to any particular geographical feature, or whether it had an alignment to a solstice or astronomical feature[25]. The association of passage tombs with the marking or

[19] Jackman, N. (2015), p 3.
[20] Jackman, N. (2015), p 3.
[21] Jackman, N. (2015), p 3.
[22] Jackman, N. (2015), p 3.
[23] Jackman, N. (2016). P 17
[24] Jackman, N. (2016)., p 27
[25] Jackman, N. (2016), p 27

particular events such as the winter or summer solstice or the equinoxes is well known, particularly at Newgrange and Knowth in Meath and Knockroe, Co, Kilkenny[26].

Cooney states that these turning points in the cycle of the seasons in all probability would have been of considerable social significance and could be related to personal and social concerns such as birth, fertility and death[27]. The encounters with the other world take place in special places which are liminal, between this world and the spirit world and include hill tops or beside rivers[28].

Some depressions which could be the sockets which could be the orthostats upright were identified in both trenches. Two located in trench one was located under a large dislodged boulders or stones so it very likely is a socket and associated orthostat, one of which may relate to the central chamber[29].

Finds which were uncovered in the course of the excavation included worked pieces of flint which Jackman thought were debitage or waste material from the manufacture of flint tools. Some pieces of possibly worked chert were also discovered. A polished stone axe was discovered in the disturbed upper layers of trench 2, having been deposited there in the construction of the hunting lodge in the early 18th century or the military road in the early 19th. There was no wear on the blade by the axe itself was broken, leading to the possibility that it was a ritual offering.

The discovery of art on two remaining small boulders at the site are a strong indicator that the site is a passage tomb as megalithic art is found almost exclusively on passage graves in Ireland[30]. Both boulders were ex-situ, having been disturbed when the monument was largely demolished and the stones used to construct the Hell Fire Club but it is likely that they are orthostats and are ether kerb stones or formed part of the burial chamber. The artwork has been damaged by weathering and fire. Laser scanning has been carried out by Robert Shaw and Gary Devlin of the Discovery Programme, and photogrammetry by Ken Williams of Shadows & Stone both of which have revealed the art in more detail. The discovery of this are work provides hope that more may be discovered in the 18th century Hell Fire Club building.

The remains that were encountered in trench one and the associated artefacts confirmed that the feature is indeed the remains of a passage tomb.

Post medieval artefacts that were uncovered include a large assemblage of eighteenth, nineteenth and twentieth century artefacts.

Two pieces of post-medieval tile were found within Trench 1 which had what appeared to be the remains of a lead glaze. Jackman states that are similar to those of medieval date though they may well represent a ‘rusticated’ type tiling from the kitchens or working area of the hunting lodge[31].

A fine clay tobacco pipe featuring zoomorphic decoration was also recovered from Trench 1. The decoration consists of a bird’s claw holding the pipe bowl which possibly represents an egg. The

[26] Jackman, N. (2016), p 27
[27] Cooney, G. (2000), p.88
[28] Cooney, G. (2000), p.89
[29] Jackman, N. (2016), p 18 19
[30] Shee Twohig, E. (1981)
[31] Jackman, N. (2016), p 22

pipe is likely to date to the first half of the nineteenth century[32]. A number of 20th century coins were also recovered, including a one penny piece (1937) and a halfpenny (1939)[33]. The remaining finds were of more recent date. A representative sample of material was kept and includes pottery, glass, bottle tops and other detritus from recreational activity[34].

Phase 4 represents the final phase of the Hell Fire Archaeology Project. It is currently being carried out and involves post-excavation analysis of the finds and samples recovered during Phase 2 & 3[35]. Again community groups are involved[36]. The post-excavation phase focuses on dissemination of the results, in order to fully determine the nature and significance of the archaeological features and information about the nature, period and activity on the site[37]. Radiocarbon dating of charcoal samples taken from the cairn will be used to date the construction of the tomb. It will be followed by publication[38].

11.3.1.2 Description

Apart from undulations in the terrain and boulders in the vicinity, there are few visible above-ground traces of the cairn that once covered the tomb. The above ground remains consisting of a low mound, located south the Hell Fire Club, on the crest of Montpellier Hill. In her assessment of the site, Margaret Keane stated[39]:

> *"The monument appears as a hollowed-out mound (dims. 18.8 N-S; 26m E-W; H 1.5m) enclosed by a shallow ditch with an external counterscarp bank running from E-W. That portion of the monument at the NE adjacent to the Hell Fire Club is clearly robbed-out and in this quadrant the mound is flattened."*

11.3.1.3 Condition

The remains of the cairn are covered in sod and grass. The excavations that were carried out in 2015 and 2016 confirmed the existence of below surface remains of the cairn. Two of the remaining kerb stones were identified in the 2016 excavation and both were found to feature Neolithic art.

11.3.1.1 Significance

Recent excavations by the Hell Fire Club Archaeological Research Project suggest that the site is of high archaeological significance. Both this passage tomb and the adjoining one are part of a wider archaeological landscape namely a megalithic cemetery. There are strong similarities to Brú na Boinne which is a World Heritage Site, Tara and Lough Crew in Meath and Carrowmore, Carrowkeel and Knocknarea in Sligo. There are also similarities to the landscape around Stonehenge in the UK, which is also a World Heritage Site.

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[32] Jackman, N. (2016), p 22
[33] Jackman, N. (2016), p 22
[34] Jackman, N. (2016), p 22
[35] Jackman, N. (2015), p 8.
[36] Jackman, N. (2015), p 8.
[37] Jackman, N. (2015), p 8; Jackman, N. (2016), p 27
[38] Jackman, N. (2015), p 8.
[39] Keane. M, (1993) National Monuments Service, Sites and Monuments Record, DU025-001001, 24th March 2017

11.3.2 Passage Tomb SMR # Du025-001002

Figure 11.3 The smaller passage tomb (SMR No. DU025-001002) is much less visible, especially when seen from the ground. The Ordnance Survey pillar is located on top of it.

11.3.2.1 Background

What is thought to be a second smaller tomb (DU025-001002) is located to the east of the larger tomb, and south-east of the Hell Fire Club[40]. The presence, exact location and nature of this tomb was recorded during the geophysical survey conducted as part of Phase 1 of the Hell Fire Archaeological Project[41]. The findings to date appear to confirm that it is a second tomb. Like the larger tomb, it was largely destroyed in 1725 when the Hell Fire Club was built. An Ordnance Survey triangulation pillar was erected in the center of it in the mid 20th century. Geraldine Stout of the National Monuments Service visited the site in the 1990s and referred to 'traces' of a second cairn[42]

Trench 4 of the test excavation that was carried out in 2015 was located at the edge of the passage tomb but did not reveal any features[43]. Jackman noted that the discovery of surviving archaeology at the highly disturbed north side of the larger tomb to the west (DU025–001001) gives hope that a partial excavation of the smaller tomb (DU025–001002) may provide evidence about the nature and period of this monument, and whether it is from the same period[44].

[40] Jackman, N. (2015), p 7.
[41] Jackman, N. (2015), p 9, figures 6, 7, 8 & 9; Gimson, H. & Bonsall, J. (2014).
[42] Stout, G. (1993) National Monuments Service, Archaeological Survey of Ireland, Sites and Monuments Record file DU025-001001.
[43] Jackman, N. (2015), p 18.
[44] Jackman, N. (2016).p 27.

11.3.2.2 Description

Above surface traces of a denuded cairn survive in the form of undulations in the ground[45]. The geophysical survey has indicated the presence of a ditch and bank. The remains are c. 18m in diameter.

11.3.2.3 Condition

The above surface remains are much is and less distinct than those of its neighbor. The presence of below surface remains was strongly suggested in the geophysical survey though excavation near the perimeter has not revealed any features to date. It is likely that the below surface archaeology has been heavily disturbed through the destruction of the cairn in 1725 and subsequently in the early 19th century when the Military Road was constructed using masonry from the cairns.

11.3.2.4 Significance

Recent excavations by the Hell Fire Club Archaeological Research Project suggest that the site is of high archaeological significance. Both this passage tomb and the adjoining one are part of a wider archaeological landscape namely a megalithic cemetery.

11.3.3 The Hell Fire Club SMR # DU025-001003

Figure 11.4 The Hell Fire Club (SMR No. DU025-001003)

The Hell Fire Club (SMR # DU025-001003), the ruins of a 18th century hunting lodge is located at the summit of Montpelier Hill in South County Dublin. The name of the building is drawn from the

[45] Jackman, N. (2015), p 7. Keane. M, (2017) RMP record for DU025–001002, 24 March 2017; Herity 1974, 257; Price 1942, 66 Healy 1975, 1-19

Irish Hell Fire Club, a men's club or society active in the early 18th century who used the lodge for their meetings. It is generally thought to have been constructed in 1725 for William Connolly using masonry that was robbed from the adjoining passage tombs (SMR # DU025-001001 & DU025-001002).

There is a possibility that some of the larger stones that are evident in the construction may contain Neolithic art work. The ground beneath and around the Hell Fire club is also of archaeological significance. The excavation of the larger tomb in 2016 revealed a glazed tile, which may have come from the kitchen area. The building is of considerable significance in architectural, archaeological, historic and cultural terms and also enjoys panoramic views N and E with those to the S and W somewhat restricted by forestry. The significance of this building is explored more fully in the next chapter.

11.3.4 Standing Stone (SMR# DU025-021001).

Figure 11.5 The Standing Stone (SMR# DU025-021001).

A standing stone is located c. 385m to the east and downslope of the Hell Fire Club.

11.3.4.1 Background

Standing stones are defined by the National Monuments Service as a stone which has been deliberately set upright in the ground, and functioned as prehistoric burial markers, commemorative monuments, indicators of route-ways or boundaries[46]. NiLionáin & Davis state that they were erected to mark important moments and places in time and space[47].

[46] National Monuments Service; Scope Note, Natiional monumnts Service Website archaeology.ie [accessed 14/06/2017]: Manning. C (2004).
[47] Ní Lionáin, C. and Davis, S. (2014),p37

These monuments date from the Bronze and Iron Ages (c. 2400 BC - AD 500), but some of them may date back to the Neolithic[48]. They are associated with other monuments. The standing stone at Killakee is located beside an enclosure (DU025-021002). Similarly the standing stone at Newtown, (DU025-047002) is located on a hill overlooking Glencullen and is 6m northeast of a barrow[49].

11.3.4.2 Description

The granite standing stone is 1m high. It is not upright, having previously fallen over giving it a squat appearance. The standing stone was shown as upright in Patrick Healy's *Glenasmole Roads,* published in 2006 and was described as being 8 ft high at the time.

Figure 11.6 Image taken from Patrick Healy's Glenasmole Roads (2006) which shows the standing stone in an upright position

[48] Ní Lionáin, C. and Davis, S. (2014), p37
[49] Ní Lionáin, C. and Davis, S. (2014),p38

11.3.4.3 Condition

The standing stone has fallen over and is lying in a recumbent position. It is prone to graffiti/vandalism. The 2014 *The Dublin Uplands – past, present, and future*' report commissioned by South Dublin County Council and Dun Laoghaire Rathdown County Council suggested that it should be set upright again, and the ground around it cleared to restore views[50]. A conservation assessment was also recommended.

11.3.4.4 Significance

The standing stone is of considerable archaeological significance and is part of a wider archaeological landscape.

11.3.5 Enclosure, SMR# DU025-021002

Figure 11.7 Extract from an 1950's pre plantation aerial photograph. The west bank and ditch of the enclosure (SMR# DU025-021002) are clearly evident as is the standing stone to the west. Image courtesy of Coillte

[50] Ní Lionáin, C. and Davis, S. (2014), p54

11.3.5.1 Background

Described by the National Monuments Service as an area defined by an enclosing element such as a bank, wall, fosse, scarp, or indicated as such cartographically, and occurring in a variety of shapes and sizes, possessing no diagnostic features which would allow classification within another monument category[51]. These may date to any period from the Neolithic onwards[52]. Some enclosures appear during the Early Bronze Age (2000–1600 BC), and they become more common in the Late Bronze Age (1200–700 BC)[53]. These sites were often located in areas that provide visual control over an area, and appear to foreshadow the Iron Age (700BC-400AD), hill forts and illustrate a growing concern with delimiting private space and a preference for elevated sites [54]. Enclosures could also relate to ring forts which were constructed in the early medieval period as farm enclosures up to about the year 900[55].

11.3.5.2 Description

The enclosure is shown on the 1950s aerial as being situated to the east of the standing stone and the western bank and ditch can be made out clearly. Is appears to have a single bank with a ditch on the outside.

11.3.5.3 Condition

Because the area has been covered in commercial forest since the 1960s, it is likely that there has been considerable disturbance of the bank and any subterranean remains. Because this area has been forested since the 1960s, the enclosure is not easily visible. Signage/displays containing information would help to identify it for visitors to the site.

11.3.5.4 Significance

The enclosure is included in the SMR (DU025-021002 and is of high archaeological significance.

[51] National Monuments Service; Scope Note, National monuments Service Website archaeology.ie [accessed 14/06/2017
[52] Cummings. V (2017), p, 128, 201
[53] Ní Lionáin, C. and Davis, S. (2014), p34
[54] Ní Lionáin, C. and Davis, S. (2014), p34
[55] Ó Cróinín, D ed. (2005), p 550: Stout. M (1997)

11.3.6 Killakee Wedge Tomb, SMR # DU025-022

Figure 11.8 Killakee Wedge Tomb (SMR # DU025-022)

11.3.6.1 Background

Wedge tombs developed in the Chalcolithic/Copper Age (2500–2000 BC)[56]. Their name is derived from their characteristic wedge or trapezoidal shape of the central chamber, which gets narrower and lower from the entrance to the back of the chamber[57]. They are surrounded by horse-shaped or round cairns, which are sometimes retained by a kerb[58]. As at Killakee, wedge tombs are often oriented to the setting sun, facing west[59]. The over ground remains of the Killakee wedge tomb were discovered by the well-known archaeologist and local historian Paddy Healy in 1978[60].

11.3.6.2 Description

The wedge tomb at Killakee is the most westerly of the Dublin Uplands' wedge tombs and is located in Massy's Wood[61]. Healy described it as follows[62]:

> *"The monument at present consists of an irregular low mound 7m wide, upon which are a number of standing slabs apparently in situ. Due to the dense foliage overhead there is no growth over the area. The chamber lies east and west with an entrance and flat facade to the west and a rounded end to the east. The cairn material and the roofing slabs together with some of the stones of the chamber and revetments have been removed,*

[56] Ní Lionáin, C. and Davis, S. (2014) 25.
[57] Ní Lionáin, C. and Davis, S. (2014) 25.
[58] Ní Lionáin, C. and Davis, S. (2014) 25.
[59] Ní Lionáin, C. and Davis, S. (2014) 25.
[60] Healy, P. (1978), pp.101-103
[61] Ní Lionáin, C. and Davis, S. (2014) 25.
[62] Healy, P. (1978), pp.101-103

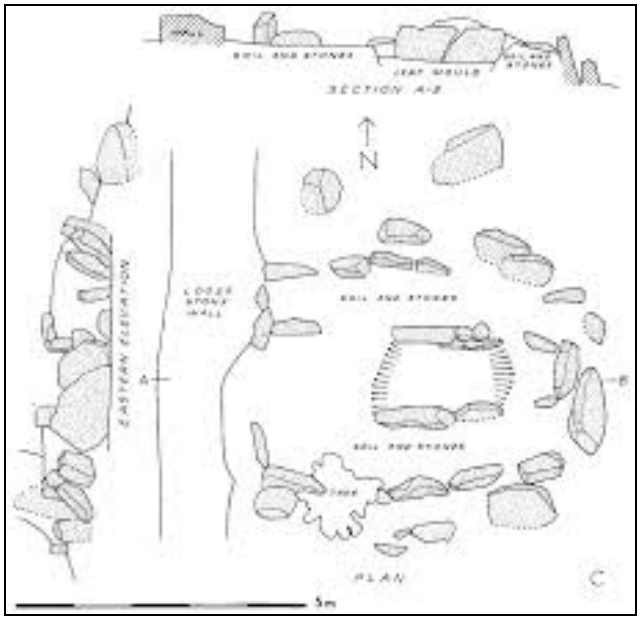
probably to build the loose stone wall which at present cuts across the western edge of the monument.

The position of the chamber is clearly defined by seven of the side stones and the eastern end stone, the centre portion being cleared to a depth of 70cm below the top edge of the side stones. Parallel to the sides of the chamber, and an average of 1m from it, are the remains of a double revetment of upright slabs of which seventeen survive, nine on the north side and seven on the south, with an extra-large slab at the east end. No kerb is visible, but this may be obscured by spoil displaced during the removal of the cairn material. A single stone on the NW side may indicate the position of a kerb. Another large slab lying to the north may be a displaced part of the chamber or revetment.

Of the western facade and entrance only three slabs are visible, one of which formed the northern jamb of the entrance. The tomb is 6m long and 6m wide and the overall length of the chamber is 5m. The space between the chamber and the revetment is filled to the level of the top edge of the slabs with a mixture of stones and soil…Allowing for the absence or concealment of a kerb, Killakee appears to be closely related to Ballyedmonduff, although built on a much smaller scale. What remains of the chamber and double revetment walls are very similar, and the eastern end may originally have been cut off to form an end chamber. The west facing facade and entrance are also found at Ballyedmonduff and Kilmashogue and are characteristic of tombs of this class."

The tomb has not been excavated but Healy recorded the over ground remains[63].

Figure 11.9 Patrick Healy's Drawn survay of Killakee Wedge Tomb (SMR # DU025-022)



11.3.6.3 Condition

The tomb is much denuded, but its east-west oriented chamber (c.5m by 1.20m), which is outlined by a double revetment of stones, is still visible[64]. At present the wedge tomb is nor easy

[63] Healy, P. (1978), pp.101-103
[64] Ní Lionáin, C. and Davis, S. (2014) 25.

to read as a wedge tomb to the average observer. Landscaping/clearance works around it and signage/displays containing information would help to clarify this.

11.3.6.4 Significance

The tomb is included in the SMR (SMR # DU025-022). Though more typical of the west of Ireland South County Dublin is one of the few areas of the east coast of Ireland that has a small concentration of wedge tombs[65]. There are 5 known wedge tombs recorded in the Dublin Uplands, three of which have been excavated[66]. The five include Killakee, Ballyedmonduff (DU025-045), Kilmashogue (DU025-007001), Laughanstown (DU026-024) and a possible wedge tomb at Shankill (DU026-059). Some tombs have an ante-chamber at the entrance, as at Kilmashogue, while others have an end-chamber at the rear, as is seen at Ballyedmonduff[67].

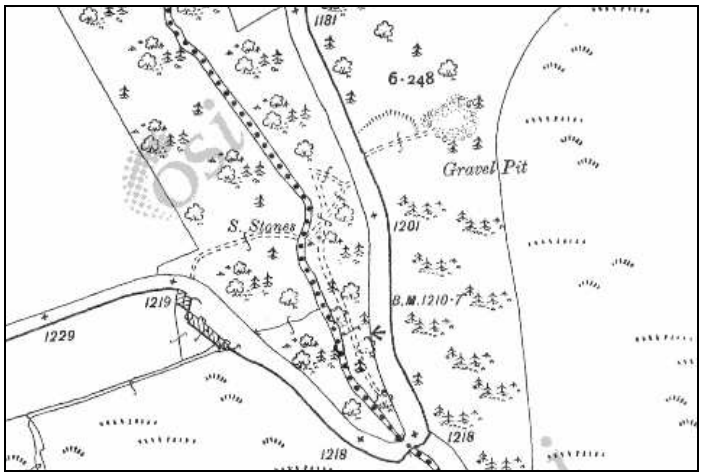
11.3.7 Other Potential Features

Austin Cooper referred to a standing stone located to the south west of the larger of the passage tombs[68]:

> *"About 60 yards (54.8m) S.W. of this stands a single stone, of about. 5 feet (1.52m) high, but whether it is a part of this druidical remains, or only put up there for the cattle to scratch themselves (the use it is now made of) I shall not positively say."*

There is no other record of a standing stone to the south west of the passage tombs although there is one to the east.

Figure 11.10 Extract of the 1912 Ordnace Survay map. 'S. Stones' may be a possible feature located ner the SE end of the Massy's Wood



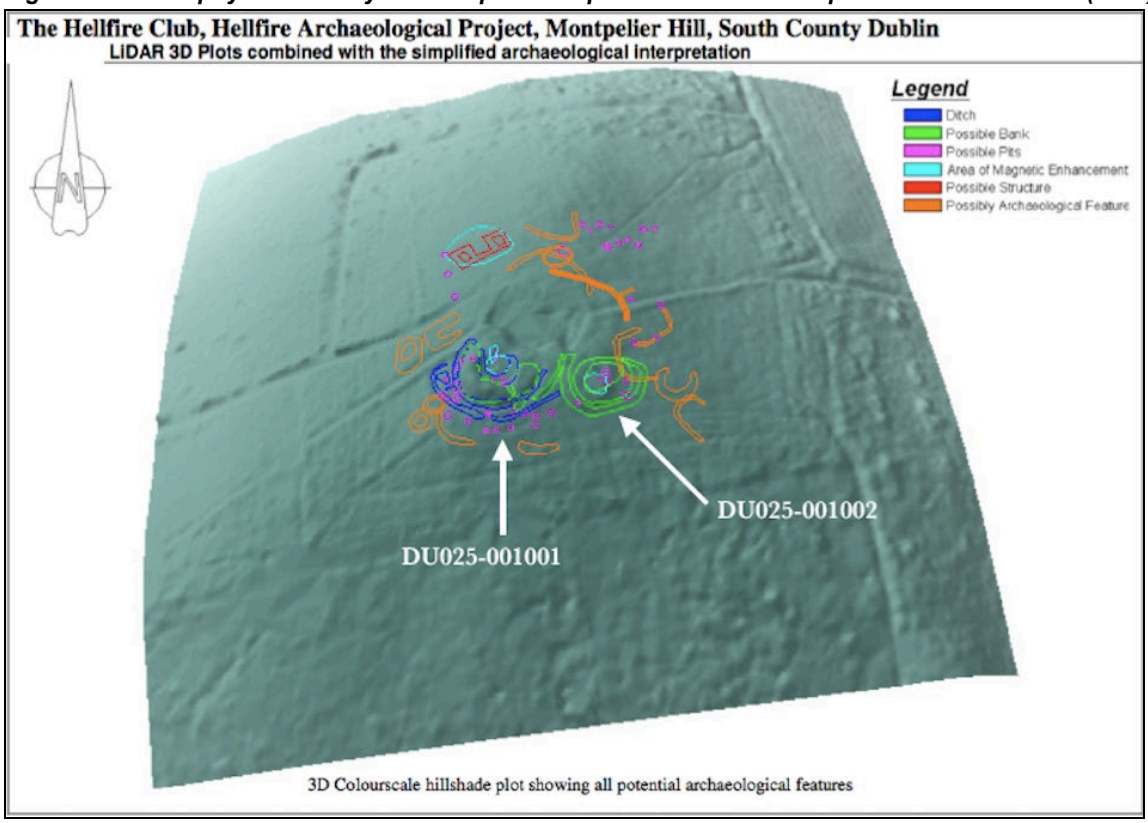
'S. stones' are marked on the 1912 OS map at the extreme SE corner of Massy's Wood, near the bend in the Cruagh Road. There is no other record of archaeological features in that immediate area however and the description does not appear on other historic maps.

In 1986 Dr. Stefan Bergh found a chert scraper approximately 20m north-west of the larger of the two tombs on a visit to the site[69]. During the 2016 excavation on the top of the hill, one of the

[65] Ní Lionáin, C. and Davis, S. (2014) 25.
[66] Ní Lionáin, C. and Davis, S. (2014) 25.
[67] Ní Lionáin, C. and Davis, S. (2014) 25.
[68] From the diaries of Austin Cooper, Montpelier eighteenth July 1779, in Price, L. (ed.) (1942)

visitors to the site brought a large flint blade that they had discovered as a 'stray find' on the slopes of Montpelier Hill some years ago but the exact location was not given. Both suggest further archaeological remains on the Hill.

Figure 11.11 Geophysical survay of the top of Montpelier Hill which was published in Jackman (2015)



As mentioned above, a geophysical survey was carried out but was confined to the open area at top of Montpelier Hill. In addition to the ditches and banks of two passage tombs a number of possible archaeological features were also identified around the Hell Fire Club. A possible structure was located to the northwest which is rectangular in plan. Archaeological test trenching in the area did not reveal any features however. Also identified in the geophysical survey were features that could be pits and other circular or semi-circular features which could be hut sites. These were scattered all around the Hell Fire Club. Test trenches 2 and 3 which were located to the south of the passage tomb (DU025-0010001) did not reveal any features though the geophysical survey had suggested the possibility of pits in this area.

Linear features were also picked out but these are likely the remains of field boundaries or are more recent paths created by the erosion resulting from use by pedestrians. Jackman thought that some may relate to the 18th century Hunting lodge[70].

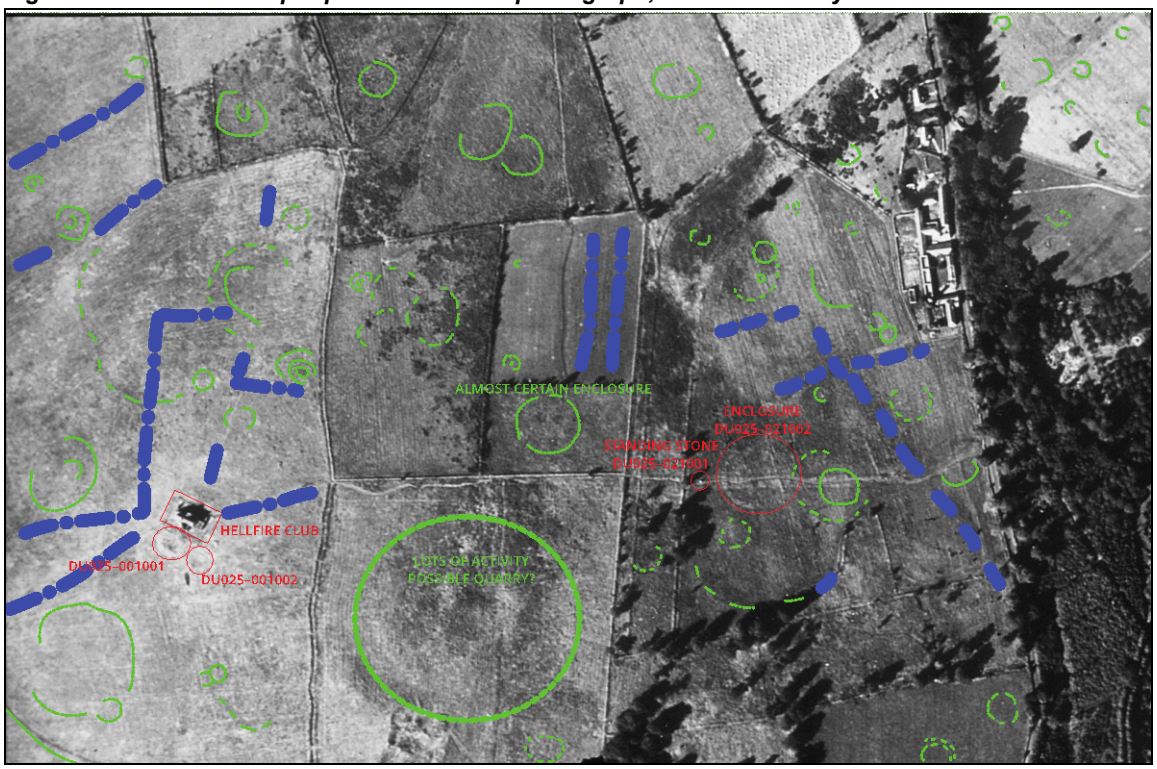
The presence of the tree plantation has obscured much of the remainder of the hill. The same is true in Massy's Wood. The presence of known monuments of extremely high status, and comparisons with other megalithic cemeteries suggests that there is potential for other features from a number of time periods in the landscape. With this in mind Neil Jackman obtained an aerial photograph of Montpelier Hill from the Coillte Archives. It was taken in the 1950s, prior to

[69] Chert is silica rich sedimentary rock, similar to flint which was used to make stone tools. The chert scraper was discovered as a 'stray find' or one that has been revealed as a result of ground disturbance. National Museum of Ireland Topographic Files; Record No. 1986:46

[70] Jackman, N. (2016).p 6.

the development of commercial forestry in the area. It has been annotated to outline possible features as well as the known monuments on the site.

Figure 11.12 The 1950's pre plantation aerial photograph, as annotated by Jackman.



Jackman's annotation is purely based on the 1950s photograph and may be the result of particular light or shadow or photographic variance. It is therefore not certain that they truly reflect sub-surface archaeological features but areas of archaeological potential. The photograph was annotated as follows:

- Known and registered monuments on the SMR are circled in red.

- There were many features marked in green which Jackman believed to be of archaeological potential. Amongst these were small regular circles could potentially represent hut sites. Hut sites have been found in similar proximity to the tombs at other upland passage tomb cemeteries such as Carrowkeel / Keshcorran in County Sligo which bears a strong resemblance to the Dublin Upland series. Jackman thought that other features that may be encountered are likely to include bronze age hut sites, burial monuments such as barrows and hill forts or ceremonial enclosures. One of the enclosures he felt to be almost certain but it is located on the adjoining land to the north and is not part of the present site. Based on the location, overlooking Dublin Bay and the Liffey, Jackman speculated that the hill itself could be a setting for a large late Bronze Age / Early Iron Age hill fort, though there was no immediate evidence apparent. There was also an area to the south east of the Hell Fire club which Jackman thought showed considerable activity and speculated that it may have been a quarry;

- Several linear features were marked in blue which Jackman thought could be large earthwork type feature or possible ditches. He speculated that they could potentially be 18th century landscaping. A long one, located near the R115 road most probably relates to the effect of light and shadowing on the the contours of the hill and indeed contour lines are marked on the 4th edition OS maps in the same location;

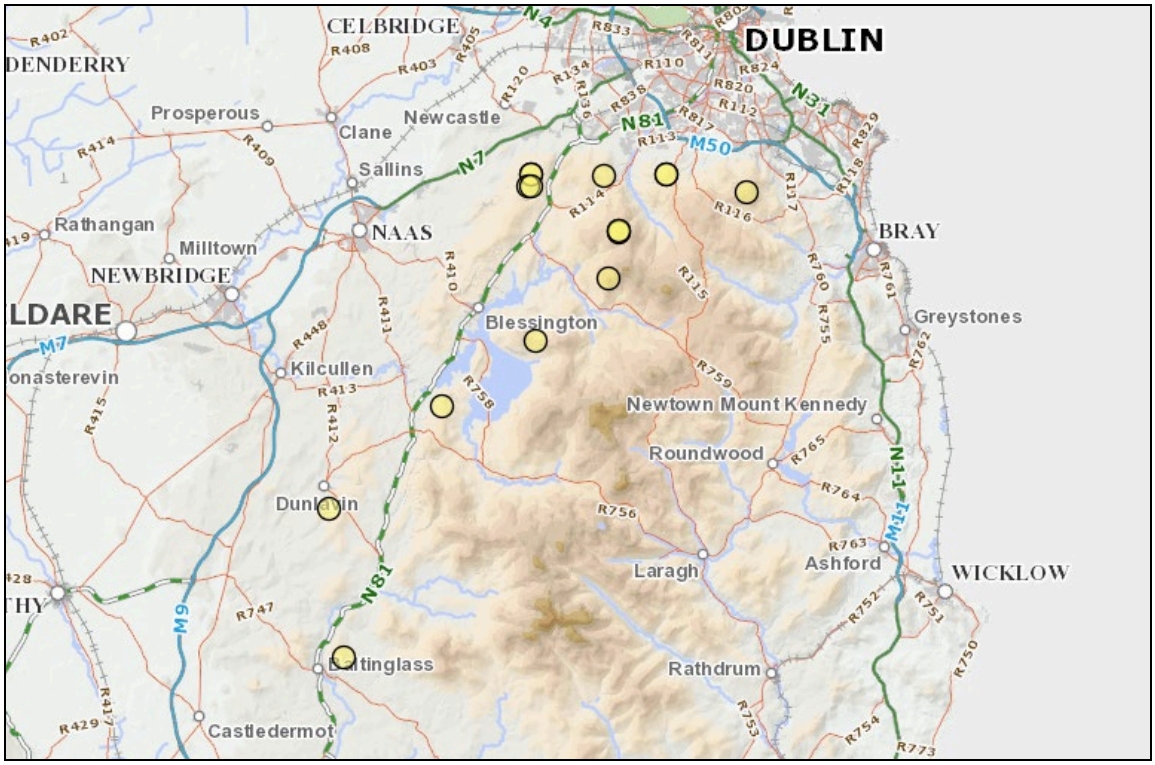
Some of the blue lines continue the line of field boundaries so it is possible that that is what they are. It is also possible that they represent drainage channels or tillage scars;

- They may also relate to earlier landscaping such as the banks and clusters of trees shown on the first and third edition Ordnance Survey maps. Jackman also speculated that these linear features may represent earlier activity. It should however be stated that this landscape has had a commercial forest on it since the 1960s and the trees have been replaced every 20-25 years. The roots, felling and replanting of conifers will have disturbed subsurface remains;

11.3.8 The Archaeology of The Dublin Wicklow Mountains Region

The archaeological sites within the Coilte site are not Isolated features but form part of a wider archaeological landscape. The Dublin Uplands and their environs have been continuously occupied since the Mesolithic[71].

Figure 11.13 SMR Map showing passage tombs in the Dublin Mountains



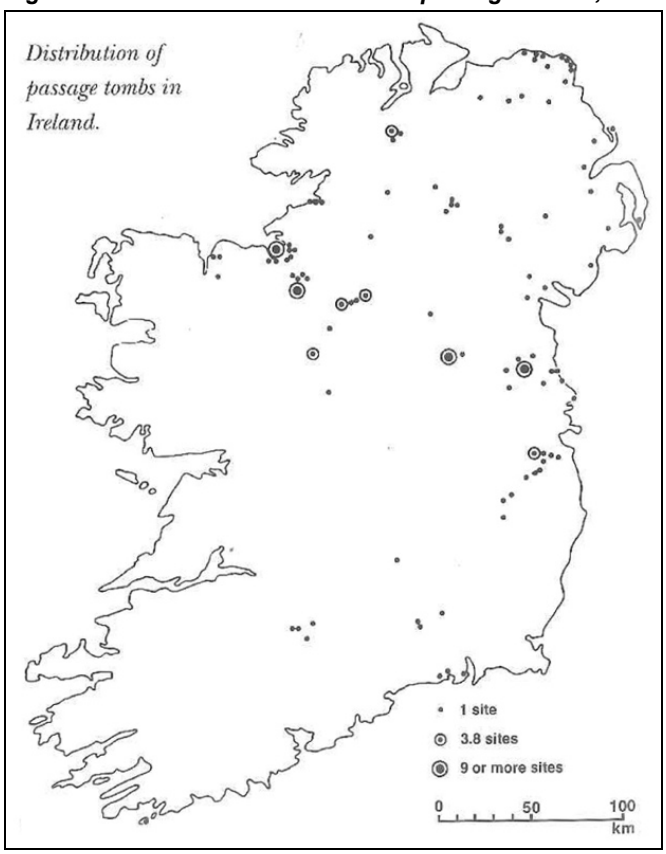
The SMR maps give an indication of the wider distribution of a selection of monument types in the Dublin/Wicklow Mountains. The tombs of Montpelier Hill form part of a major cluster of megalithic tombs located on the N and W perimeter slopes of the Dublin and North Wicklow mountains[72]. There are seven portal tombs, at least eleven passage tombs, seven wedge tombs, and two unclassified tombs[73]. There are also a number of hill-top cairns, some with kerbs, that may be passage tombs but may also belong to other monument traditions, such as Bronze

[71] Ní Lionáin, C. and Davis, S. (2014) p 38
[72] Jackman, N. (2015), p 7, 10, after Cooney, G. (2000), p.143; O'Nualláin (1989); Stout and Stout (1992); Stout (1994): Grogan and Kilfeather (1997).
[73] Cooney, G. (2000), p.143, figures 5.5 and 5.6

Age cemetery cairns and may form part of a megalithic cemetery[74]. Such cemeteries are recognized as occurring in several regions of the Atlantic Europe[75].

Other examples of passage-tombs in the Dublin Mountains include tombs at Seahan, Tibradden, Kilmashogue, Fairy Castle, Two Rock Mountain, Saggart Hill and Killiney Hill[76]. Two passage tombs are located at Knockananillier in Co. Dublin[77]. Those in North Wicklow include Seefin, Seefinghan and possible passage-tombs like Lackan, Tornant Upper, Blakestown Upper, and the tomb at Tuckmill Hill[78]. The recently excavated tomb at Montpelier Hill (DU025-001001) is one of the largest of the series[79]. All are on prominent locations summits with extensive vistas over the surrounding landscape. They are also inter-visible from each other[80].

Figure 11.14 National distribution of passage tombs, after Cooney, 2000



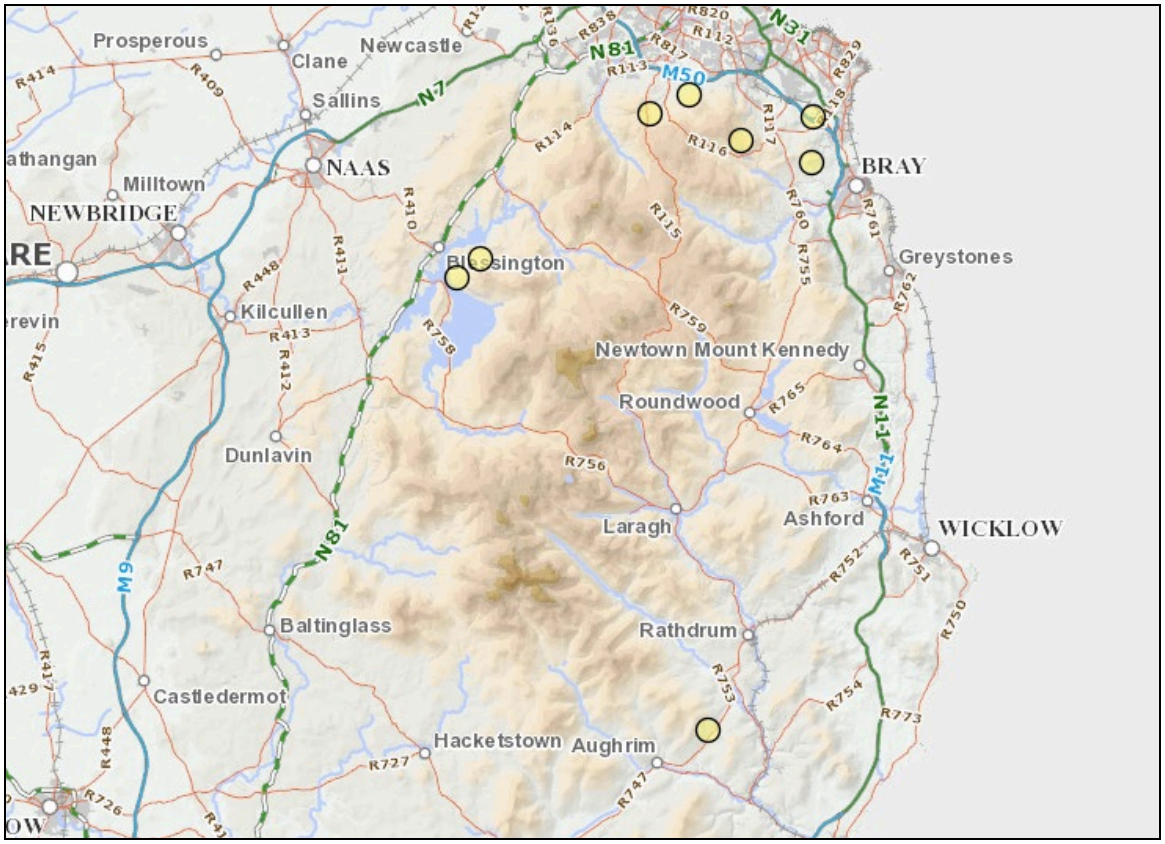
Other groups of passage tombs in Ireland include Brú na Bóinne, Carrowmore, Carrowkeel and Loughcrew. They are frequently situated on hill or ridge-top and isolated from contemporary settlement[81]. The passage tombs at Roughaun Hill in the the Burren in Co. Clare, were located near but separate from a contemporary Final Neolithic/Early Bronze Age settlement in the area[82].

[74] Jackman, N. (2015), p 7, 10, after Cooney, G. (2000) p.143; Grogan and Kilfeather (1997) 18; Redmond and MacAongusa (1994).
[75] Cooney, G. (2000), p.147.
[76] Corlett, C. (2012)
[77] Cooney, G. (2000), p.145.
[78] Jackman, N. (2015), p 10.
[79] Jackman, N. (2015), p 7.
[80] Herity (1974), 75
[81] Cooney, G. (2000), p.146
[82] Jones and Walsh (1996) 98

Jackman states that not all of these tombs may be Neolithic passage-tombs, as antiquarians investigating the tomb at Tibradden in 1849, discovered a Bronze Age Food Vessel along with cremated human remains[83]. However, the occurrence of Early Bronze Age burial deposits in Neolithic tombs is far from unusual in Ireland or internationally[84]. Burial assemblages elsewhere which were note by Cooney include Isbister in Orkney, and La Chauseé-Tirancourt, in the Paris basin[85].

In the Cooley and Mourne and the Dublin/Wicklow uplands the siting of different tomb types across the landscape seems to be complementary[86]. It has been argued that at Brú na Bóinne, settlement and ceremonial activity went on in the same landscape[87].

Figure 11.15 SMR Map showing wedge tombs in the Dublin Mountains

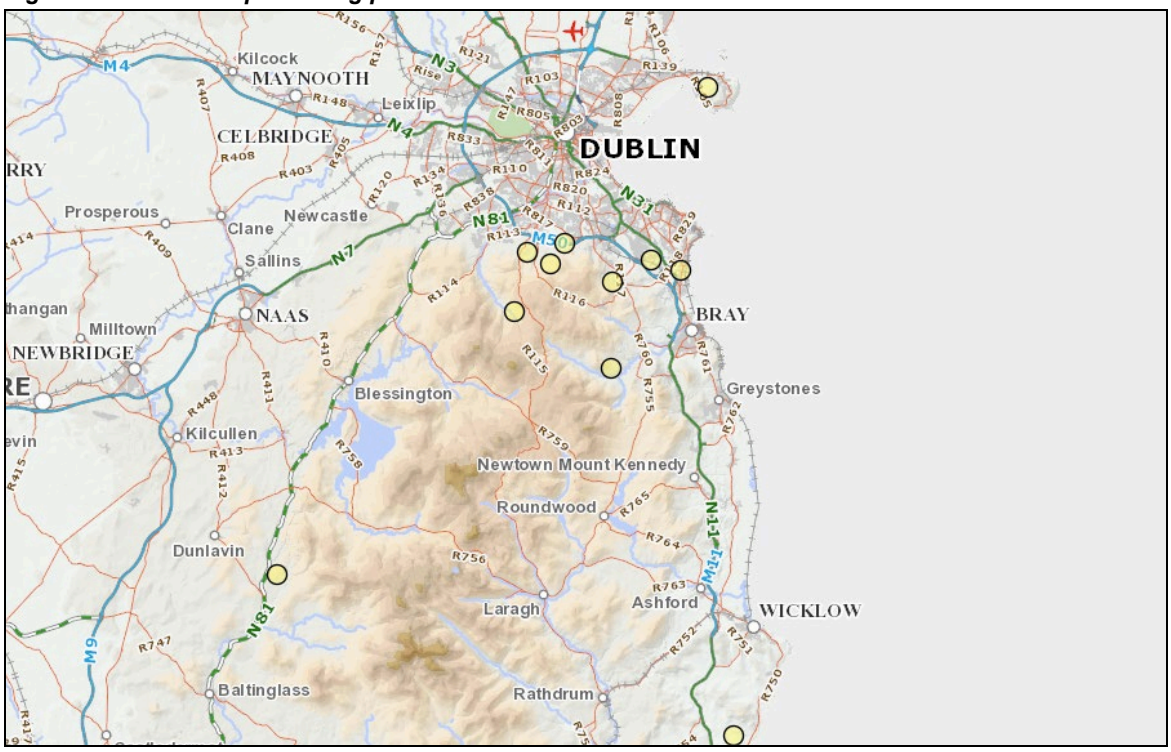


Wedge tombs are later in date and generally located at higher altitudes than portal tombs and below passage tombs, although there is overlap with portal tombs[88]. There are connections between the wedge tombs and ceremonial practice in the Bronze Age[89]. This can be seen in the partial demolition and re-use of the wedge tomb at Kilmashogue, Co. Dublin as a cemetery mound[90]. In the complex of sites at Carrig, Co. Wicklow, a wedge tomb is located to the west of a

[83] Jackman, N. (2015), p 10.
[84] Corlett, C. (2012)
[85] Cooney, G. (2000), p.86, after Chesterman (1983) and Masset (1993)
[86] Cooney, G. (2000), p.146
[87] Cooney, G. (2000), p.147
[88] Cooney, G. (2000), p.145.
[89] Cooney, G. (2000), p.145.
[90] Cooney, G. (2000), p.145 after Kilbride-Jones (1954)

Bronze Age cemetery cairn, and cairns and standing stones on the lower western slopes of the cairn-topped summit of Lugnagun mountain[91].

Figure 11.16 SMR Map showing portal tombs in the Dublin Mountains



Portal tombs or dolmens include those at Woodstown (SMR # DU025-002), Kilternan (DU025-019), and Kilmashogue (DU025-006) with a further three in the Lowlands as at Cunard (DU025-051). The date to the early Neolithic (c 38885 -3850 cal BC) and derive their name from two supporting orthostats or jambs at the entrance and usually feature a large capstone, supported by the two orthostats at the entrance and a smaller stone at the rear[92]. Further orthostats at the side forming the walls of the central chamber. Woodstown is noted for a massive capstone. Cremated human bones, as well as disarticulated unburnt bones, have been found in the rectangular chambers at some portal tombs, but few have been excavated by archaeologists.

There are also a number of Cist and Pit burials as at Cruagh (SMR # DU025-004), and Glassamucky (SMR # DU025-057001 and DU025-057002), the Chalcolithic Cairns at Piperstown to the South (SMR # DU025-019001 To 019011) and a Cairn and Kist Burial at Tibradden to name but a few.

[91] Cooney, G. (2000), p.145, figure 5.5, after Grogan (1990); Grogan and Kilfeather 1997
[92] Cummings. V (2017), p, 116-117.

Figure 11.17 Aerial view of the Woodstown Cursus (SMR # DU025-087). Courtesy of the National Monuments Service.

The Woodstown Cursus (SMR # DU025-087) is located to the north of the Coillte land holdings and close to the R115. An aerial photograph from the SMR file shows that it is aligned approximately NW–SE with the u at the south east end[93]. A cursus is a U-shaped or linear earthwork, defined by a low bank and external fosse. The one at Woodstown encloses an area c. 125m by 45m. Cursus have been recorded in other megalithic landscapes. One can also be seen close to Newgrange, there is also one at Stonehenge and the 'Hall' at Tara is a possible cursus.

Sites from the medieval period and post medieval period include:

- Ringfort such as that at Bohernabreena (SMR # DU022-027);
- Church sites include Cruagh Cemetery, church and Inscribed Stone (SMR # DU025-003005 & DU025-003001, DU025-003004); St Anne's Well, Chapel and Graveyard, Glenasmucky or Kilmesantan, named after a 6th century Bishop who was mentioned in

[93] Walsh. P (2015) SMR file for DU025-087, 15 April 2015

the Book of Leinster. It is no longer in use but as with Cruagh Cemetery, it is of historic archaeological and genealogical interest.

- Further afield, other sites include Whitechurch, Kilternan, Kilgobbin, Kilmacanogue. Fassaroe, Rathmichael Church and Glendalough.

The mountains were also on the border of the Pale or area controlled by the Crown in the late medieval period. To the north there are numerous 15th and 16th century tower houses and the remains of the 15th century Pale Ditch both of which were subsidized by the Crown and built to protect the protect the Pale from the O'Byrne's & OToole's who had a stronghold in the mountains. Specific tower houses include those at Newcastle Lyons. Athgoe, Kilgobbin and Puck's Castle in Rathmichael.

11.3.9 Folklore

The Hell Fire Club and the former Stewarts house at the base of Montpelier hill have a rich folklore which has grown up around the Hell Fire Club since the 18th century is one or the key contributory factors to its heritage and as a place to visit. Part relates to the original slated roof being blown off one night in a tremendous storm soon after the house was completed[94]. Local folklore states this was caused by the Devil in retaliation for desecrating the adjoining tombs[95]. This belief is related to a similar superstitions around monuments, as to tamper with them was to invite the wrath of the supernatural[96].

Most of the folklore however relates to the notorious Irish Hellfiire Club, organised by Richard Parsons, first Earl of Ross and Colonel Jack St. Leger[97]. It has its roots in similar clubs in Britain, notably the London Hell Fire Club which was established in 1720 and suppressed the following year for its 'ungodly' practises[98]. The Dublin club's activities began about 1720[99]. The Hell Fire Club's association with the building ended with the death of Richard Parsons in 1741.

A regular meeting place was the Eagle Tavern on Cork Hill but the hunting lodge on Montpelier Hill was also used for wild orgies, excessive drinking, gambling, and satanic rituals[100]. The club was famously condemned by Johnathan Swift as a band of 'Blasters or Blasphemers or Bacchanalians'. Ryan argues that the members of these were expressing their disdain for the authority of the church of Christianity through violence, hedonism, sexual deviancy and mock satanic rituals, inspired by the philosophy of the Enlightenment[101].

The members feature in a circa 1735 painting by James Worsdale which is in the National Gallery in Dublin [102]. It shows a group of five men seated around a table on which reposes a huge punch-bowl. The punch-bowl contained the club's special beverage- scaltheen (hot whiskey and butter)[103]. There are stories of the club invoking the Devil. Folklore frequently refers to a black cat, representing the Devil presiding over the proceedings. On one occasion the large tom cat was

[94] Byrne, P. (1976), p 29.
[95] Handcock, W. D. (1899), p 88
[96] Westropp, T. J. (2003).
[97] Other members included Henry Barry, fourth Lord Santry, Colonel Clements, Colonel Ponsonby, Colonel St. George and Simon Luttrell of Luttrellstown, afterwards first Earl of Carhampton. Byrne, P. (1976), p 28.
[98] Ryan, D. (2013), p 8.
[99] Byrne, P. (1976), p 16.
[100] Byrne, P. (1976), p 29; Quane, M. (1971), p. 26.4
[101] Ryan, D. (2013), p 8.
[102] Byrne, P. (1976), p 29.
[103] Byrne, P. (1976), p 29.

immersed in the scaltheen and set on fire[104]. It was pushed outside the door, and when it appeared, the crowd who had gathered to listen to the ribald shouts and singing inside, seeing a fierce animal with flames leaping from it rushing straight at them, thought the devil had really appeared and fled[105]. It may be related to stories of reported sightings of an enormous black cat at the Stewart's house many years later.

Another well-known myth relates to a mysterious stranger, the devil playing cards and one of the club members looks under the table and notices a hoof[106]. Thomas Connolly (1738-1803) is also said to have met Satan there during a card game which ended with the devil erupting into flames and disappearing through the roof.

Sometimes when the Hell Fire Club meeting ended after midnight a member of the club emerged as Satan, wearing the skin, tail and horns of a cow, to the terror of any citizens who happened to be around at the time[107]. There are other tales of abducting young girls, burning of a butler or another servant and luring a dwarf to the Hell Fire Club before beating him to death for entertainment. Byrne states that to this day there are some who will not go near the Hell Fire club ruins after dark[108].

11.4 PROPOSED DEVELOPMENT

The proposed development includes:

- Landscaping works around the Hell Fire Club, including a ring walk or path encircling both the Hell Fire Club and the two passage tombs and associated signage.
- Graffiti is to be removed from the standing stone;
- Existing trails are to be upgraded and new trails are to be laid out on the Hill;
- The proposed visitors centre is to be set in to the hill;
- Electrical, lighting, water and sewerage services are to be installed to cater for the proposed centre and the low level lighting in the grounds and within the Hell Fire Club building;
- The existing single tier car park is to be enlarged to three tiers, and may accommodate 275 spaces. The proposal will result in and levelling works carried out to ensure it meets a safe gradient of 1:20.

11.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

Levelling works associated with the proposed centre, car park, and access road, are to be undertaken to meet a safe gradient will involve excavation as will the laying of services. The proposed centre, car park and the access road in to the site are located in areas where there may be archaeological features which may be directly impacted during the construction phase through levelling works or laying services.

The proposed circular walk and signage around the Hell Fire Club and passage tombs forms part of the interpretation of the site. The circular walk though located close to the southern our south-eastern perimeters of the passage tombs (DU025-001001 and DU025-001002) has been designed and set back from the monuments so that it will not directly impact on the underlying archaeology. Test excavations in the area in 2015 did not reveal archaeological features but the possibility of archaeological features being impacted during the construction phase should not be ruled out.

[104] Byrne, P. (1976), p 29.
[105] Byrne, P. (1976), p 29.
[106] Ryan, D. (2013), p 1.
[107] Byrne, P. (1976), p 29.
[108] Byrne, P. (1976), p 28.

The existing trails up to the Hell Fire Club traverse the enclosure (DU025-021002) and pass the Standing stone (DU025-021001). The proposed landscaping on the slopes Montpelier Hill and the upgrade or laying of trail paths may impact on known and potential archaeological features during the construction.

The removal of and replacement of trees also has the potential to disturb underlying archaeological features.

Potential accidents and disasters which could arise from the proposed replanting of trees are erosion and landslides particularly in combination with a severe weather event such as heavy rainfall. This has the potential to adversely impact both known and potential archaeological features.

Upgraded to services during the operational phase where they necessitate excavation will also potentially impact on underlying archaeological features.

There are an estimated 100,000 visitors to the site annually. It is estimated that the proposed development will bring 225,000 visitors, possibly increasing to 300,000 over ten years. During operation, increased use of the site may result increased disturbance to archaeological and architectural heritage features. The features have proved resilient to access over time. An initial reparation programme is proposed, and thereafter regular monitoring of the effects of increased use of the site on these features, with mitigation measures to be put in place if necessary. These resources are predicted to be better managed (and in better condition) as a result of the development over time.

11.6 REMEDIAL AND MITIGATION MEASURES

As with the architectural heritage on site a minimal intervention approach has been adopted in relation to the archaeology on site. It is not proposed to restore any of the monuments. However where archaeological features or potential archaeological features are likely to be impacted archaeological monitoring and test excavations will be carried out by a licenced archaeologist, subject to the requisite ministerial consent and permissions, particularly in the areas of the proposed car park, visitor's centre and where service runs and trails are to be routed before or during the construction phase.

The removal and replacement of trees has the potential to impact on archaeological features where it causes erosion and/or landslides. Archaeological monitoring of tree removals will be carried out in consultation with Coillte to avoid major accidents such as landslides.

Archaeological investigations in advance of the project will increase understanding of the archaeological landscape of the Dublin Mountains. The information recovered from these investigations will be incorporated in to the exhibition along with information gathered from archaeological excavations at the Hell Fire Club in 2015 and 2016.

11.7 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

The site has strong similarities with archaeological sites such as the megalithic cemeteries in the Boyne Valley and Carrowkeel, Keshcorran and Knocknarea in Sligo but the upstanding remains and other earth works in the vicinity are not easily discernible to the average visitor.

The project is geared towards protecting the site and the public good and will highlight, interpret the facilitate access to the archaeology, architecture and folklore of the site and its significance within the wider Dublin mountains region as part of Irelands Ancient East and will provide an amenity for visitors, the culturally curious and as well as educational opportunities. It is the policy of the Development Plan, and

regional and national policy to provide and promote access to such sites for the benefit of the population and tourists (and the tourism industry).

11.8 RESIDUAL IMPACT AND PROPOSED MONITORING

The increase in visitor traffic has the potential to result in wear in tear, although improved trails and annual inspection and repair of the trails will take place. Some of the linear features on Montpelier Hill are paths created through the erosion of the ground by hill walkers. It is proposed that there will be long term management of the sites in order to monitor any changes to the condition of the various monuments in the form of flood damage, erosion and wear and tear. Inspections of the sites are to be carried out during the operational phase in order to identify any conservation issues or residual impacts that arise from increased visitors numbers weathering anti social behavior. The development will thus improve the protection of archaeological resources.

Fire prevention and fire safety procedures will form part of the proposed ongoing monitoring procedures in collaboration with Coillte in order to minimise the risk of fire damage to the monuments on site.

11.9 CUMULATIVE IMPACTS

Wear and tear at monuments would be considered a cumulative impact. It is hoped that the project will reduce graffiti on site but this is not guaranteed. Repeated cleaning necessitated by the re-occurrence of vandalism has the potential to damage the standing stone.

The six recorded monuments are located on high ground in an area which is not prone to flooding according to the Office of Public Works Online Flood Mapping Service Floodinfo (http://www.floodinfo.ie, accessed 16/10/2019). Some 5 No. of the recorded monuments are located on Montpelier Hill. It is very unlikely that these sites will be impacted by flooding. Killakee Wedge tomb (DU025-022) is located 60.9m from Glendoo Brook and on incline. It is very unlikely to be affected by flooding caused by increased rainfall as a result of climate change.

The outbreak of fire in either the Hellfire or Massys Wood also has the potential to cause damage to archaeological features, particularly those within the tree plantation on the east slope of Montpelier Hill and the wedge tomb in Massey's wood. The Hellfire Club and the remains of the Megalithic tombs are located in an open area on the top of the hill, thus there is a fire break between them and the tress on the slopes of the hill.

12.0 ARCHITECTURAL HERITAGE

12.1 INTRODUCTION

This chapter has been prepared by Julia Crimmins of Cathal Crimmins Architects.

Julia Crimmins and holds a Masters in Urban and Building Conservation and has worked as a Historic Buildings Consultant since 2006.

12.2 METHODOLOGY

The initial analysis focused on the immediate areas of Montpelier Hill and Massy's Estate.

The Record of Protected Structures of the South County Dublin County Development Plan 2016- 2022 and the National Inventory of Architectural Heritage inventory for South County Dublin were consulted to determine to identify buildings and other structures of interest in the area. These were collated with information gathered from numerous historic maps of the area, the pilot study by Paul Keogh Architects and local historical sources. Having identified and researched the various structures, the sites were inspected and photographs were taken in late 2016. Their condition and significance was determined and is outlined below. Recommendations were then formulated for the repair of the various structures and their ongoing maintenance. The various proposals for the site were assessed in terms of their impacts. Mitigating measures were identified, including inputs in to the design process in consultation with other members of the team.

12.3 EXISTING ENVIRONMENT

12.3.1 The Hell Fire Club

Figure 12.1 The Hell Fire Club

12.3.1.1 History

Between 1723–5, William Connolly purchased a considerable amount of land and estates from the Duke of Wharton, including Rathfarnham Castle and Montpelier Hill in South Dublin. By the time of his death in 1729 Connolly was the wealthiest man in Ireland, having made his fortune in property. He is known as 'Speaker' Connolly as he was a Speaker in the Irish Parliament from 1715–1729. Castletown House in County Kildare, designed by Allesandro Gallilei for Connolly is regarded as one of the finest examples of Palladian architecture in the British Isles[109].

In 1725 Connolly built a hunting lodge on the top of Montpelier Hill. The site at Montpelier hill was chosen because Connolly believed it would be possible to see both Castletown and Rathfarnham Castle from it. It is thought to have been designed by Edward Lovett Pearce (1699–1733) who also contributed to the Allessandro Galilei's design for Castletown.

The hunting lodge is generally thought to have been built using stones from two passage tombs located to the south of the lodge. The present stone roof is not the original roof but a replacement. The original timber roof was reputedly blown off in a storm soon after the hunting lodge was built. After Connolly's death, the hunting lodge lay vacant until 1735.

The hunting lodge was then leased by members of the Irish Hell Fire Club, Ireland's answer to London's Hell Fire Club, who used it as their occasional meeting place. The Hell Fire Club's association with the building gives it the present name and has made it notorious but ended in 1741. In 1749 the building was purchased by Charles Cobbe, son of the Archbishop of Dublin, who died inside the building after losing a duel in 1751[110]. Sometime thereafter the interior of the lodge was gutted by fire, following which the building was abandoned.

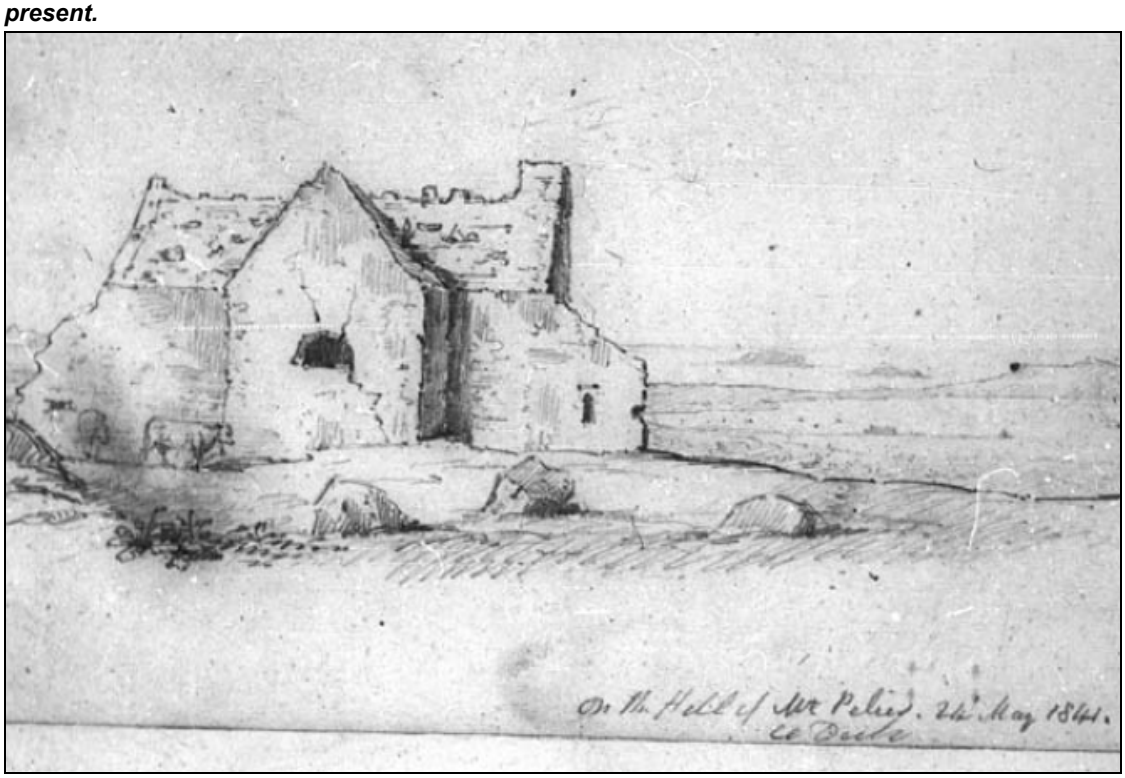
In 1763, it was stripped of all its finer stone finishes including the granite entrance steps by Henry Loftus (1709-83), first Earl of Ely and reused in the construction of Killakee House which was located a mile downhill. The antiquarian Austin Cooper visited Montpelier Hill 18th July 1779, and described the Hell Fire Club as follows:

> *'On the top of the Hill of Montpelier stands a house built by the late Mr. Connolly, it is all arched & is now entirely out of repair[111]'*

[109] O'Brien, J. & Guinness, D. (2005)
[110] Bohill, Kelly & de Gascun, (1991)
[111] Price, L. 1942, p 43

Figure 12.2 Sir William Betham's 1841 view of the building, courtesy of the National Library of Ireland

Figure 12.3 Sir William Betham's rear fiew of the buiding as it alppeared in 1841, courtesy of the National Library of Ireland. The kerbstones of the larger cairn are more evident and numerous than present.



The building suffered further damage when tar barrels were burned on the roof to create a large welcoming bonfire for Queen Victoria's visit to Dublin in 1849.

Figure 12.4 Handcock's lat 19th century drawing prports to show the building as it would have looked in the 1770s

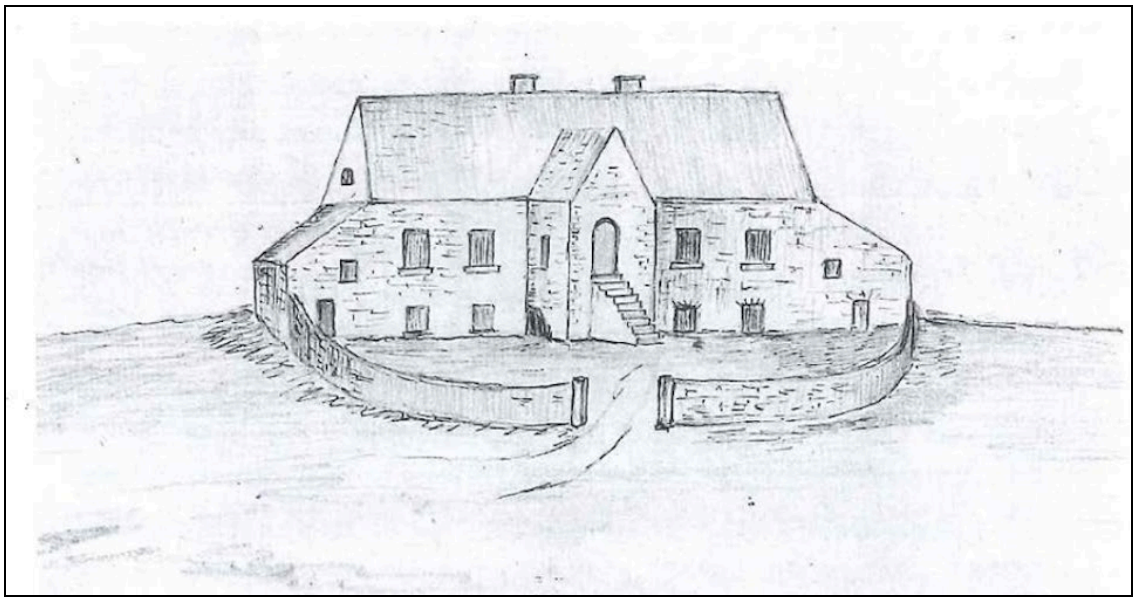
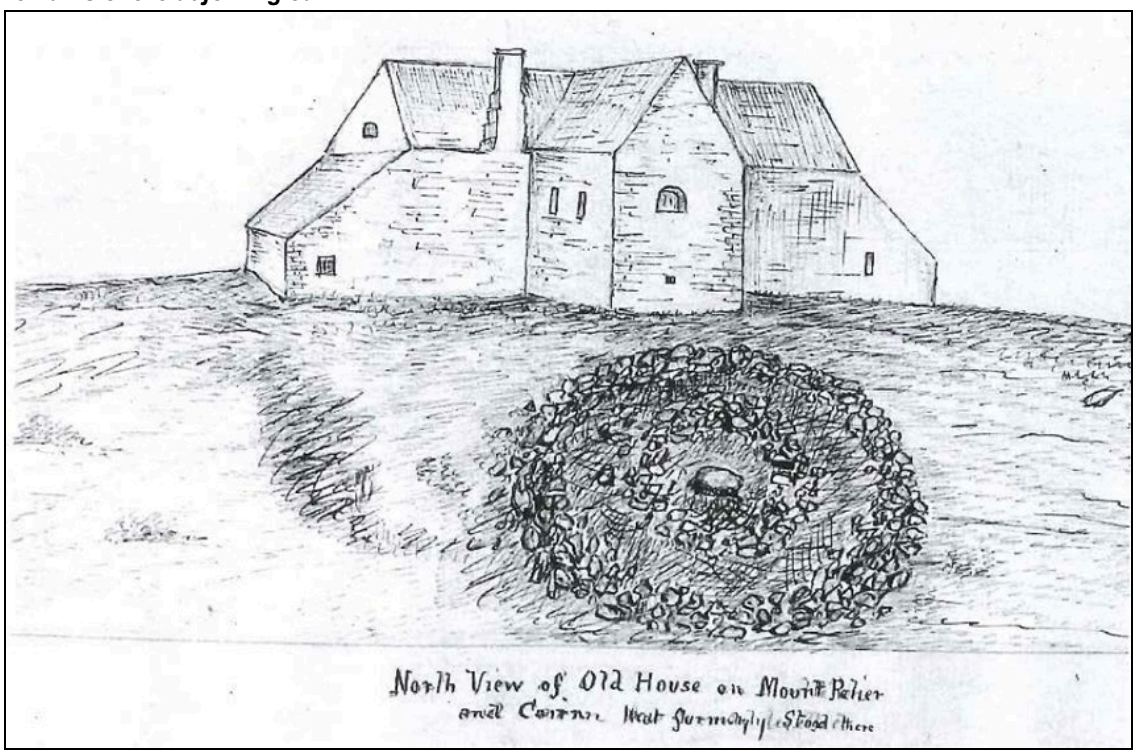


Figure 12.5 Handcock's rear view of the building as it appeared in the 1770s and also shows the remains of the adjoining cairn



William Domville Handcock visited the site in 1899 and described the condition of the building as follows:

> *"a mere ruin, each winter hastening its decay. It is only used as a shelter for cattle. The lower rooms are half filled with manure and rubbish. The stone staircase, that I can remember inside, is all gone and the cattle can no longer ascend to the drawing rooms as they used to do. The only way of getting to these rooms now is by climbing up the front*

wall to the hall-door; while the room in the return is almost inaccessible, except to an active climber[112]*'*

Figure 12.6 late 19th century photograph from the Lawrence Collection in the National Library of Ireland

Figure 12.7 late 19th century photograph from the Lawrence collection in the National Library of Ireland

[112] Price, L. 1942, p 43

The building remained vacant and derelict until Coillte acquired the land for forestry in the 1960s. Coillte carried out works to the building. This involved inserting a concrete stair with an iron hand rail, repairs to the roof and walls, and insertion of steel bars over the windows to make it saf for visitors.

12.3.1.2 Description

Figure 12.8 The Hell Fire Club as seen from the east

The Hell Fire Club is a detached five bay, two story over raised basement former hunting lodge, located at the summit of Montpelier Hill. The lodge has a projecting porch in the centre of the north elevation. A second single bay two story projection or wing is located in the centre of the south elevation.

Figure 12.9 The Hell Fire Club as seen from the south

There are single bay two story wings attached to the east and west sides. The east and west wings have pitched lean-to stone roofs. Extending north from the east and west elevations is a curtain wall. The east curtain wall is notable for the presence of a stone mounting block that was used to assist horsemen on to their saddles.

With its central projections, and two low flanking wings the Hell Fire Club has been compared to to a mid-18th century house at Mount Gordon in Castlebar in County Mayo which is of a similar form[113].

Figure 12.10 Example of 'In Line' Figure Mount Gordon House, Castlebar, Co. Mayo. Credit: landedestates.nuigalway.ie

Roof: The main roof appears to be of vaulted stone construction, previous repairs to the roof obscuring the construction somewhat. It is not the original roof but was built not long after the construction of the building, the original timber roof having been blown off in a storm. The roofs over the wings are also of vaulted stone construction.

Walls: The walls are composed of rubble masonry. As mentioned in the previous chapter, the masonry that was used to build the hunting lodge was taken from the adjoining passage tombs. Large stones are still evident in the walls.

Openings: The openings on the north or main elevation are predominantly square headed with the exception the arched entrance at hall level in the centre of the north projection. This was formerly the main entrance. A flight of cut-stone steps originally led up to the fan-lit door. these have since been removed. The windows at hall level are larger than those in the raised basement, further suggesting that it was the main reception area. The openings on the north elevation of the east and west wings are smaller.

[113] Jackman, N. (2015), p 10; Craig, M. (2006)

The openings on the side elevations are smaller again. Those on the side elevations of the north porch consist of small gun loops. A half-vaulted entrance to the servant's quarters is located on the east elevation of the entrance porch. The east end west elevations of the Hell Fire Club have small square headed openings on what was the first floor, just above the pitched roof of the stable wings.

Gun loops are present on the east and west elevations of the southern wing. The south elevation also contains arrow loops at raised basement level although there is a small square headed window on the south elevation of the west wing. The most notable opening on this elevation however it the arched semi-circular fanlight of the card room which was located off the half landing. Some of the large lintels over the windows may be orthostats from the adjoining passage tombs.

Interior:

Figure 12.11 (Left) One of the ground floor rooms.

Figure 12.12 (Right) The mid 20th century stairs, as seen from the ground floor. The handrail in particular has deteriorated and is a hazard

The lower ground floor rooms, accessed through a doorway in the northern projection, were most likely used as a kitchen, storage and for servant's quarters and are not as well-lit as the rooms on the floor above. There are two rooms on either side of the central stairway all with vaulted stone ceilings which support the stone floor of the floor above. The west room, which contains a large fire place was probably the kitchen.

Figure 12.13 (Left) Fireplace in the western room on the First floor.
Figure 12.14 (Right) View looking west from the east room on the first floor. Note the changes in level at the door


The large openings on the first floor suggests that, as at Mount Gordon, the main entrance and principal reception rooms were at that level. There is a large room on either side of the stairway, each containing a fireplace and niches in the walls. The windows at this level were north facing which exploit the panoramic view over Dublin Bay.

Figure 12.15 The apses in the west wall of the west room on the first floor. The window above relates to the second floor as there would have been a timber floor in between and a vaulted stone roof above.

There was another loft floor above which probably had a timber floor, as the old reception rooms now appear as double height spaces, with openings at high level. The underside of the vaulted roof can be seen. This first floor probably contained bedrooms. The southern wing contained rooms that were located off the halt landing. The one at basement level was the wine cellar and the one above it which features the fanlight was reputedly a card room.

In the east and west wings at either end of the lodge, were the stables, one for horses and one for hounds.

12.3.1.3 Condition

The NIAH states that because of its vaulted stone roof, the building is perhaps one of the best preserved early eighteenth-century hunting lodges in Ireland. However, the building is currently derelict and has been for many years. While previous works to the roof that were undertaken by Coillte have held it together, water was noted on the interior, suggesting ingress from the roof.

The building is prone to vandalism and anti-social behavior. It was also noted that youths up on to the roof which is a serious health and safety concern.

The hand rail to the stairs, is in poor condition and represents a hazard for visitors. Pigeon droppings were also noted on the interior and pose a health hazard.

12.3.1.4 Significance

The Hell Fire Club building is listed in the National Inventory of Architectural Heritage, the Sites and Monuments Record and the Record of Protected Structures (NIAH Reg # 11220022; SMR #: DU025-001003; RPS#: 388). The NIAH rated the building as being of Regional importance for it's architectural, artistic, cultural, archaeological historical, and social interest. The building remains very popular locally amongst equestrians and walkers, for its panoramic views of Dublin an in relation to the folklore that is connected with the site. It remains significant in terms of its history, archaeology, architecture, folklore and setting.

12.3.2 The Old Military Road

Figure 12.16 The Military Road

12.3.2.1 History

The Old Military Road was constructed by the British Army in the wake of the 1798 Rebellion between 1800 and 1809. It was intended to open up the mountains to the British Army, as many rebels continued to hide out in the Wicklow Mountains which were not easily accessible. The road stretched from Rathfarnham in County Dublin to Aughavannagh in County Wicklow.

Jackman speculated that it was constructed using masonry from the two passage tombs on Montpelier Hill as Austin Cooper's 1779 description of the cairns suggests that there were substantial upstanding remains at that time.

12.3.2.2 Description

A short stretch of the Military Road approximately .75Km, runs up through Massy's Estate. It is the only section of the Military Road that has not been resurfaced with tarmac and retains its original cobblestones.

12.3.2.3 Condition

It appears to be in fair condition.

12.3.2.4 Significance

The stretch of road in Massy's Estate is included in both the Record of Protected structures and the National Inventory of Architectural Heritage (RPS#: 385, NIAH #: 11221019). Because it was reputedly built from the remains of the cairns on Montpelier Hill, it is of archaeological interest also.

12.3.3 Massy's Walled Gardens

12.3.3.1 History

The Killakee Estate was owned successively by the Connolly, White and Massy families Killakee house was built by Luke white around 1806 and demolished in 1941 having lain vacant for many years.

Figure 12.17 Late 19th Century photograph of Killakee House. Courtesy of the Lawrence Collection in the National Library Ireland

The walled gardens were developed as part of the estate of Lord Massy of Duntrileague in the early 19th century. The formal gardens and terraces were designed for Samuel White in the 19th by Ninian Niven a renowned landscape designer.

Figure 12.18 Late 19th century photograph of the walled gardens showing the terraces and the curvelinear glass house by Turner.

The walled gardens are not recorded on Duncan's 1821 map so were built between 1821 and 1843. The glass houses were built sometime between 1843 and 1909-10.

Figure 12.19 (Left) Extract of the 1843 Ordnance Survay Map showing the Walled Garden. Turner's glass house and the terraces can be made out
Figure 12.20 (Right) Extract of the 1850 Griffith Valuation Map showing the Walled Garden. The map shows that the some glass houses had been built against the north wall of the gardens along with a boiler house

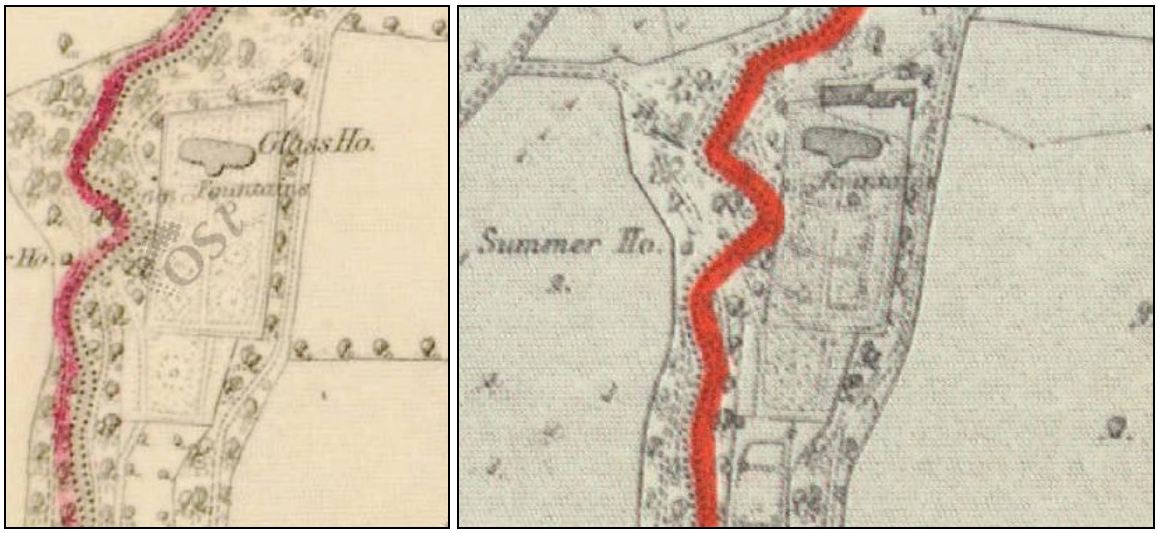
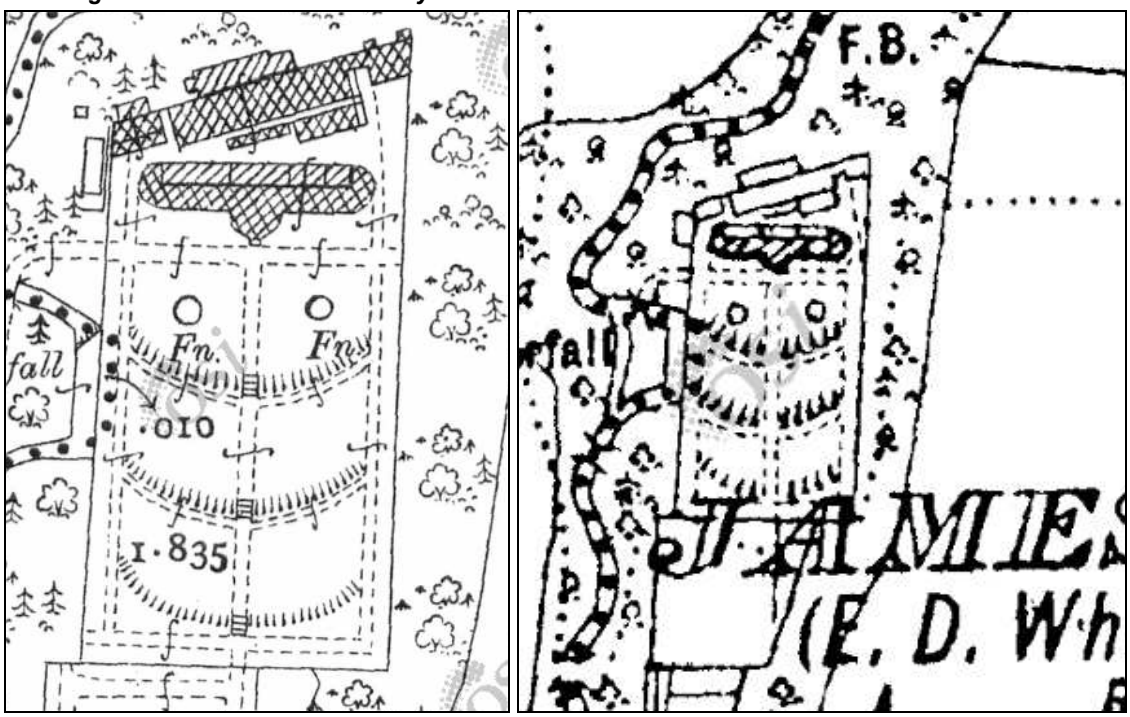


Figure 12.21 (Left) Extract of the 1910 Ordnance Survay Map showing that further glass houses had been added to the Walled Garden
Figure 12.22 (Right) Extract of the 1938 Ordnance Survay Map suggests that the northern range of lean to glass houses were in ruins by that time as was the biler house



At Killakee, a large and ornate curvilinear glass house was the first to be constructed and is shown on the first edition 1843 OS map. The 1912 map indicates that it has a boiler house within the structure.

The eastern and central lean-to glass houses and associated boiler were built against the north wall before 1850 as they are shown on the Griffith Valuation map

The remainder, including those in the centre of the complex of glass houses were built at a later date, sometime before 1912, as they are shown on the third edition 25" OS map. To the north of them and attached to the north side of the walled garden were four structures, most probably boiler houses and associated outbuildings.

By 1938 most of the glass houses were in ruins as only their outline is shown on the 1938 OS map suggests that the northern ones which were built up against the north wall were ruined by that time. The curvilinear glass house still appears extant at that point however.

12.3.3.2 Description

The gardens are a long linear complex of walled gardens running NS. At the north end was a formal garden containing a complex range of terraces fountains and south facing glass houses designed by Richard Turner. Turner also designed the Curvilinear Range in the National Botanic Gardens in Dublin and the Palm House at Kew Gardens in London.

The walls are of coursed granite and limestone masonry and raised in height above the south entrance to the formal garden. Many of the walls are covered in ivy and fissures were evident in the some of the walls where visible around the entrances. The NE corner has partially collapsed.

There were four arched entrances in to the formal garden: one in the centre of the south wall, two in the west wall at the north and south ends, and one at the north end of the east wall. These entrances have brick dressings. The arch above the entrance in the east wall has collapsed.

There were a series of glass houses at the north end and their red brick foundations are amongst the most easily identifiable features within the gardens. Built against the north wall were three lean-to glass houses. The largest of these was located between the other two and those at the east end were interconnected. The south elevation of the north wall is composed of brick and formed part of the largest to the three lean-to glass houses. High up on the north wall there are a number of square headed openings. They possibly contained small windows which provided ventilation as needed. Smaller openings located further down may be connected with the adjoining boiler house. The north wall has a large hole near the base. It may be an opening that was enlarged when bricks collapsed from the wall.

Located on the north side of the walled garden and associated with the lean-to glass houses are the ruined remains of what is most likely a boiler house. There are similar structures attached to the north sides of the Curvilinear Range and Palm House in The National Botanical Gardens in Glasnevin. Four structures were shown on the 1912 OS map. The largest survives a ruin. The walls are of coursed granite rubble with dressed granite quoins to the corners and red brick dressings to the gothic openings. Brick linings were noted on the interior as were sections of collapsed brick and masonry walling, possibly part of the north wall of the walled garden. A large fissure was noted on the north wall of the boiler house.

Directly south of the large lean-to glass house were two long narrower glasshouses. The remaining walls are of red brick construction, the pits which contained the service runs clearly evident. The larger of the long narrow central glass houses survives as a brick lined pit. Most of the brick foundations are overgrown and some of the brickwork has become dislodged and the mortar exposed.

To the south of these was a large and elaborate curvilinear glass house, roughly T-shape in plan with bowed ends to the east, west and south ends. Much of what remains is buried or overgrown.

What is evident are dressed granite flags which are slightly curved. They appear to a have formed part of the south wing of the glass house. On the north side, some remains of the integral brick boiler house were noted and currently function as a step. Some of the bricks have been removed. Rubble has been used fairly recently to form the base of a fire in the areas within what was the curvilinear glass house.

The remains of the fountains were not positively identified but loose and dressed masonry was noted on some of the former terraces. The dressed block may form part of the remains of the fountains, or the plinth of one of the urns or statues shown in historic photographs. Dressed stone which formed the border of flowerbeds was also noted.

Near the south by the roots entrance to the garden there is a set of stone steps, these have been badly damaged of the tree. The low stone balustrade on the west side has also become dislodged.

The central walled garden was the orchard. A cobbled surface was noted in the central walled garden.

The southernmost garden is long and narrow and was further sub divided in to five walled gardens which were probably the kitchen gardens. The remains of ruined outbuildings were noted in the north west corner of the northernmost of the kitchen gardens.

Figure 12.23 Perimeter wall of the walled gardens

Figure 12.24 Ruined outbuilding in the Kitchen Garden

Figure 12.25 Edge of some Cobbles or decorative border in the Orchard which was the central garden

Figure 12.26 Arched entrance and steps at the southern end of the formal garden.

Figure 12.27 Arched entrance in the west wall of the formal garden. Note the fissure in the wall above the arch

Figure 12.28 The paving in the forground denotes the remains of Turners curvelinear glass house

Figure 12.29 The brickwork which is just visible forms part of the foundations of the boiler house which was located within Turner's curvelinear glass house

Figure 12.30 Dressed stone. The manner in which it curves suggests that the stone bordered a bed which ran around the curvelinear glass house

Figure 12.31 Foundations of some of the glass houses with the north and east walls of the walled garden in the background

Figure 12.32 Foundations of some of the glass houses with the north and east walls of the walled garden in the background

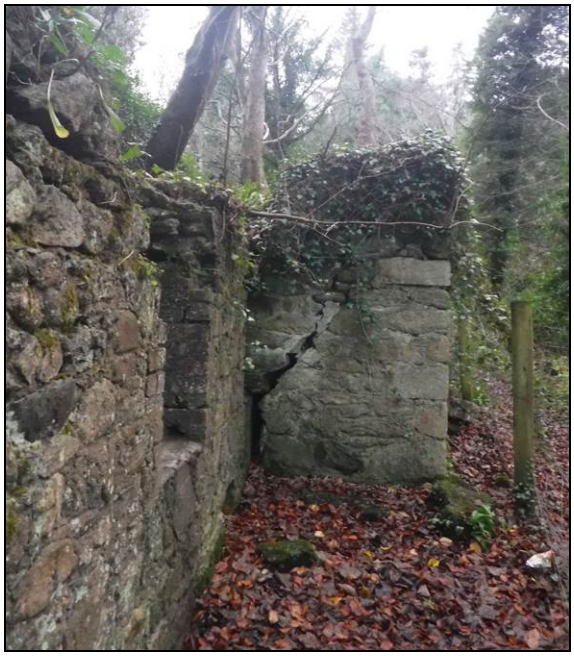
Figure 12.33 Brick foundations of some of the glass houses. Services ran in between the brick walls

Figure 12.34 The south face of the north wall of the formal garden

Figure 12.35 The north face of the north wall of the formal garden and the remains of the boiler house

Figure 12.36 The east wall of the boiler house

Figure 12.37 (Left) Large fissure in the north wall of the boiler house
Figure 12.38 (Right) Stone seat located outside the formal garden



12.3.3.3 Condition

Initial inspection of the walls to the walled gardens revealed that although many sections are covered in ivy, the walls are largely intact. A fine fissure was noted over the north archway in the west wall. There has been a partial collapse of the NE corner of the formal garden the arched entrance to the east wall has also collapsed. The north wall has a large hole near the base which

is a source of concern. The north face also displays a number of fissures. The attached boiler house to the north is also in a poor state of repair. A large fissure was noted on the north wall and some of the walls have partially collapsed.

Most of the brick foundations of the glass houses are overgrown and some of the brickwork has become dislodged and the mortar exposed. Trees are also growing in amongst the foundations. The steps at the south end of the north garden have become dislodged by a tree root as has the associated stone balustrade.

12.3.3.4 Significance

The Walled Gardens are among the remains of the Killakee House and grounds and are of architectural, artistic, historical, and technical interest.

With the exception of the Military Road, the remaining structures within Massy's Estate are protected under a single listing in both the Record of Protected Structures and the National Inventory of Architectural Heritage (RPS#: 384, NIAH #: 11221018).

12.3.4 The Gothic Lodge

12.3.4.1 History

It was built sometime between 1821 and 1843 as it is shown clearly on the first edition Ordnance map of 1843 but not on William Duncan's 1821 map.

12.3.4.2 Description

The lodge is located just inside the entrance to Massy's Wood abutting the boundary wall at the SW corner. It is a two bay single storey building roughly running NS with the main elevation on the east side. The lodge is of rubble construction, predominantly granite where the masonry has been exposed. Render is evident on the east elevation. The south elevation is totally obscured by vegetation and the west elevation is obscured by the vegetation and the boundary wall. The square headed door near the south end of the east elevation may be a later addition the jambs and lintel have been rendered with Portland cement render and the door is lout of keeping with the rest of the lodge. It contains a steel door which is obviously a 20th century intervention. It is covered in graffiti. The remaining openings are all gothic openings with dressed granite surrounds, rustication and blocking, similar to that of a Gibbs surround.

The sills are also of stone. All of these openings have been blocked. In the case of the windows at the north end of the east elevation and the north elevation, they have been blocked with corrugated iron sheeting. The doorway at the west end of the north elevation is blocked with granite masonry, coursed in a manner similar to the walls which suggests, along with its less than ideal location that it was always a blind hope. The roof is a concrete flat roof, obviously a 20th century intervention. A small vent, which is also a 20th century intervention was noted high up on the east elevation. The interior was not accessible at the time of inspection.

Figure 12.39 East wall of the gate lodge

Figure 12.40 North wall of the gate lodge

Figure 12.41 South wall of the gate lodge and the boundary wall to Massy's Wood

12.3.4.3 Condition

The former lodge is currently disused. Salt efflorescence was noted on the east elevation.

12.3.3.4 Significance

The former lodge is of architectural and historic interest.

12.3.5 The Ice House

12.3.5.1 History

The ice house was built sometime 1843 and 1912 as it is not on the first OS or the Griffith Valuation map or record of 1850.

12.3.5.2 Description

The ice house is located between the Glendoo Brook and the west wall of the walled gardens. It consists of an underground storage pit for the ice with a vaulted brick roof and walls. There is a lintelled entrance at the south end. The interior is lined with copper sheeting, except for the brick vault. The south end of the building consisted of an outer chamber, of which only the base of the walls and foundations remain.

Figure 12.42 The Ice House, as viewed from the south

Figure 12.43 The Ice House as viewed from the north

Figure 12.44 The interior of the Ice House

12.3.5.3 Condition

Inspection of the north wall of the Ice house revealed a large horizontal fissure. Bricks have fallen away at the NE corner and at least part of the west wall has collapsed in to the Brook. The west wall was not inspected closely as it was difficult to access but what was visible was overgrown. The lintel of the opening on the south elevation is pitched possibly as a result of the west side of the ice house being undermined. There is a large amount of detritus on the floor of the chamber.

12.3.5.4 Significance

The Ice House is of architectural, historic, technical and social interest.

12.3.6 Sluice

12.3.6.1 History

Located to the south of the ice house and on the east bank of Glendoo Brook are the remains of a brick and stone structure. The structure is not marked on any of the historic maps. Tracy refers to it as a water filtering system through which water from the Brook was diverted and conveyed via a 3 inch metal pipe, which is still visible, to the fountains and conservatories in the

garden[114]. This suggests that it is of similar date. Its form and location suggests that it is a sluice of some kind. Sluices were a common feature at mills and weirs. Several are marked close to mills and weirs further down the Glendoo Brook on the 1912 OS map, as at Edmondstown, Rockbrook and Ballyboden.

12.3.6.2 Description

The sluice is constructed of brick and stone and is capped with concrete. The north side of it is curved and tiered with stone to the lower tier and brick to the upper. The structure is hollow beneath the concrete capping. The form suggests that a lock operated on a central pivot which controlled the flow of the stream. The south side of the structure is obscured by a tree which has grown close to the remains.

Figure 12.45 The Sluice

12.3.6.3 Condition

As mentioned above, only partial remains survive. The brick has been exposed where some of the concrete capping has fallen away.

12.3.6.4 Significance

The sluice is of architectural, technical and social interest.

[114] Tracy, F., & South Dublin Libraries. (2009), p 24

12.3.7 The Saw Mill, Water Wheel, Weir and Miller's Cottage

To the south of the walled gardens lie the remains of a weir, and a number of ruined structures which formed part of a complex of buildings which included the weir, a saw mill, its water wheel and what was probably a miller's cottage.

12.3.7.1 History

The miller's cottage was built before 1843 as it appears on the first edition OS map. A collection of building are shown in the same location on Duncan's 1821 map but it is not known if they are the same buildings. The weir and saw mill is clearly marked on the 1912 OS map as separate structures with the miller's cottage located further south. Only the outline of the cottage is shown on the 1938 map, indicating that it had fallen out of use and was in ruins by that time.

12.3.7.2 Description

What remains of the old saw mill is the partial skeletal remains of a water wheel. The remains of the weir are located on the west bank of the stream. To the south of the weir was a dammed mill pond which also fed the fountains in the walled gardens.

The ruins of a stone building are located to the south of the weir. The remains and historic maps indicate that it was a long building, EW in orientation with gables to the east and west ends. Given the presence of a stack on the west gable and its location, it is possibly a miller's cottage and/or outbuildings. It is predominantly composed of coursed granite rubble but there is a later brick stack to the west gable. The walls extend north from the east and west gables, forming a yard to the north of the building.

Figure 12.46 The mill complex with the remains of the water wheel, weir and bridge in the foureground and the millers cottage in the background

Figure 12.47 The remains of the water wheel, weir and Mill as seen from the south

Figure 12.48 The Millers Cottage

12.3.7.3 Condition

Much of the north elevation of the cottage has fallen away with only foundations remaining. The east west and south walls are more intact but there has been some collapse on the east and south elevations. The west elevation is the most intact. The walls appear to be in fair condition. No fissures were noted. Only the base of the water wheel and walls around it survive. Little remains of the weir apart from some rubble on the west bank of the Brook.

12.3.7.4 Significance

The Weir, Water Wheel and Miller's Cottage are of architectural, vernacular and technical/industrial interest.

12.3.8 The Well

12.3.8.1 History

There is a well located further downstream, near the military road. It is indicated on the 1843 OS but not on subsequent ones.

12.3.8.2 Description

The well is of stone construction.

Figure 12.49 The well.

12.3.8.3 Condition

The well is disused but the stonework appears to be in good condition.

12.3.8.4 Significance

The well is of architectural, technical and social interest.

12.3.9 Stone Bridges and Culverts

There are some dozen stone foot bridges or culverts within Massy's Wood which do not fall under any of the above headings. They are as follows:

1. Located south of the sluice. This bridge is of stone construction with two flat arches and a central pier beneath;

2. Located to the north of the mill buildings. Similar to bridge 2 it is of stone construction with two flat arches and a central pier beneath;

3. A fine curved bridge or the Fairy Bridge, located in the centre of Massy's Wood and is located along the path leading from the gate lodge to the south end of the walled gardens. It is of randomly coursed stone construction. There is a pipe at the base;

4. Located up near the stone well at the north east end of Massy's Wood. This bridge is intact and functions as one of the main access points in to Massy's Wood;

5. Located to the south west of bridge 4. The outline is marked on current OS maps but it was not evident on the site survey. Partial remains of the bridge may survive;

6. Located to the west of the NW entrance to the formal gardens. This is more like a culvert as there is a concrete pipe beneath the path;

7. Located to the west of the SW entrance to the formal gardens. Only the outline is indicated on maps. Partial remains of the bridge survive;

8. Located near the NW corner of the kitchen garden. The bridge if of randomly coursed rubble construction;

9. Located to the west of the kitchen garden where the Piperstown Stream meets the Glendoo Brook. Only the outline of this bridge is indicated on the current OS map. Partial remains of the bridge survive;

10. Located to the south of the mill complex. Only the outline of this bridge is indicated on the current OS map. Partial remains of the bridge survive;

11. Located to the south east of the wedge tomb on the Glendoo Brook. This bridge is intact;

12. Two culverts to the west of the curved bridge.

12.3.9.1 History

Many of the existing stone walls and bridges date to the mid or late 19th century and are shown either on the 1843 or the 1912 OS maps. Some contain concrete piping suggesting alterations in the 20th century.

12.3.9.2 Description

The bridges within Massy's Wood are generally of masonry and brick construction though the use of concrete or concrete piping has been noted at some. In many cases the masonry is covered with mosses and other vegetation.

Figure 12.50 The Fairy Bridge

Figure 12.51 Bridge to the north of the Mill Complex

Figure 12.52 Bridge

Figure 12.53 Bridge

Figure 12.54 Culvert

12.3.9.3 Condition

The bridges are in many cases covered in mosses. Those that are extant appear to be in fair condition. Others were less visible, partly because they are obscured by vegetation or because little remains of them.

12.3.9.4 Significance

The bridges within Massy's Wood are of architectural, technical interest.

12.3.10 Walls

12.3.10.1 History

There are various sections of walling are located along paths or relate to the boundaries of the estate. The walls which bordering Massy's Wood are probably part of the 19th century boundaries. Those which border west side of the road appear to be 20th century.

12.3.10.2 Description

The walls along the R115 are of coursed granite construction. The walls within Massy's Wood are of randomly coursed rubble construction.

Figure 12.55 The 19th century boundary wall to Massy's Wood with the gate lodge located just beyond

Figure 12.56 The boundary wall to the Coillte lands at Montpelier hill is by contrast a low 20th century wall

12.3.10.3 Condition

Some sections are covered in mosses, ivy and vegetation but appear to be in fair or good condition.

12.3.10.4 Significance

The walls are of architectural and technical interest.

12.3.11 Other Structures

A summer house is recorded on the 1843 first edition OS map and was located to the south of the waterfall and to the west of the walled garden. It is shown on the 1850 Griffith valuation Map but had disappeared by 1912 and no trace of it is evident but there may be subterranean remains. There is a small rectangular structure shown on the 1843 and 1912 OS maps to the south east of bridge 4 at the NE end of Massy's Wood. It is not shown on the present map either.

12.3.12 Structures in the Surrounding Areas

Buildings within 1 Km of the site include:

12.3.12.1 Killakee House

The Stewart's House also called, Killakee House, stables and bell tower are located directly north of the Coillte lands in the R115 and are listed as protected structures in the South County Dublin Development Plan 2016-2022 (ref 380) and is included in the NIAH (Ref: 11221020). The house was built by the Connolly family of Castletown around 1765 as a hunting lodge.

The Dower House of the Massy Estate, abuts it, to form a T-shaped plan and was added circa 1806. Writers such as George Russell, George Moore, W B Yeats and Katherine Tynan were frequent visitors to the house in the early twentieth century. Countess Markievicz reputedly recommended the house to men on the run during the War of Independence. Like the Hell Fire Club, Killakee House also has associations with the supernatural. The local folklore frequently refers to an enormous black cat. It was in use as a restaurant when inspected by the NIAH circa 2002 but has since been converted back to a private residence. Some or the stables are in ruins with their carriage arches blocked up. The buildings are of architectural interest and are a prominent feature on the Killakee Road.

12.3.12.2 Carthy's Castle

Also known as Dollymount or Montpelier Castle, it was built by Lord Ely in the late 18th century as a part of a much larger two storey hunting lodge with an arched entrance at each corner. It was eventually abandoned by the Ely family and became uninhabitable. Much of it was demolished in 1950. The tower of what was the west end is the only surviving part. The site was not included in the record of protected structures because of the fragmentary nature of the site it was determined that the remains were not considered worthy of inclusion in record of protected structures. The ruins are in poor condition. The tower remains a striking feature in the landscape and are of architectural interest.

12.3.12.3 Piperstown Bridge

Piperstown Bridge (NIAH #: 1225009) was built C.1920 and of rubble and concrete construction, it is of architectural, technical interest. Part of north parapet missing. The bridge will require works to make it safe.

12.3.12.4 Vernacular Cottages

There are a number of 19th vernacular cottages to the south west of Montpelier Hill which are of interest but all are in private ownership.

12.3.12.5 Further Afield

One of the main aims of the project is to improve access for walkers and the culturally curious, to improve existing and create new trails and to highlighting the enormous cultural significance of the region. Under the proposal archaeological and architectural sites within the Coillte Lands will be linked with others in South Dublin the Dublin Mountains via the Dublin Mountains way, and to link up with the Wicklow National Park and other sites along the Wicklow Way.

There is a possibility of linking it with the Art O'Neil Challenge which passes to the west of the site. The event annually commemorates Art O'Neill, and Red Hugh O'Donnell who in 1592 made the only successful escape from Dublin Castle and trekked to Glenmalure over 50km away, then still the stronghold of the O'Byrnes. There are numerous other sites which are located along established trails which are in hiking distance. These include but are not limited to:

- Cruagh Cemetery, (NIAH 11221016, SMR # DU025-003005) which contains a c.1820 watch tower. The site is of architectural, local historic and genealogical interest;
- Glenasmole Reservoir (NIAH Reg. No. 11220014 & 11225016), designed by Richard Hassard in 1880 is of historical, technical and social interest. It is also a potential blue way but is not currently open to the public for recreation. Consent/co-operation with Irish Water, who manage the site would be needed however;
- Rockbrook Mill, Cruagh (NIAH 11221009), is a former paper mill, built c.1820. The site forms an important part of the industrial heritage of the area;
- Rockbrook Park (NIAH 11221007);
- Orlagh House to the north (NIAH 11220008);
- Glencree Centre for Peace and Reconciliation (NIAH 16400203) and German Military Cemetery (NIAH 16400207), located south on the Military Road;
- St Enda's In Rathfarnham (NIAH 11216043);
- Rathfarnham Castle (NIAH 11216007);
- The Powerscourt Estate Near Enniskerry in Wicklow

12.4 PROPOSED DEVELOPMENT

A minimal intervention approach or 'as little as possible and as much as necessary' has been adopted in relation to all of the structures on the Coillte site as it was considered that a large scale intervention, as restoration would have a negative impact on unique character and ambiance of the Hell Fire Club and structures in Massy's Wood. The proposed works are therefore largely confined to repairs, the removal of vegetation where it is found to be damaging or obscuring structures and making them safe. A similar approach was adopted by the Office of Public Works at Archbold's Castle in Dalkey.

12.4.1 The Hell Fire Club

A general survey of the buildings has been carried out by Paul Corrigan Associates and the building has been inspected and photographed internally and externally. At a minimum, the building will require works to make it safe. The following works are therefore proposed:

- With the exception of what could be seen from the from the ground both externally and internally, the vaulted roof structure was not inspected closely. Repairs were carried out by Coillte in the 1960s but, typical of the approach to ruins at the time, the methods used were very crude. Some dampness and water was noted on the interior as was lime leaching;
- Closer Inspection of the roof structure is proposed to determine its condition. The source of water ingress is to be determined and repairs carried out accordingly;
- It is known that local youths climb up on to the roof of the Hell Fire Club which represents a serious health as safety risk both in terms of potential falls from the roof and any damage that it may be causing to the roof structure itself. Works to prevent people climbing on to the roof are therefore proposed. The chimney flues are to be sealed or blocked to prevent people climbing up them on to the roof structure. The proposed seal will be reversible;

- Green mould and lichens were also noted on the interior. The interior is to be inspected more closely. If it is found that the mould and lime leaching are not causing significant long term damage to the masonry and structure building they should not be removed as the mould and leaching contribute to the otherworldly ambience and character of the ruin. Cleaning of this type is something that often has to be repeated and can cause more damage to the stonework over time. Moreover, it may result in the building being too clean, or the gentrification of the ruin which is something that should be avoided;
- Neil Jackman, who recently undertook partial excavations of the remains of the larger passage tomb (SMR# DU025-001001) at the Hell Fire Club uncovered Megalithic art on a remaining kerb stone. This artwork was only evident in certain lights as it was heavily worn by exposure to the elements over centuries. The find was confirmed when a laser scanner was used to record the art work. The tomb was largely destroyed in 1725 and the stones were used to build the Hell Fire Club. Because The Hell Fire Club was constructed using stone from the passage tombs, some of the lintels and other stones are possible orthostats and may feature Neolithic art. The masonry in the Hell Fire Club is to be closely inspected and a similar noninvasive LiDAR survey of the stonework has been commissioned;
- It is recommended that modern graffiti be removed, as it detracts from the building. If Neolithic artwork is uncovered, it is essential that it that it is not obscured. A small area should be tested under controlled conditions initially, using various cleaning methods beginning with the least aggressive until visible results are evident. The results should be monitored to ensure that no potential damage occurs. This is to ensure the appropriate method is identified and damage to the masonry is not incurred;
- Historic graffiti where it can be identified should be retained however as it is part of the history and folklore of the building;
- The present iron handrails to the stairs and balconies which were installed by the Coillte have deteriorated and the handrail is sharp, posing a risk of injury. The concrete stairs and landings were also installed by Coillte. They are of no architectural merit. It is proposed that the present staircase be removed altogether and replaced with contemporary stairs that is durable but in keeping with the building. The proposed works will also be reversible;
- Visibility on the interior of the Hell Fire Club was found to be poor at certain times of the day and year and there are changes in level or steps up or down into some of the rooms, creating a trip hazard. Discreet, energy efficient lighting is to be installed to improve visibility in the interior;
- Currently the floors at lower ground level are of earth. The rooms on the upper floors have stone floors created by stone vaulting but there has been a buildup of earth and pigeon droppings. These are to be removed;
- It is proposed that a stone floor be laid. This floor will protect the underlying archaeological features and will enable the concealment of lighting services. A similar approach was adopted in the crypt of Christchurch Cathedral;
- A large circular path or ring is to be laid around both the tombs and the Hell Fire club along with signage;
- Minimal lighting is proposed along some of the paths, at the proposed centre and at the car park to facilitate staff, departures at dusk and for security and safety reasons;
- The proposed lighting is also intended to future proof the site. The history and folklore associated with of the Hell Fire Club means that it is a destination for those interested in the occult particularly at Halloween. There is therefore considerable potential for ghost tours and linking up with other cultural events, such as the Stoker Festival, National Heritage Week, Culture Night and Open House.

12.4.2 The Old Military Road

It is important that the surface be retained as it is the only stretch of the Old Military Road that has not been resurfaced with tarmacadam. It is will be inspected on an annual basis, its condition monitored and a minimal repairs carried out to ensure the safety of visitors whilst retaining the significance of the feature.

12.4.3 The Walled Gardens

A survey of the walled gardens has been carried out by Paul Corrigan Associates.

It is recommended that the walls and the remains of outbuildings be inspected further and checked for structural integrity. Fissures which were noted in the walls are to be monitored for movement of the walls. Ivy is to be removed where it is causing damage. Where masonry or brickwork is loose it is to be repaired. Mortar is to be analyzed and matched like for like.

The trees within the walled garden contribute to the character of the walled gardens. A tree survey has been carried out Cunnane Stratton Reynolds. It recommends the retention of the majority of trees. Those that have been recommended for removal by CSR are to be removed.

There are a number which are growing very close to the north wall of the formal garden and amongst the remains of the glass houses. Some are regarded by CSR as being of high quality and that their retention is highly desirable. While they are of high quality there are concerns that their roots may be having a negative impact on the walls. It is therefore recommended that these trees and the adjoining sections of wall should be monitored closely for fissures or other signs of structural damage.

The north wall also has a large hole at the base which may pose structural issues. This too should be checked by a structural engineer.

The dislodged steps at the south end of the garden are to be repaired and reset for safety rather reasons, retaining the adjoining tree.

The surviving masonry and brick walling to the glass houses is to be cleared of ivy and other scrub vegetation to reveal their foundations and the remains of the Victorian service runs and give a sense of what the complex was like. Repairs to the brick and granite walls are to be carried out. Loose bricks are to be put back and mortar is to be matched like for like with the existing, samples having been taken. A similar approach was taken by Buchan Kane Foley Architects on the ruined glass houses located in the walled garden of Kylemore Abbey in Connemara in the 1990s. With the exception of two glass houses which were restored, the conservation works in were minimal. Most of the glass house remains were repaired as ruins.

It is recommended the boiler house be carefully cleared of debris. Fissures should be monitored. Where possible the masonry and brick sections of the wall should be repaired and collapsed sections put back.

The foundations of the fountains should be located and uncovered. Dressed masonry blocks which can be identified as the plinths of statues, urns which form part of the fountains should be put back in situ where possible.

12.4.4 The Ice House

Initial inspections indicate that the ice house may require stabilizing works to prevent it collapsing in to the Brook. It is recommended that the structure be inspected and monitored more closely to determine what works are needed and how to display it to the public. Debris and rubbish on the interior of the Ice house is to be removed. Repairs are to be carried out on the brick walling of the ice house as necessary.

12.4.5 Sluice

The sluice is to be inspected further. Scrub and ivy is too removed. Repairs are to be carried out on the exposed brick walling of the sluice as necessary.

12.4.6 The Gothic Lodge

There are no immediate proposals for the former lodge but it has considerable potential for re-use. The building requires conservation works but at present any works to the lodge will be confined to maintenance and repair works.

12.4.7 The Weir, Water Wheel and Miller's Buildings

A survey of the miller's buildings has been carried out by Paul Corrigan Associates.

It is recommended that the Weir, Water Wheel and Miller's Cottage be further inspected, their structural integrity determined and repairs carried out as necessary. A challenge of the project will be conveying the past use of the structure from what remains.

12.4.8 The Well

The well is disused and presents a safety risk. Repairs should be carried out to make it safe and prevent accidents. Repairs should be carried out to make it safe and prevent accidents.

12.4.9 Bridges and Walls

A detailed survey of the three of the bridges has been carried out by Paul Corrigan Associates. Many of the others have been also been recorded in a general survey of Massy's Wood. It is proposed that the bridges be inspected closely and checked for structural integrity and repaired as necessary as they will be in use by the public. Many are covered in mosses and other vegetation which contribute to their character and the character of the woods in general. These are to be retained, except where vegetation is found to undermine the structural integrity, in which case it should be carefully removed.

It is proposed to widen the Killakee Road (R115) for a c.100m stretch on the eastern side into Massy's Estate to accommodate a 1.8m wide footpath on the western side near the Stewart's House. The proposed widening will entail modest road widening of about 1.2m immediately adjacent to the western elevation of the Gothic gate lodge.

It is proposed to rebuild the wall, using the same materials, along the newly aligned boundary. A pedestrian entrance will also be created in this wall. A small buried retaining wall will also be built to accommodate the level difference between the road and the ground level at the gate lodge.

12.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

The proposals will involve conservation works which will protect the various sites in to the future.

The Hell Fire Club is dangerous in its present state, because of changes in level, poor visibility on the interior and because of people climbing on the roof. Some works are therefore necessary, not discretionary.

The proposed removal and replacement of the existing stairs in the Hell Fire Club will provide safe access to the upper floors of the building. Care must be taken however, to ensure that the removal of the existing stairs and the instalment of new stairs does not damage the building. It is intended that the proposed works are reversible so that the building is not damaged or its character undermined.

Increased visitor traffic in the Hell Fire Club and the various structures within Massy's Wood has the potential to cause increased wear and tear on these structures.

Although the removal of ivy from some structures is intended to prevent long term damage to walls, removal may also cause damage.

Though signage is proposed is part of the interpretive measures, too much may clutter the site and detract from it.

There is a risk that lighting or too much of it will detract from the character and setting of the site, and the Hell Fire Club silhouette.

12.6 REMEDIAL AND MITIGATION MEASURES

As part of the mitigating measures and subject to the necessary permissions and ministerial consent, small areas on the lower ground and first floors of the Hell Fire Club should be investigated to determine their nature. The proposed stone floor is intended to protect any underlying archaeological features that may be found.

- The instalment of discreet lighting in the Hell Fire Club will not involve the chasing of walls. Where possible, wires will be hidden by the proposed stone flooring.
- Most of the other works to the Hell Fire Club and the various structures in Massy's Wood involve closer inspection and repairs.
- Where vegetation is being removed it must be done with care so that removal does not cause damage.
- The widening of the R115 will result in the realignment of the boundary wall to Massey's Woods. As a mitigating measure, it is proposed to rebuild the wall, using the same materials, along the newly aligned boundary. This is intended to ensure a retention of character along the Boundary to Massy's Wood.
- Although no works are currently proposed for the Gothic Gate lodge in Massy's Woods, the realigned boundary wall will be built very close to the rear wall of the lodge. Measures will therefore be taken to ensure that the lodge is protected from damage during the demolition and construction works.
- The lodge is currently hidden by the boundary wall, particularly when viewed from the. The proposal will reveal the lodge more fully.

All structures on site will be inspected on an annual basis, to assess their condition and to address issues as they arise.

12.7 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

Clearing of some of the trees from the top of Montpelier Hill will restore the silhouette of the Hell Fire Club when viewed from the city to the north.

The laying of services around the Hell Fire Club during the construction phase may impact on archaeological features. The recent excavations uncovered tiles which may have come from the former kitchen. The proposed removal of pigeon droppings and other build-up on the interior may have a negative impact on the archaeological features in the building.

During construction, the localised widening of the R115 along the Massy's Wood frontage will impact on the estate boundary wall, and the setting of the gothic lodge located close to the wall near the Massy's entrance. The gate lodge is set far enough back from the existing boundary wall to allow for the widened road. Careful road widening, including a small buried retaining wall to accommodate the level difference between the road and the ground level at the gate lodge, will ensure no damage to the building, and the western elevation of the gate lodge will became the boundary at this point, revealed to public view (the lodge is currently hidden from view).

12.8 RESIDUAL IMPACT AND PROPOSED MONITORING

The blocking of the chimney flues in the Hell Fire Club is intended to curb people from climbing up on the roof. It will not prevent it altogether however as it is possible to climb up the building via the lean to wings.

As well as repairs and removal of destructive vegetation from the Hell Fire Club and the various structures in Massy's Estate, all structures are to be monitored through inspections which are to be carried out on an ongoing basis. This is particularly the case with a number of trees which are located close to the north all of the Walled Garden and existing fissures or holed in the wall.

Those structures located on or close to Glendoo Brook will also be monitored for erosion and other damage caused by flooding

As with the archaeological heritage, referred to in the previous chapter, fire prevention and fire safety procedures will form part of the proposed ongoing monitoring procedures in collaboration with Coillte in order to minimise the risk of fire damage to the architectural heritage and designed landscape features on site.

Although it is intended to link the project with the heritage of the wider Dublin Mountains region there are issues that have to be considered:

Safety

- The condition of many sites in the surrounding areas is a cause for concern and the maintenance of these sites is outside the control of the various stake holders in the project.
- Roads are currently the only public routes on some sections of existing trails which is a hazard.

Access

- Gaining access to sites is not guaranteed as many sites are on private land or are in private ownership and there will be issues of rights of way, insurance and consent from owners. If access to sites is not possible, the broad scope of the project will be curtailed. Consultation and engagement with neighbouring landowners, local communities and stakeholders is therefore vital.

Reparation works and minor interventions are proposed to improve the condition of the Hell Fire Club and its safety for visitors. Vegetation clearance is proposed in the Massy's Wood walled garden, for protection of the structure and better appreciation by visitors. A programme of initial inspection (and repair if necessary), followed by annual monitoring of the condition – and the effects of visitors - and mitigation measures (if necessary) is proposed for all architectural heritage features on the site. The effects of this will be improved condition and protection of the architectural heritage.

12.9 CUMULATIVE IMPACTS

It is proposed that modern graffiti will be removed from the interior. Should it re-occur as a result of anti-social behaviour, there is a danger that frequent cleaning will damage the masonry.

Several of the built heritage features a located at or close to the Glendoo Brook which include the Ice house, walled garden, bridges, and the remains of a sluice, mill complex and weir.

There are no recorded floods on the brook but it flows in to the Owenadoher river. There is a record of a flood event on the Owenadoher River at Edmondstown Road on 05/11/2000 and at Boden Villas on 03/02/1994.Storm Lorenzo caused the Glendoo Brook to swell on Oct 3, 2019. Footage of which was recorded at the remains of the weir and ruined mill (https://twitter.com/SavetheHellfire/status/1179686618506125312/video/1. accessed 16/10/2019).

Increased rainfall resulting from climate change will increase the possibility of flooding. This is likely to cause erosion along the course of the brook including at the Ice house, west wall of the walled garden, bridges, sluice, mill complex and weir. The fissures on the walls of the ice house indicate evidence of subsidence. This is likely to be aggravated by further erosion as a result of flooding. Flooding is also likely to cause damage to sections of the west wall of the walled garden, bridges and the remains of the sluice, mill complex and weir. This would have a significant negative effect on the built heritage of the area and would require conservation and repair works to reverse.

The outbreak of fire in Massys Wood has the potential to cause damage to the disused gate lodge, Ice house, the walled garden complex, bridges, sluice, military road, mill complex and weir. As mentioned in the previous chapter, the Hellfire club is located in an open area on the top of the hill, thus there is a fire break between them and the tress on the slopes of the hill.

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13.0 MATERIAL ASSETS - FORESTRY

13.1 INTRODUCTION

The EPA *Advice Notes for Preparing Environmental Impact Statements* (Draft 2015) identifies, for project types 28, the following material assets which may be impacted by development:

- Roads – the impacts on roads, traffic and transportation are addressed in Chapter 14;
- Water supply – no significant impacts are expected on water supply – the impact on hydrogeology are addressed in Chapter 7 and water and hydrology in Chapter 8;
- Power – no impacts are predicted on the electricity network;
- Telecommunications network – no impacts are predicted on the telecommunications network;
- Waste disposal requirements – no impacts are predicted to result from the waste disposal requirements of the development.

Since the proposed development will take place on a site currently used for timber production, forestry – as a material asset - was included in the assessment. The forestry consultancy Veon prepared the following assessment of the forest resources, which informed the landscape development proposals.

The forests in the area of the project are very diverse, ranging from commercial plantations to native woodlands of all ages. The range of benefits that these forests deliver is also diverse, extending beyond basic timber production to encompass bio-diversity, wildlife conservation, environmental protection, rural development, carbon sequestration, amenity and recreation, and tourism.

Although considerable overlap does occur, the forests can be roughly divided into two types, amenity to the east (Massy's Wood) and timber production forests (The Hell Fire Club) to the west. The entire area is outlined in red on the map below, the areas highlighted in yellow will be discussed in detail in this report.

Fig. 13.1 Hell Fire Club and Massy's Wood Project Area

Both Hellfire Club and Massy's Wood are owned by Coillte. As such both are managed under the principles of sustainable forest management and are certified by the Forest Stewardship Council (FSC). Coillte's primary focus for the forests is the production of high quality timber. This can certainly be the case for the Hell Fire Club forest, however, given the species breakdown in Massy's Wood high quality timber production would be of lesser concern.

Hell Fire Wood is almost entirely coniferous with a range of ages present including areas recently clear-felled and replanted, areas of mature forest due for harvesting/clear-felling in the near future and middle forest management.

Massy's Wood, by contrast is predominantly broadleaved woodland of beech and oak, ash, fir, larch and spruce. There are some areas of coniferous plantations and specimen trees from the original Killakee demesne, species such as Giant Sequoia, Monkey Puzzle, West Himalayan spruce, Monterey Pine, and Western red cedar. In places, exotic invasive species such as Cherry laurel and rhododendron have a strong hold and are being cleared and reduced. Whilst predominantly a recreational forest with a high biodiversity function, woodland management works are ongoing with areas of beech wood thinned in 2016.

As a result of the already high amenity values in Massy's Wood, it is not projected to carry out many large operations that are going to greatly affect the forests' significance. Smaller operations such as repairing the wall structure in the walled garden, building a treetop foot bridge and ongoing forest enhancement management to promote amenity and nature conservation will be carried out.

13.2 FOREST DEVELOPMENT HELL FIRE CLUB

The western section of The Hellfire Club will continue to be managed as a commercial conifer plantation. This part of the project has a species mix of predominantly Sitka spruce, ranging from 1 year to approx. 25 years of age. There is a very good road network through this area of the forest, which would be intensively used by walkers also. The eastern section, as highlighted in figure 13.2 below, will undergo a phased plan of conversion from coniferous forest into a predominately broadleaved woodland.

As a result, the remainder of this report will focus on the development of this section of The Hellfire Club. The total area of this section comes to approximately 26.12 ha. The area is broken up into 9 separate sub compartments as there are different parameters in each plot.

Figure 13.2 Phased removal of coniferous forest to predominantly broadleaved woodland

Sub Compartment	Area (Ha)
1	3.60
2	3.56
3	5.30
4	2.02
5	.70
6	.84
7	3.91
8	4.99
9	1.20
Total	**26.12**

13.3 EXISTING ENVIRONMENT – SUB-COMPARTMENT DESCRIPTIONS

13.3.1 Sub-compartment 1

Plot 1 is located above the existing car park, it is also where the new car park is proposed. The species composition is predominately Douglas fir, the majority of the trees have reached their critical height and are beginning to blow down and snap as illustrated in figures 2 and 3 below. The prevailing wind blows from the south west, and with plot 3 being removed in recent years, plot 1 has become more exposed.

13.3.2 Sub-compartment 2

This plot has been replanted approximately 10 years ago with predominately Sitka spruce and 15% larch and 10% birch and fir. There is a spiralling walk way down through this plot. Trees are approximately 5 meters in height. This plot also adjoins the public road.

13.3.3 Sub-compartment 3

Figures 13.2 and 13.3: Snap and wind blow in an unstable sub compartment 3

Plot 3 was clear-felled in 2016. There are a few free standing broadleaves throughout the site as illustrated in figure 4 below. The plot is yet to be replanted. Brash is quite heavy over the majority of the site as illustrated in figure 5.

Figure 13.4: View from the top of sub compartment 3 recently clearfelled and unplanted

Figure 13.5: Heavy brash to be removed from sub compartment 3

13.3.4 Sub-compartment 4

Sub compartment 4 is planted with larch which are 20 meters in height, there is some natural regeneration of beech under the canopy, and there is a nice even floor with a good cover of grass which makes it easy to walk. Sections of the larch are showing signs of windblow. The most eastern point of this plot, where the forest road is located, has a very important role. This section, as illustrated in figure 6 below, is a narrow strip that restricts walkers view coming out of The Hellfire Club. This holds the interest for walkers as they have to wait to get around the corner before the view of Dublin is exposed.

Figure 13.6: Restricted view of Dublin

11.3.5 Sub-compartment 5

Plot 5 consists of 95% Sitka spruce and 5% Larch measuring 20m in height. This plot is the most southerly block of mature timber. It covers views of the mountains to the south as illustrated in figure 7 below.

Figure 13.7: View to the south behind plot 5

13.3.6 Sub-compartment 6

Sub-compartment 6 contains very old beech trees. As illustrated in figure 8 below. These trees are approximately 50 -80 years old. The ground conditions below the canopy are very good for walking etc. The beech adjoin the new clear-felled plot 3.

Figure 13.8: Mature beech trees in plot 6

13.3.7 Sub-compartment 7

This sub compartment consists of a 10 year monoculture of closely stocked Sitka spruce with 15% larch and birch mix. This plot would be similar in make up to plot 2. The trees are approximately 6 meters in height.

13.3.8 Sub-compartment 8

The majority of sub compartment 8 is planted with Sitka spruce and are approximately 18 m in height. The easterly section is quite patchy with open pockets present from wind blow, as illustrated in figure 9 below. These areas are very untidy due to the trees blowing down, there are also firs beginning to naturally regenerate now that light is getting to the forest floor.

Figure 13.9: Open areas within plot 8

Throughout the entire sub compartment there is evidence of windblow as illustrated in figure 10 below. There is a good cover of grass on the forest floor where there is not a large opening in the canopy. Figure 11 below also illustrates the large presence of public activity, there are remains of numerous fires present through this plot.

Figure 13.10: Windblow throughout plot 8

Figure 13.11: The remains of fires set by the public in plot 8

13.3.9 Sub-compartment 9

Sub compartment 9 consists of a 16/17 year old reforested block of closely stocked Sitka spruce with 15% larch and birch mix. This plot would be similar in make up to plots 2 and 7 albeit further advanced. The trees would be approximately 11 meters in height.

13.4 POTENTIAL FOREST OPERATIONS

13.4.1 Sub-compartment 1

Due to the risk of further windblow and snap which is already evident here, and due to the fact that this location is going to be used for additional car park spaces, plot 1 should be scheduled to be removed. Where possible, broadleaves present in the plot should be left behind and replanting with additional broadleaves can be carried out with tubes and stakes. Species such as oak, rowan, cherry, hazel, alder, birch, holly, scots pine should be considered.

13.4.2 Sub-compartment 2

Pockets of plot 2 should be considered for removing the conifers and enrichment planting with broadleaves, mainly along the spiralling walk way through the plot.

13.4.3 Sub-compartment 3

This plot has been recently clear-felled. It should be considered to remove the brash from this site and grade the ground to create a more even surface for walking. Old stone walls should be restored and the area replanted using shelters and stakes with broadleaves as in plot 1.

13.4.4 Sub-compartment 4

Areas of larch could be removed in this plot to encourage the growth of the understorey of beech. Some ground cultivation could be carried out to encourage natural regeneration or enrichment planting using shelters and stakes might be more suitable. The most southerly section should be retained especially along the forest road as this is acting as a blind to the views of Dublin.

13.4.5 Sub-compartment 5

Plot 5 covers views to the south. Open areas, creating vistas, could be created to again create an understorey and expose views to the south, however this plot provides good shelter to the rest of the site. High pruning could be carried out to remove branches, this will allow walkers along the forest road see through the plot.

13.4.6 Sub-compartment 6

No forestry work required. Nice viewing area and potential picnic area.

13.4.7 Sub-compartment 7

As in plot 2, pockets of plot 7 should be considered for removing the conifers and enrichment planting with broadleaves. A setback area should also be installed around the hell fire club landmark.

13.4.8 Sub-compartment 8

Areas of blown down trees should be cleared up and the ground graded off with the brash removed. These areas can be replanted with shelters and stakes with a range of broadleaf species. Given the age class of this forest a continuous cover forestry system might be suitable,

creating a multi storey ecosystem. There is a risk of windblow within this plot however, which will be increased if pockets are to be opened for under-planting. It may be more suitable to clear-fell and replant as in plot 3.

13.4.9 Sub-compartment 9

This compartment is very close to being ready for a first thinning. A heavy first thinning to open the canopy may be suitable, however, given the overall area of the plot it may be more suitable to enforce the management regime that is going to be selected for plot 8 beside it.

13.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

The options presented will have impacts on the forestry in the area. These impacts include removing commercial forestry in some cases and replacing with broadleaves. This in itself may prove cumbersome to establish given the exposure of the site and presence of deer mainly. By replacing conifers with broadleaves, the value of that piece of ground will depreciate.

A felling licence granted by the Minister for Agriculture, Food & the Marine provides authority under the Forestry Act 2014 to fell or otherwise remove a tree or trees and to thin a forest for silvicultural reasons. This Act prescribes the functions of the Minister and details the requirements, rights and obligations in relation to felling licences. The principal set of regulations giving further effect to the Forestry Act 2014 are the Forestry Regulations 2017 (S.I. No. 191 of 2017).

Under the 2014 Forestry Act, all trees that need to be cleared whether for silvicultural reasons or for recreational purposes such as tracks or buildings etc. will require felling licences. The forestry act states, in layman terms, that when forests are cut down they need to be replanted. If replanting is not going to occur then replacement lands may need to be planted instead.

Single trees and small groups of trees can be removed under a general felling licence. However, discussions will have to be opened with the Department of Agriculture in relation to clearing larger areas and lines of trees for tracks etc. without replanting. As the areas are going to be used for recreation there may be scope to forgo replanting rules. Where a licence for the felling of trees is granted on or after 24th May 2017, the licensee shall erect a Site Notice, seven days prior to the commencement of and remain in place for the duration of harvesting operations

With clearing areas of trees, the remaining forest can sometimes be disturbed depending on a number of factors (aspect, elevation, remaining tree shelter etc.) Opening areas of the forest for structures and tracks etc. may lead to some trees becoming unstable and prone to windblow as evident in Massy's wood. This could be a health and safety risk.

Future operations will have to be planned for certain times of the year only, given that during the summer month's visitor numbers are going to increase. If car parks overspill there is the potential also that traffic could become a problem for timber lorries.

Tracks that are to be upgraded or newly installed for vehicles should be designed and built so that timber lorries can also use these roads in the future. Some of the walking tracks designed should be multi-purpose; tracks, such as the one around the perimeter of Hell Fire can be used as a walking track but as a fire line also. The management of gorse in the area is a factor that will require work. Scrub clearance will need to be accounted for and a fire management plan completed.

13.6 MITIGATION STRATEGIES

Commercial forest activities such as road maintenance, thinning and clear-felling will need to be planned well in advance and organised during winter months when visitor numbers are lower. Pedestrian diversions can be installed off paths etc. to allow forest activities as normal if necessary. Certain car parks may need to be closed during these operations also.

For security and health and safety, barriers should be kept in place to prevent vandalism, dumping, anti-social behaviour, rallying and overnight parking. Car parks should close during the night. Discussions should commence with the Forest Service before any progress is made with felling licences. This can iron out any potential problem in the future.

Specific types of trees shelters can be used instead of deer fencing where areas are being converted from conifer to broadleaf.

14.0 MATERIAL ASSETS - ROADS, TRAFFIC AND TRANSPORTATION

14.1 INTRODUCTION

This document summarises the Transport Impact Assessment (TIA) prepared by Seamus MacGearailt of Roughan & O'Donovan as part of the Design Team led by Paul Keogh Architects (PKA) that was commissioned by South Dublin County Council to prepare a planning application for the development of a Dublin Mountain Visitor Centre, near the Hell-Fire Wood on Killakee Road (R115). **Seamus** is a Civil and Structural Engineer and holds a Bachelor of Engineering Degree from University College Dublin awarded in 1986. Seamus is a Chartered Engineer, a Fellow of Engineers Ireland, and a Fellow Professional Consulting Engineer (F.Cons.EI) with the Association of Consulting Engineers of Ireland (ACEI). Seamus is a Director of Roughan & O'Donovan Consulting Engineers. Over the past 30 years his relevant professional experience includes a very wide range of civil and structural engineering projects including transportation facilities and public buildings.

No difficulties were encountered during the preparation of this chapter

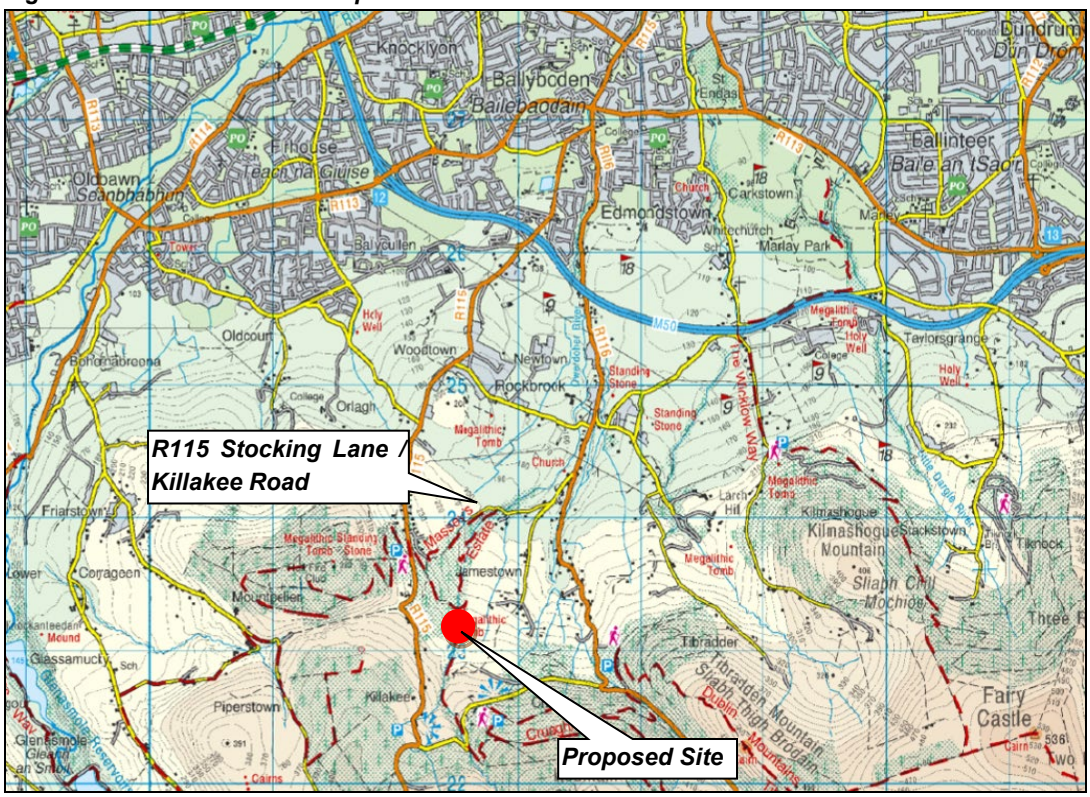
~~Our role as Civil and Structural Engineering Consultants included the preparation of this Transport Impact Assessment for the proposed development. The Environmental Impact Assessment for the project is coordinated and prepared by Cunnane Stratton Reynolds and includes the following summary of the TIA.~~

14.2 EXISTING ENVIRONMENT

14.2.1 Site Location and Proposed Development

The proposed site is located at the northern gateway into the Dublin and Wicklow Mountains from Dublin City, near the Hell Fire Wood to the southwest of the existing car park on the north east facing slope of Montpelier Hill, accessed from Killakee Road (R115) as shown on the map below.

Figure 14.1 Site Location Map



14.2.2 Surrounding Road Network

A Feasibility Study was prepared in 2015 for the proposed visitor centre to find the most suitable location in the Dublin Mountains. That study considered suitability for access as a major factor and the Hell Fire Wood location was identified as being the most suitably accessible site available.

The site is located on the R115 Stocking Lane / Killakee Road / Military Road route that extends from Ballyboden at the southern edge of the Dublin suburban area into County Wicklow at Glencree, and continues onward through the heart of the Wicklow Mountains to Laragh and Glendalough.

This regional road is fairly narrow, typically 5m to 6m wide, and carries moderate levels of traffic consisting of both local access traffic and visitors entering the mountains from the north. This is one of the primary access routes into the mountains and is generally suitable to cater for a modest increase in traffic that may be attracted by the proposed visitor centre. However, there is no footpath along the road, which makes it unattractive for people to walk into the mountains from the city. Traffic speeds are reasonably low in response to the narrow and bendy road alignment, and there is a 60 km/h speed limit. While there are no cycling facilities along the road, it is a popular recreational cycle route with cyclists sharing the road with vehicular traffic.

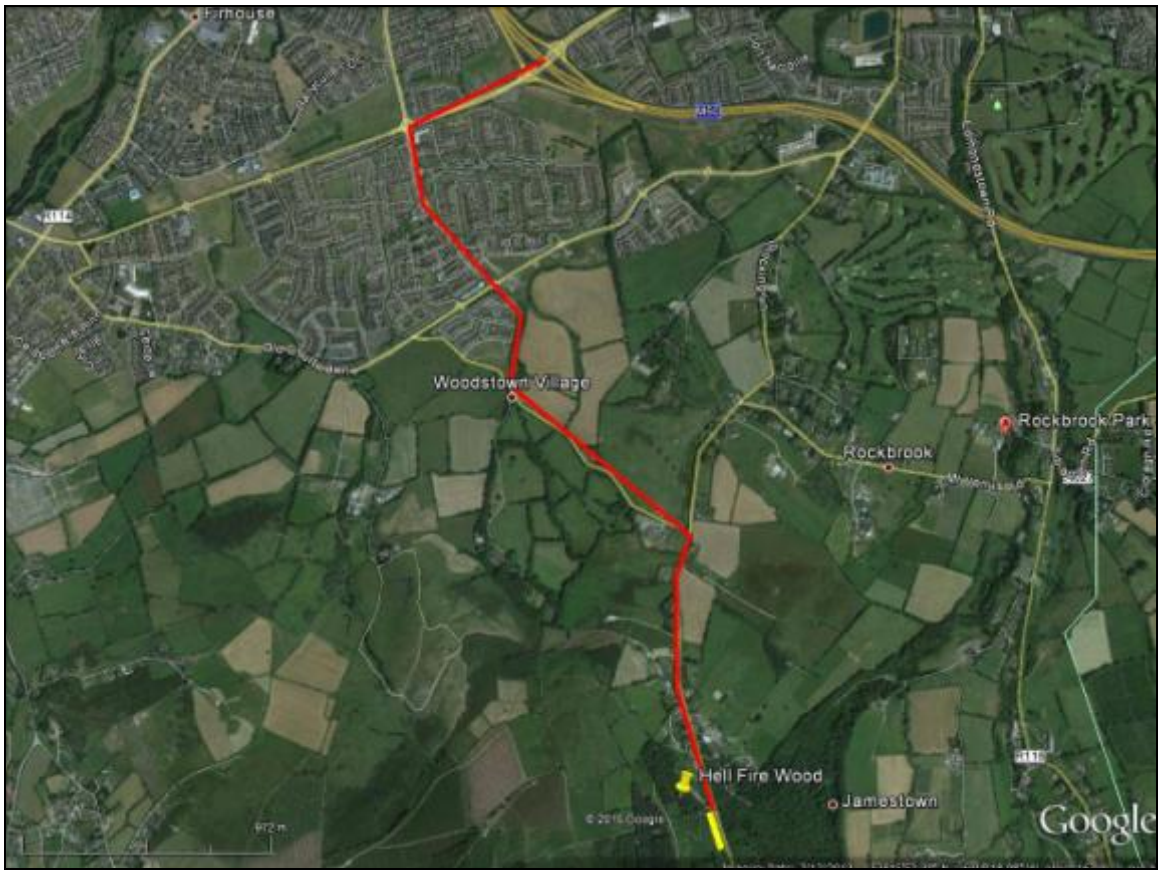
Figure 14.2 R115 Stocking Lane

Another local road Gunny Hill provides a 1km long link from the R115 Killakee Road in a north-westward direction to Ballycullen Road at Woodstown and from there to Junction 12 on the M50 ring motorway.

Three traffic access routes are available from the Dublin City direction to Hell Fire Wood:

1. From Dublin City Centre via Rathfarnham over a distance of 12 km;
2. From M50 Junction 12 via Ballycullen Road over a distance of 4 km;
3. From Tallaght via Oldbawn Road and Killininny Road over a distance of 6 km.

Figure 14.3 Traffic Route from M50 Junction 12 to Hell Fire Wood



All of these access routes involve up to 2.5 km along rural roads that are relatively narrow. These roads have considerable landscape character and do not need to be widened for a modest increase in traffic attracted to the proposed *Dublin Mountains Visitor Centre.* The narrow and bendy roads serve to slow traffic and to support the low speed limits that facilitate shared use by cyclists. It will be more appropriate and feasible to actually narrow the road slightly in places to accommodate a footpath and provide a traffic calming layout for the benefit of cyclists in the slow uphill direction, as described later in this report.

14.2.3 Public Transport Accessibility

Existing public transport services are available reasonably near the site for the proposed visitor centre but the lack of footpaths makes these services effectively inaccessible to the site at present.

14.2.4 Dublin Mountain Visitor Numbers

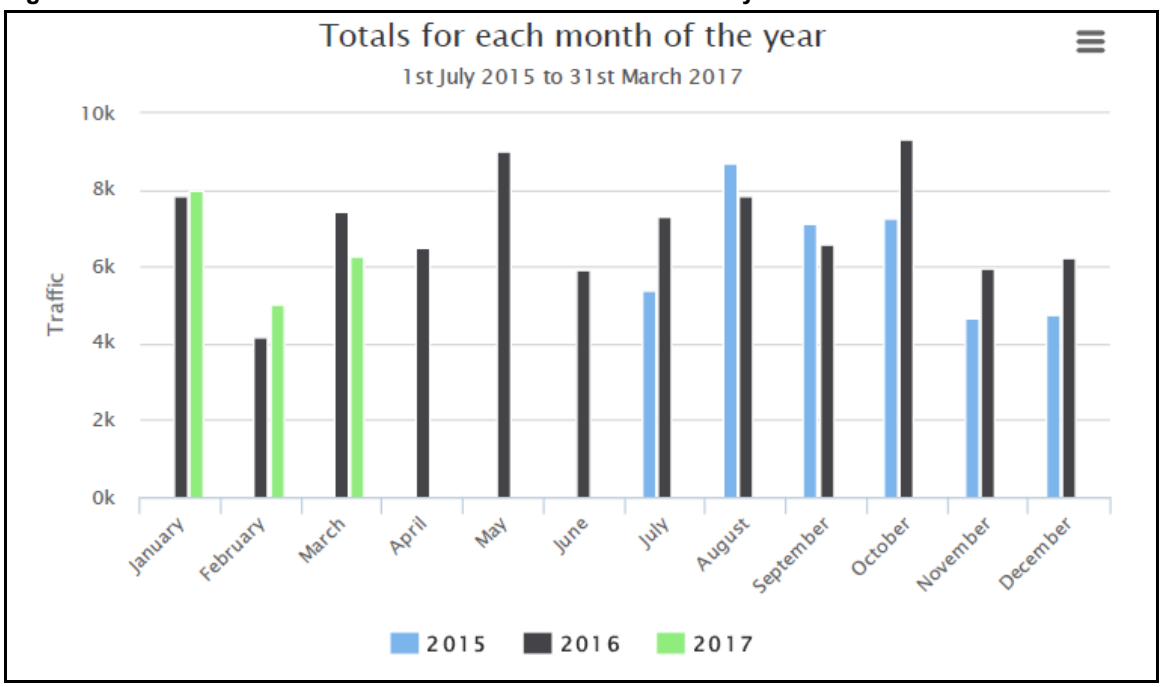
Extended transport surveys were undertaken by Coillte at four of their sites in the Dublin Mountains over a 21 month period from 1st of July 2015 to 31st March 2017 as summarised in the table below.

Table 14.1 Visitor Numbers in the Dublin Mountains

Location	Annual Visitors	Parking Spaces
Barnaslignan	31,500	20
Ticknock	198,000	200
Kilmashogue Wood	Not surveyed	30
Tibradden Wood	Not surveyed	55
Cruagh Wood	16,900	35
Hell Fire Wood	105,000	80
Totals	351,400	370

From the four sites surveyed, Hell Fire Wood accounted for 30% of the overall total number of visitors at the four sites included in the Coillte surveys.

Figure 14.4 Seasonal Traffic Pattern at Hell Fire Wood - Monthly



The graph above shows that the Hell Fire Wood site is visited fairly consistently all year round with the busiest months in May and October, and the quietest periods in November, December and February.

Weekly traffic flows at Hell Fire Wood car park range between 600 and 2,700 vehicles, with an average of 2,000 vehicles per week with daily patterns as follows:

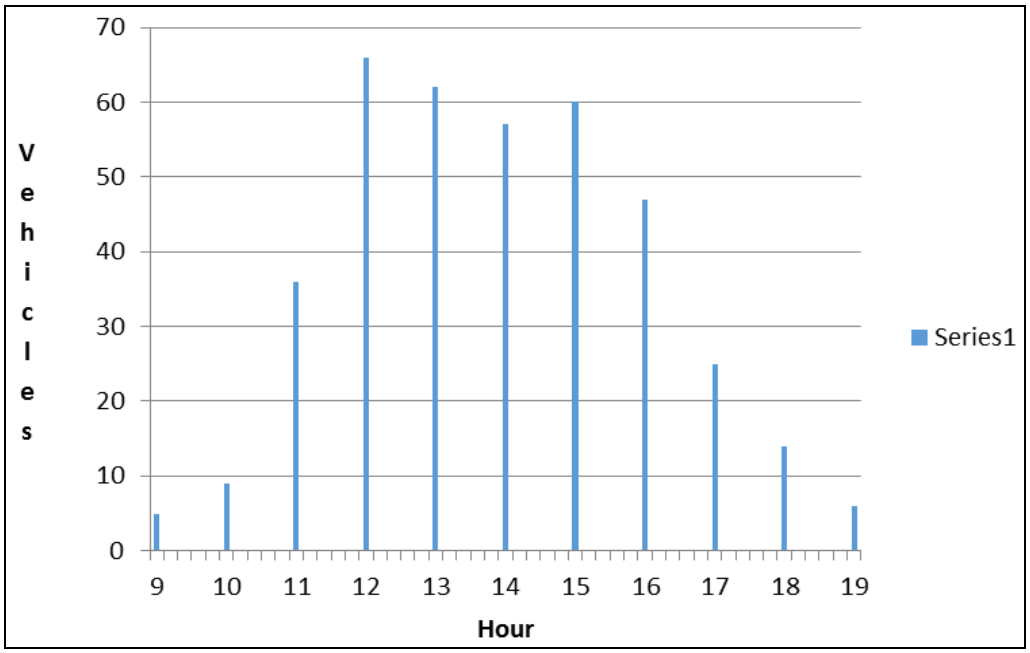
- Weekends account for 50% of weekly visits;
- Sunday is the busiest day with 30% of weekly visits = 700 vehicles average;
- Saturday is the second busiest day with 20% of weekly visits;
- Weekdays have on average 10% of weekly visits;

- The busiest hours of the day are between 10am and 4pm with 71.5% of daily vehicles cumulatively;
- Peak daily traffic movements are between 12am and 3pm.

14.2.5 Traffic Survey Results

Detailed traffic surveys were undertaken over weekends and weekdays in November 2016 and June 2017 at the site entrance to Hell Fire Wood and at the nearest junction to the north at Gunny Hill.

Figure 14.5 Cumulative Vehicles in Hell Fire Wood Car Park on Sunday 4th June 2017



Parking spaces are not formally marked out in the Hell Fire Wood car park, and the capacity of the existing car park is estimated at between 75 and 80 spaces. The peak parking demand recorded on Sunday 4th of June 2017 was 66 vehicles, which equates to 88% of the capacity for 75 spaces.

There have been reports of occasional overspill parking onto Killakee Road at the Hell Fire Club due to demand exceeding the car park capacity. Various site visits were undertaken by a member of the Roughan & O'Donovan team over the past two years to observe peak demand conditions at the car park. On one of these occasions on Sunday 27 September 2015 the car park was full at 2pm with 83 cars parked and an overflow of 20 cars parked along Killakee Road.

While the formal traffic surveys for this project did not capture overspill parking, it is recognised that on occasion some overspill does occur. In addition there is regular on-road parking at the gate into Massy's Estate, associated with people who are reluctant to use the adjacent car park at Hell Fire Wood.

Figure 14.6 Cars Parked on Killakee Road at Massy's Estate Gate

14.2.6 Traffic on Killakee Road

The peak hourly traffic flow on Killakee Road north of the Hell Fire Wood car park entrance was 244 vehicles per hour on Sunday 4th June 2017 between 3pm and 4pm.

- In that hour the number of vehicles entering and exiting from the Hell Fire Wood car park was 111, which is 45% of the total traffic in Killakee Road.
- The average traffic flow in and out of the car park in the busiest 6 hours was 91 vehicles per hour.

The cumulative total traffic in and out of the Hell Fire Wood car park was 700 vehicles over the 11 hour period from 8am to 7pm.

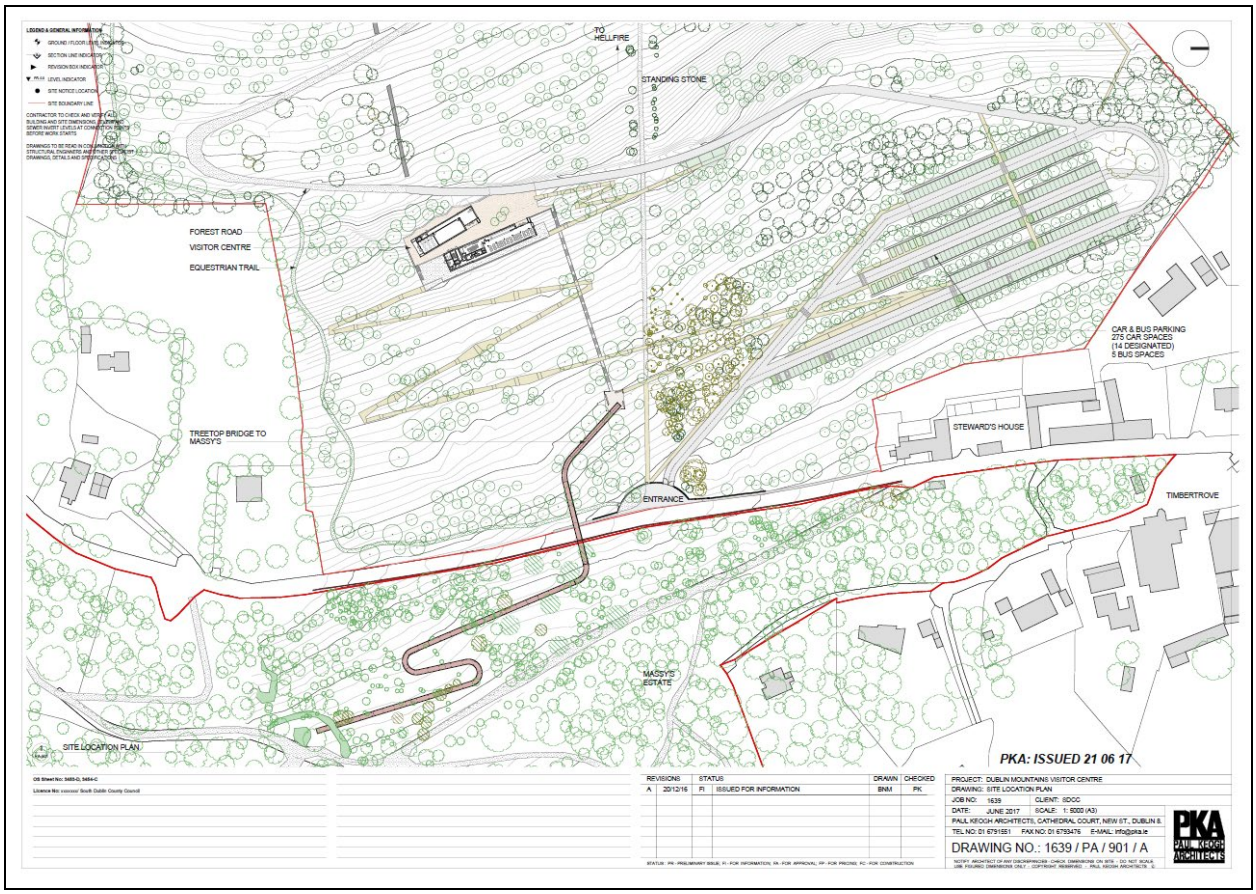
Traffic speeds were recorded in the November 2016 survey on Killakee Road just south of the Gunny Hill junction with a Mean Speed of 49 km/h and the 85th Percentile Speed at 57 km/h.

14.3 PROPOSED DEVELOPMENT

The proposed development includes the introduction of a visitor centre with support facilities such as additional car parking and improved access arrangements on the grounds of the Hell Fire Wood Coillte forest. The visitor centre will comprise two buildings with external terraces. These buildings will accommodate a 70 seat cafe, audio-visual display and exhibition room, a small shop, food kiosk, toilets, storage and plant room.

The existing car park at Hell Fire Wood will be expanded from c. 80 car spaces to 275 car spaces and 5 coach spaces to cater for the additional number of visitors expected. It is also proposed to improve pedestrian and cyclist facilities along Killakee Road and Gunny for access from the nearby urban areas. A tree-top walkway and bridge will provide a pedestrian link over Killakee Road into the adjoining Massy's Estate, which will also be served by the visitor centre and parking at Hell Fire Wood. Site layout details are shown on the PKA Drawings.

Figure 14.7 Proposed Site Layout Plan.

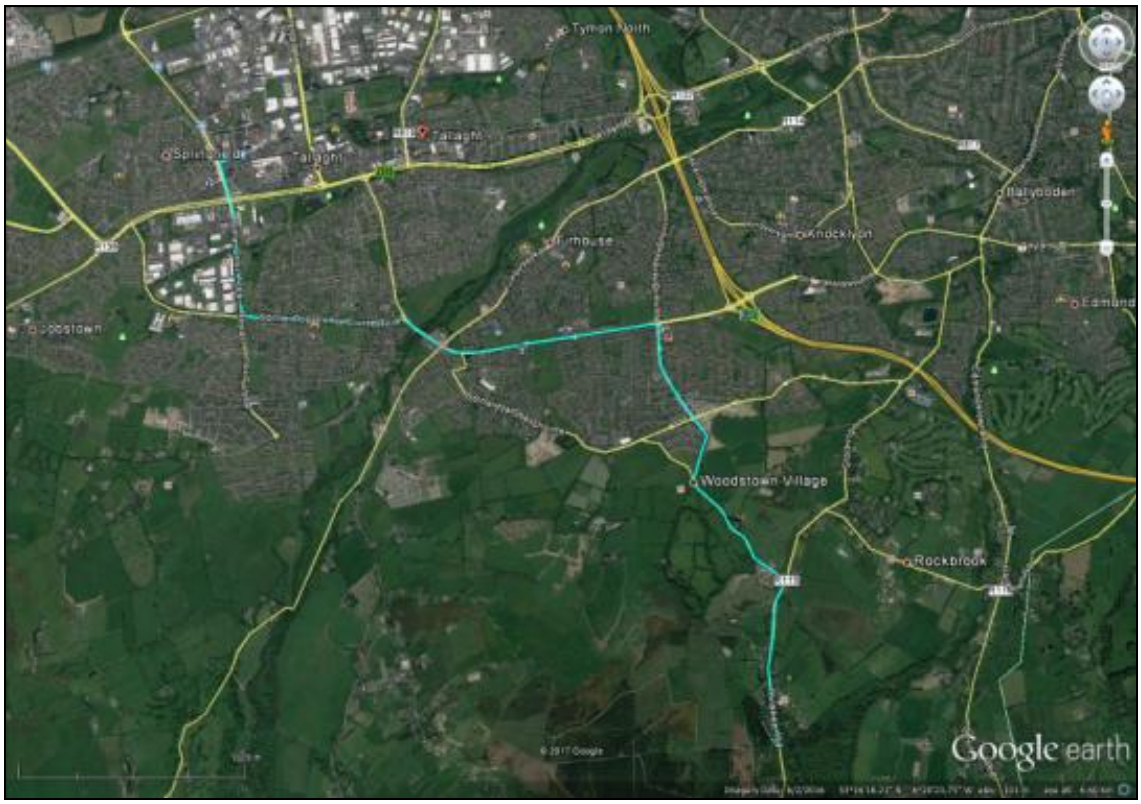


14.3.1 Proposed Shuttle Bus from Tallaght

In order to make the proposed visitor centre properly accessible by public transport, South Dublin County Council proposes to operate a shuttle bus service from Tallaght LUAS stop and Public Transport Hub at Tallaght Town Centre. The proposed route will be 7.5km long via Oldbawn and Ballycullen as shown in the following map. It will also serve a proposed Park & Ride facility at Tallaght Stadium (details described later in this report), which is owned by South Dublin County Council. At Woodstown Village the shuttle bus can also interchange with the No.15/15B Dublin Bus route.

This shuttle bus service will operate 7 days a week year round, with a frequency of 15 to 30 minutes according to varying seasonal and daily demand. A public transport operation licence will be required from the National Transport Authority for this service, which will determine details such as fares, capacity and operating hours. The potential demand for the bus service is determined later in this report as part of the overall transport demand assessment. The estimated journey time is 12 to 15 minutes at an average speed of 30km/h to 40km/h. Two vehicles will be required for a 15 minute frequency service.

Figure 14.8 Proposed Shuttle Bus Route from Tallaght to Hell Fire Wood (in light blue)



A suitable vehicle will be a 20 to 30 seater midi-coach that will have sufficient capacity for the peak period demand. This type of vehicle is 2.0m wide (as shown in the following photograph), compared to over 2.5m for a full-size coach, and can therefore fit more easily on the narrow roads in the Dublin Mountains.

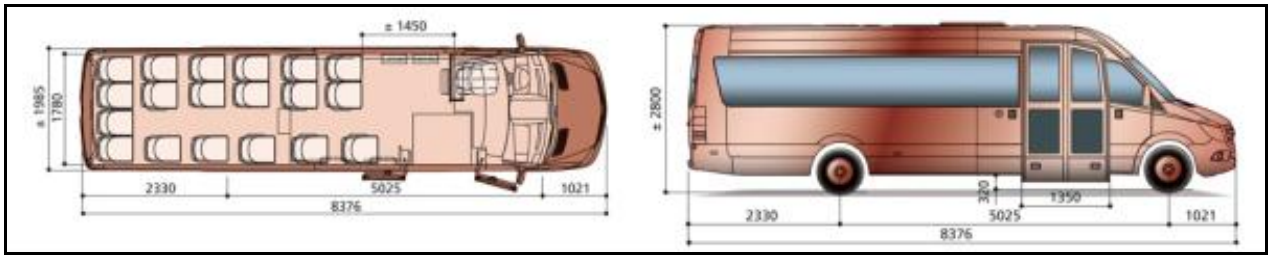


Figure 14.9 Typical Midi-Coach Vehicle with full wheelchair accessibility and 22 seats

Such a shuttle bus arrangement is provided from the town of Llanberis to Pen-Y-Pass in Snowdonia in North Wales as shown in the following photograph.

Figure 14.10 Example: Shuttle Bus for Mount Snowdon at Pen-Y-Pass

14.3.2 Proposed Park & Ride Facility at Tallaght

It is preferable if a proportion of visitors travelling by car could be encouraged to transfer to public transport for the last part of the journey, especially at peak periods. The proposed shuttle bus service from Tallaght LUAS stop and Public Transport Hub at Tallaght Town Centre to Hell Fire Wood will provide the required service for a Park & Ride facility located along the route. South Dublin County Council therefore proposes to provide a Park & Ride facility at Tallaght Stadium, which is owned by the County Council.

Figure 14.11 Proposed Park & Ride Facility at Tallaght Stadium

There are 400 parking spaces available at this site, which is accessed from Whitestown Way just south of the N81 Tallaght Bypass. The charge for this service will be determined under licence from the National Transport Authority on the same basis as for the proposed shuttle bus service. The stadium parking is only used occasionally for football matches on Saturday afternoons or mid-week evenings, and will therefore be available most of the time for the Park & Ride activity.

14.3.3 Promotion of Park & Ride Service

Marketing for the proposed Dublin Mountains Visitor Centre will actively promote the Park & Ride service to visitors, and will advise of potential peak period capacity limits at Hell Fire Wood. Fixed direction signs will direct motorists towards the visitor centre on the main approach routes and will also show the direction to the Park & Ride site at Tallaght.

14.3.4 Car Park Monitoring and VMS

To advise motorists approaching the mountains from the M50 motorway, it is proposed to install a Variable Message Sign (VMS) on the link road from Junction 12 towards Ballycullen Cross that will state how many parking spaces are available at Hell Fire Wood and direct drivers westwards along Killininny Road towards the Park & Ride site at Tallaght.

A permanent electronic car park monitoring system will be provided to record the occupancy rate at the Hell Fire Wood Car Park. This will link to Variable Message Signs (VMS) to the north on the two main approach routes from the city and M50 directions. At unusually busy periods the VMS signs will alert drivers to the lack of parking spaces at Hell Fire Wood and will instead direct them to the Park & Ride site.

As the visitor centre will be manned during opening hours there will be personnel on hand to marshal traffic at peak periods and to manage any risk of overspill parking on Killakee Road. Such arrangements are in place at Sliabh Gullion Forest Park in County Armagh, which is operated by a similar arrangement joint venture between the local authority and the Forestry Service.

Figure 14.12 Example: Car Park Marshals at Sliabh Gullion Forest Park

14.3.5 Potential Special Tourist Bus Route

An especially themed tourist bus service could be developed from the city centre to the new Dublin Mountains Visitor Centre. This could be called the "*Art O'Neill Tour Bus"* service from Dublin Castle direct to Hell Fire generally following the historical escape route taken by Art O'Neill and Red Hugh O'Donnell in January 1592. The route could follow the historical Military Road that was constructed after the 1798 Rebellion to enable access to the wild rebel Wicklow Mountain fastness from which raids were launched on The Pale. Intermediate stops could be made at Rathfarnham Castle and the Pearse Museum at St. Enda's Park. Such a special service could encourage visitors to Dublin to undertake a wider experience of the city and surroundings.

14.3.6 Accessibility for Pedestrians

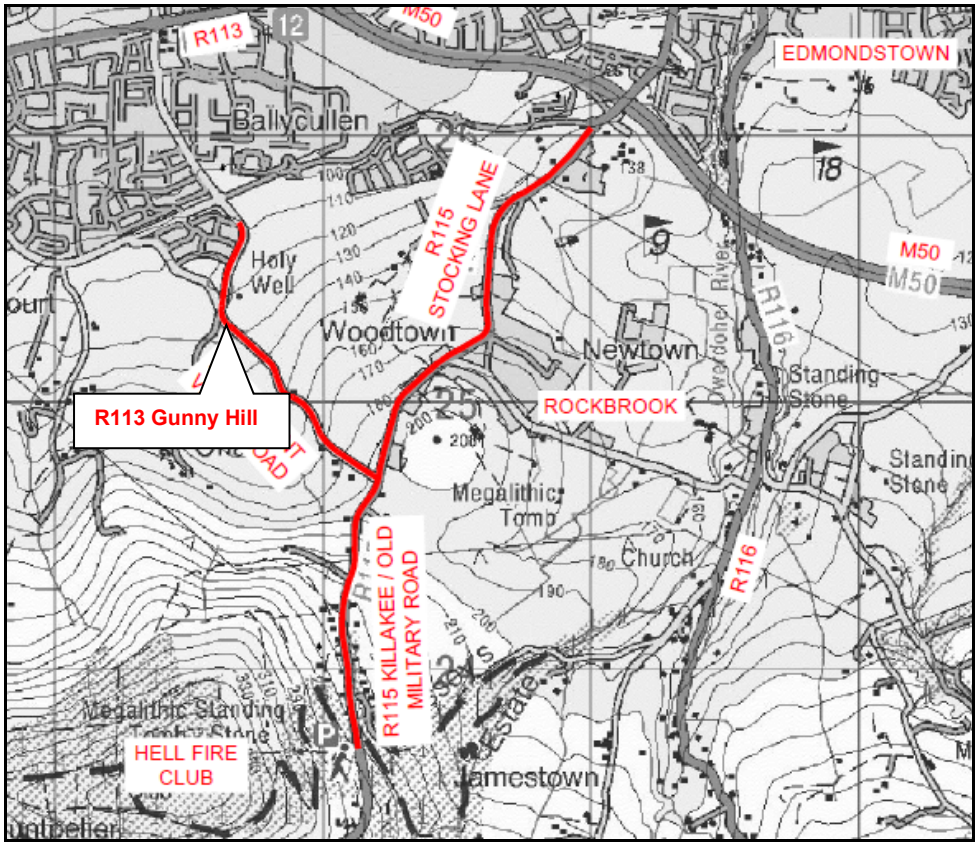
There are no footpaths the rural roads between the proposed site and the city edge, 2.5km to the north. It is not therefore currently pleasant or particularly safe to walk to the Hell Fire Wood from the city at present.

Figure 14.13 Killakee Road, R115 - No Footpath

14.3.6 Proposed Footpaths along Access Routes

It is proposed to provide new footpaths along the two existing roads as shown on the following map highlighted in red.

Figure 14.14 Proposed Footpaths along Rural Roads for Access to Hell Fire Wood from the City



A general footpath width of 1.8m is proposed as the desirable minimum for the new footpaths for this project. However, due to the constrained road width available in a few places, it will be necessary to reduce the footpath width slightly to 1.5m absolute minimum over short sections.
To achieve suitable footpath widths will entail some encroachment into the existing road to a small degree of typically 0.3m, but up to 0.9m maximum. There will be no road widening into adjoining privately owned lands for the purpose of the provision of new footpaths for the proposed development.

In just 2 locations there is not enough space for the proposed footpath and a minimum 5.0m wide road for two-way traffic. Proposals for suitable adjustments to the road layout at these two pinch-points are as follows.

- Pinch-Point A: On Killakee Road at Massy's Estate opposite the Steward's House over a length of 100m the road is 5.5m wide with a 0.6m wide verge on the western side. It is proposed to widen the road on the eastern side by 1.2m into Massy's Estate to accommodate a 1.8m wide footpath on the western side.

Figure 14.15 Killakee Road at Steward's House / Massy's Estate: Proposed to widen road on the left (eastern side) to accommodate a footpath on the right (western side)

- Pinch-Point B: On Killakee Road between the junctions at Mount Venus Road and Gunny Hill there is a 90m long section where the existing road is 5.2m wide and there is only 0.5m of verge on the western side. It will be necessary to narrow the road by 1m to 4.2m wide to accommodate a footpath. This will require a single lane traffic shuttle.

Figure 14.16 Narrowest Section of Killakee Road where Traffic Shuttle is proposed

The proposed traffic layout will provide for slow cyclists in the uphill direction through an advisory cycle lane (1.5m wide) on the eastern side of the road. Motor traffic will share a 2.7m wide traffic lane in the centre of the road in alternating directions governed by yield signs at each end of the 120m long shuttle section as shown on the drawing detail below. Downhill cyclists will not require to yield to uphill traffic, which can straddle the uphill cycle lane as necessary to enable passing. This arrangement will have a strong traffic calming effect to reduce traffic speeds in addition to sharing the limited road space appropriately.

There will be no adverse impact on traffic conditions with the proposed traffic shuttle arrangement in the context of the modest traffic flow on this road which is about 200 vehicles per hour at peak on a Sunday afternoon, which is 1 vehicle every 18 seconds on average, or every 36 seconds per direction. The hourly capacity of a traffic lane is 1,600 vehicles per hour at 60 km/h. Thus the existing traffic demand is only 12.5% of the capacity of a single traffic lane.

In a previous project designed by Roughan & O'Donovan for *The Boyne Greenway* between Drogheda and the Battle of the Boyne Visitor Centre at Oldbridge, Co. Meath, an existing local road has been narrowed over 3 lengths of up to 230m to accommodate a shared footpath and cycleway as shown in the following photograph. A single-track traffic shuttle operates at each pinch-point controlled by a Yield sign at one end and a Stop sign at the other end. That situation is similar to what is proposed for Killakee Road on the access route to the proposed Dublin Mountains Visitor Centre.

Figure 14.17 Example of Single-Track Traffic Shuttle on Oldbridge Road, Co. Meath

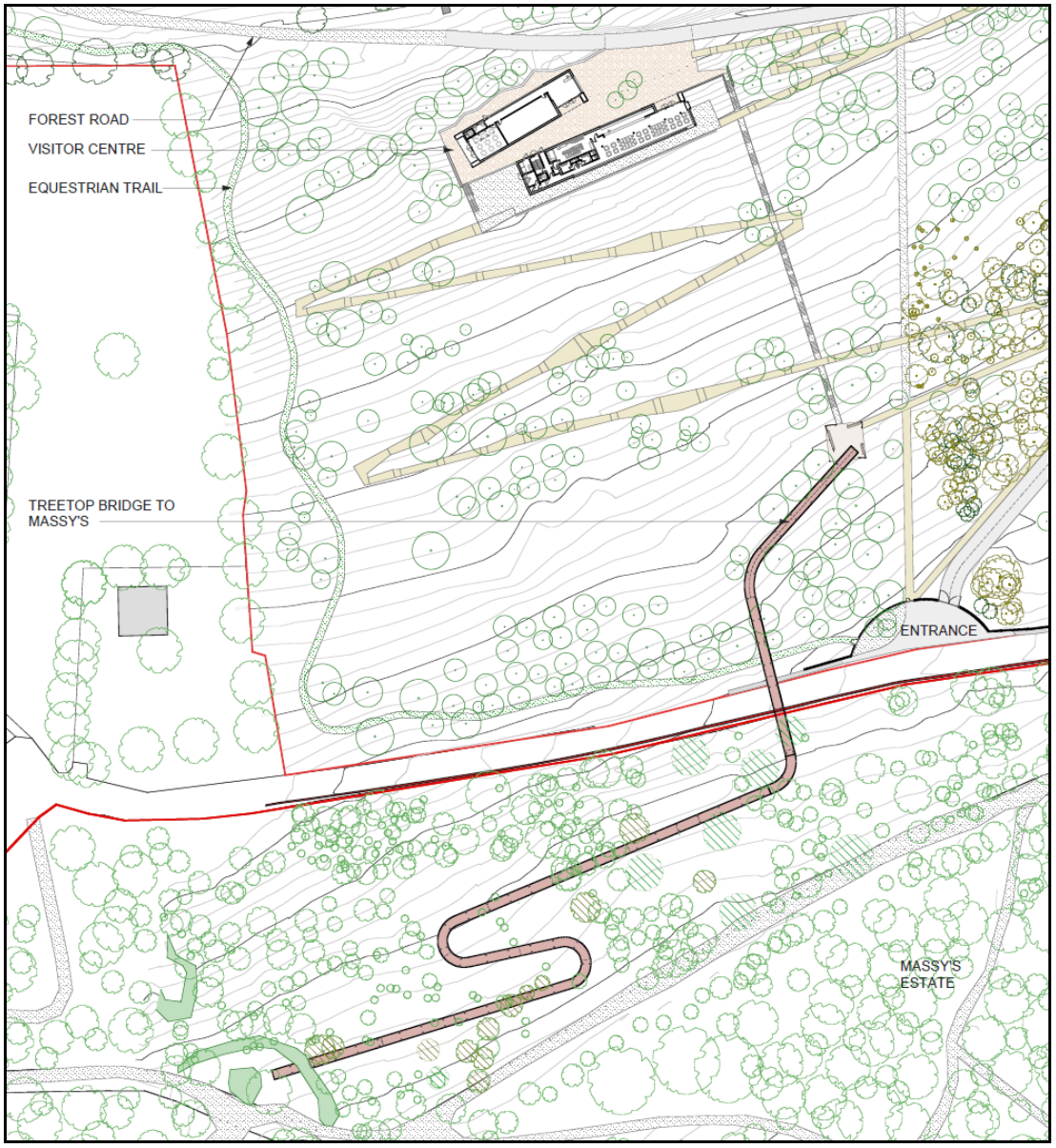
Figure 14.18 Example of Single-Track Traffic Shuttle on Oldbridge Road, Co. Meath

14.3.8 Link Bridge from Hell Fire Wood to Massy's Estate

A link bridge will be provided between Hell Fire Wood and Massy's Estate over Killakee Road, which will be 2m wide and about 250m long so as to address the gradient along the route. The proposed bridge is intended to be an unusual and interesting feature that will wander through the trees at a high level. It should form an attraction in itself in addition to the functional purpose to link the two sites comfortably and safely.

This bridge will overcome the current severance between the two sites which causes some people to park on the road at the entrance to Massy's Estate on Killakee Road. In future these people can use the enlarged car park at Hell Fire Wood and then cross on the new bridge to Massy's Estate.

Figure 14.19 Proposed Link Footbridge from Hell Fire Wood to Massy's Estate



14.3.9 Accessibility for Cyclists

Considerable numbers of recreational cyclists travel along Killakee Road for access to the Wicklow Mountains further south along the Military Road.

Figure 14.20 Recreational Cyclist on The Military Road, climbing up to The Featherbed

The speed limits on the rural roads in the Dublin Mountains are reduced to reflect their narrowness and bendiness, which also helps to make the routes more suitable for cyclists. The 50 km/h zone extends southwards from the urban area to the Gunny Hill junction, 1km north of the Hell Fire Wood car park where it changes to 60 km/h speed limit along Killakee Road past the proposed visitor centre site.

The existing conditions on these roads are generally suitable for experienced cyclists to share with traffic due to the fairly low traffic volumes and the low speed limits.

Figure 14.21 Cyclist on Killakee Road - in slow uphill direction at Massy's Estate

14.3.10 Proposed Uphill Cycle Lanes

As an improvement on the existing road layout for cyclists it is proposed to modify the existing road markings on the R115 Killakee Road and R113 Gunny Hill as follows:

- Remove the existing road centreline marking during resurfacing of the roads;
- Marking of an advisory cycle lane, 1.5m wide, in the uphill direction.

This arrangement will encourage vehicular traffic in the uphill direction to keep out from the edge of the road and to provide suitable clearance when passing slow cyclists on the hill. The absence of a road centreline marking will also create some uncertainty for drivers and should encourage slower traffic speeds.

Figure 14.22 Example of a Rural Road in the Netherlands with Advisory Lanes for Pedestrians and Cyclists

14.3.11 Bicycle Parking

Bicycle parking facilities will be provided as follows:

- 10 spaces at the Massy's lower gate;
- 50 spaces at Hell Fire Wood.

14.4 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

14.4.1 Projected Visitor Numbers

The Business Plan for the proposed development is estimated to attract approximately 300,000 visitors per annum, 10 years after construction, which is an approximate 3 fold increase in the current visitor numbers to the site at the Hell Fire Wood. This would amount to 200,000 new visitors in addition to the existing 100,000 visitors.

This proposed development will be targeted at a larger tourist market, which will increase the trips during the mid-week periods. Key demand estimates for the proposed development over the first 5 years of operation:

- Potential 300,000 visitors per annum to developed site, distributed as follows:
  - Domestic Amenity visitors: 130,000 = 30% growth on existing;
  - International Tourists: 100,000;
  - Domestic Tourists: 66,000;
  - Others, e.g. School Groups: 4,000
- Tripling of demand annually, but with greater spread across the week due to growth of tourist visits;
- Weekend demand is expected to double on average;
- Longer duration visits expected due to expanded range of activities on site. A large increase to 4 hours has been assumed.

14.4.2 Modal Share

The existing site is almost exclusively accessed by private car with domestic amenity visitors predominant. However, most of the future growth in visitors is expected to come from tourists, both international and domestic.

It is expected that few international tourists will have car transport available, and will be heavily reliant on public transport or tourist coach transport. On this basis it has been decided that the site will be served by shuttle bus from Tallaght and Ballycullen. Thus tourists can use the LUAS tram service to Tallaght or the frequent Dublin Service to Woodstown, and then transfer to the shuttle bus for the final leg into the Dublin Mountains. There are also likely to be special tourist bus services from Dublin. The shuttle bus service will also enable some modal shift by domestic amenity visitors.

The transport demand estimates for the proposed development have been assessed using a range of assumptions for mode share as follows:

- International Tourists: 70% by public transport / 30% by car;
- Domestic Tourists: 30% by public transport / 70% by car;
- Amenity Visitors: 0% to 30% by public transport / 70% to 100% by car;
- Combined: 19% to 44% by public transport / 56% to 71% by car;

14.4.3 Public Transport Demand

Estimated demand for public transport services is:

- 120,000 passengers per annum;
- 770 passengers per day on the weekend in the Summer peak;
- 90 passengers per hour peak demand each way.

With a 22 seater shuttle bus, a 15 minute frequency service will be required at peak.

14.4.4 Car Parking Demand and Provision

The car parking demand at the proposed visitor centre will vary according to the market segment and modal share by visitor type and has been separately assessed to range between 227 and 270 parking spaces at peak on a summer weekend.

The proposed development will provide the following parking facilities

- 275 parking spaces proposed to cater for increase in demand and longer stays;
- 5 coach spaces.

The proposed car park capacity will exceed the highest estimated demand in accordance with a fairly low modal shift from private car to public transport, walking and cycling despite the proposed provision of a frequent shuttle bus service and upgrade of the access roads to provide a footpath and uphill cycle lane within a traffic-calmed revised road layout.

The extended car park will provide 200 additional spaces on top of the existing 75 spaces. It will be formed in 3 tiers of parking terraced on the hill side including the existing car park as the lower tier with 2 new tiers further up the hill above. The bus parking will be located closest to the entrance with the shortest walking distance to the proposed visitor centre buildings a short distance up the hill to the southwest.

The proposed site layout takes account of the steep topography with the circulation roads aligned to angle across the contours at a maximum gradient of 8% for universal access. 14 Disabled parking spaces are designated, of which 3 are located adjacent to the visitor centre buildings, with controlled access from the main car park below.

The proposed visitor centre is intended to be a base for a cluster of sites in the vicinity, there will be satellite parking available at Killakee, Cruagh Wood and Tibradden Wood. Some visitors may call briefly by the centre at Hell Fire Wood on their way to and from these other sites and only stay briefly. Others may park at Cruagh for example and make an extended walking trip to Massy's Estate and Hell Fire Wood, via the Dublin Mountains Way.

14.4.5 Traffic Assignments

The projected peak period traffic flow in and out of the extended car park is estimated as 165 vehicles per hour, which is an increase of 54 vehicles per hour, 50% approximately, compared to the existing peak traffic of 111 vehicles per hour recorded on Sunday 4th of June 2017.

While the annual number of visitors is expected to increase by a factor of 3, the additional demand will be more evenly spread over the week and will be less peaky than at present. As most of the growth is expected to consist of tourists, there will be a significant mode share by bus, including the proposed shuttle bus service. Thus the increase in traffic flows will not be proportional to the total increase in visitor numbers.

Due to the limited access routes, additional traffic generated by the proposed visitor centre and car park expansion will follow the existing traffic patterns to and from the site. The estimated traffic volumes for the proposed development are small and will be quickly dispersed in the wider traffic context within the adjoining city suburbs;

- Peak Traffic on Killakee Road will increase from 244 vehicles per hour by 54 to approximately 300 vehicles per hour, an additional 23%;
- A 2 lane rural road has capacity for about 1,800 vehicles per hour, so Killakee Road will operate at about 17% of capacity with the visitor centre development;
- At the Gunny Hill junction the peak hour traffic movements will increase from 373 to 427 vehicles per hour (+14%). This increase is small on top of an already low number and will not materially impact on the capacity of the priority junction;
- On the basis of the existing junction turning proportions, the additional traffic will distribute 60% (32 vehicles) onto Gunny Hill from the west and 40% (22 vehicles) from the north along Killakee Road.

14.4.6 Traffic Impact

A capacity analysis for the junction of Killakee Road and Gunny Hill indicates that the peak demand at the junction with the increased traffic to the proposed visitor centre will be only approximately 20% of the capacity. This junction will easily cater for the minor level of traffic increase expected due to the proposed visitor centre expansion.

14.5 REMEDIAL AND MITIGATION MEASURES

No remedial of mitigation measures will be required for roads, traffic and transportation.

14.6 PREDICTED IMPACT OF THE PROPOSED DEVELOPMENT

The predicted impact of the proposed development for roads, traffic and transportation will be small and can be comfortably accommodated by the existing road network.

14.7 CUMULATIVE IMPACTS

No cumulative impacts will arise for roads, traffic and transportation since other developments are severely restricted under planning policies for the local area surrounding the proposed Dublin Mountains Visitor Centre at the Hell Fire Wood.

14.8 MAJOR ACCIDENTS AND NATURAL DISASTERS, CLIMATE CHANGE AND NATURAL RESOURCES

It is considered unlikely that the proposed development will result in an increased risk of major accidents or disasters. The risk of significant effects on Roads Traffic and Transport arising from major accident or natural disaster at the site are considered highly unlikely and indeterminable.

There will be no negative residual impact on Natural Resources as a result of the proposed development. Impacts on climate change during the construction and operational phases are considered to be imperceptible and therefore no residual impacts are predicted.

15.0 INTERACTIONS

15.1 INTRODUCTION

This chapter addresses the main interactions between the different aspects of the environment likely to be significantly affected by the proposed development in addition to cumulative impact.

Only topics that could reasonably be linked to the proposed development have been examined. When a topic is not identified for inclusion within the matrix the authors have concluded that no potential for significant impact exists. Cumulative impact has been assessed in each of Chapters 5 to 14 inclusive.

15.2 METHODOLOGY FOR INTERACTIONS

The European Commission *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions* defines interactions as "*The reactions between impacts whether between the impacts of just one project or between the impacts of other projects in the area."* All environmental factors are inter-related to some extent, and the relationships can range from tenuous to highly complex. The major interactions between the recorded environmental impacts are assessed within the individual chapters of the EIAR.

Table 15.1 below provides a matrix summarising the interactions between the various environmental topics addressed in this EIAR from Chapters 5 to 14 inclusive. Actual effects and their significance are dealt with in the most relevant chapter. The effects matrix identifies where there is potential for the topic or issue in the left-hand column to have an effect on the environmental topic listed in the top row of the matrix.

If there is the potential for an effect during the construction phase, this is indicated by a 'C'. An 'O' indicates the potential for an effect during the operational phase and 'CO' indicates the potential for effects during both the construction and operational phases of development. If there is considered to be no potential for significant interaction of effect, this is indicated by '-'.

This assessment was based on information contained within this EIAR, the outcome of discussions and interactions between the EIA team and the design team. The potential for significant interactions, cumulative impact and indirect impacts was considered throughout the design process and preparation of the EIAR. Where the potential for significant interactions or impacts was identified, such interactions and impacts were addressed in the baseline and impact assessment chapter for each of the relevant environmental topics in Chapters 5 to 14.

15.3 POTENTIAL INTRA-PROJECT INTERACTIONS OF IMPACTS OF THE PROPOSED DEVELOPMENT

Table 15.1 identifies the main interactions between environmental topics. The interactions are discussed for each topic below.

Table 15.1 Potential Interaction of Environmental Effects

Key Environmental Interactions Matrix	Population & Human Health	Biodiversity	Soils, Geology & Hydrogeology	Water & Hydrology	Air, Noise & Vibration	Landscape & Visual Resources	Archaeology & Cultural Heritage	Architectural Heritage	Material Assets - Forestry	Roads, Traffic & Transportation
Population & Human Health		O	-	-	-	-	O	O	-	CO
Biodiversity	CO		-	CO	-	O	-	-	CO	-
Soils, Geology & Hydrogeology	-	-		CO	-	-	-	-	CO	O
Water & Hydrology	-	CO	-		-	-	-	-	CO	O
Air, Noise & Vibration	C	-		-		-	-	-		CO
Landscape & Visual Resources	CO	CO	-	-	-		-	-	CO	-
Archaeology & Cultural Heritage	O	-	-	-	-	-		-	-	-
Architectural Heritage	O	-	-	-	-	-	-		-	CO
Material Assets - Forestry	-	-	-	-	-	-	-	-		-
Roads, Traffic & Transportation	CO	-	-	-	CO	-	-	C	-	

15.3.1 Population and Human Health; Biodiversity; Archaeology and Culture; and Architectural Heritage; Roads, Traffic and Transportation

The main impact on population and human health – and the intended outcome of the development - will be increased usage of the site for recreation by the local community, the wider Dublin population, domestic and international tourists and other groups, e.g. schools, special interest groups, and corporate groups. The increased usage of the site will have effects on other environmental aspects.

During operation, increased use of the site may result increased disturbance to certain habitats and species. While some Key Ecological Receptors have been identified, it is not predicted that any will experience significant negative impacts from increased usage of the site. It is expected that most users will stay on the trails network, which will largely remain the same in extent, so the area of disturbance by human presence will not expand significantly although the footfall in the affected area (the trails) will. A successful and well managed woodland park can be well-used by people and remain rich in biodiversity. A monitoring and management programme is proposed which will identify if any negative impacts are arising from use, and prescribe mitigation measures if necessary. It should be noted that the only significant negative impact on biodiversity predicted is the effect of habitat loss on the Red Squirrel (an impact of local importance), which will result from tree felling near the existing car park. The felling of those trees will take place irrespective of the development as they are conifers approaching end of life. This habitat will be replaced by permanent woodland.

During operation, increased use of the site may result increased access to and potential disturbance of archaeological and architectural heritage features. The features have proved resilient to access over time. An initial reparation programme is proposed, and thereafter regular monitoring of the effects of increased use of the site on these features, with mitigation measures to be put in place if necessary. These resources are predicted to be better managed (and in better condition) as a result of the development over time.

Increased traffic to the site, using the R115, is not predicted to have any significant negative effect on roads and traffic. Traffic on the road currently is at a low level, and the road has capacity to accommodate additional traffic. The development includes improvements to the R115 including the provision of a footpath, and an advisory cycle lane, and the proposals are expected to improve safety on the road for all users.

15.3.2 Biodiversity; Population and Human Health; Water and Hydrology; Landscape and Visual Resources, and Material Assets

During construction there will be vegetation/habitat loss and disturbance of wildlife which will have a temporary negative impact on people's enjoyment of the site.

During operation there will be habitat enhancement as commercial coniferous forest is replaced with mixed deciduous woodland, and the drainage system creates new habitat, and operational management measures take effect (e.g. monitoring of the identified sensitive species and habitats, and responsive management for their protection). This will have a long term positive impact on the landscape and views, and people's enjoyment of the site.

During the operation the replacement of coniferous forest with amenity woodland will reduce the value of the forest as a material asset, but this accepted by Coillte as the asset owner and is in line with Coillte's policy to promote recreation and biodiversity on a proportion of its property portfolio.

15.3.3 Soils, Geology and Hydrogeology; Water and Hydrology; Material Assets; and Roads Traffic and Transportation

During construction there will be excavation, compaction and earth storage in and around the areas of new infrastructure, buildings, etc. This will have temporary effects on water and hydrology, and implementation of the Construction Management Plan will ensure any effects are acceptable.

During construction, an area of ground will be excavated for ponds and swales. The depths of these are to be kept to an absolute minimum and will generally be used as green areas.

During construction, there will be precautionary measures to ensure that the proposed new drainage sewer is not damaged. This sewer will be surveyed prior to the development commencing.

To ensure that there are no pollutant spillages to soil and water from increased traffic and parking numbers a petrol interceptor has been included as part of the scheme's design.

15.3.4 Water and Hydrology; Biodiversity; Material Assets; and Roads, Traffic and Transportation

During construction, the applicant will prevent spillages to the surface water system from construction traffic through the imposition of a Contractors Construction Management Plan. A survey of the proposed drainage sewer will be undertaken prior to use commencing to ensure that the new drainage sewer will not leak.

During construction, a hydrobrake will be used to restrict increased surface water run off to acceptable levels. To ensure that there are no pollutant spillages to surface water from increased traffic/parking numbers a petrol interceptor has been included as part of the design.

During operation, there will be an increase in habitat diversity as a result of the proposed ponds which will promote new habitats, particularly for the newt. The new drainage features (shallow, grassed depressions) are also designed to function as amenity space when not inundated.

15.3.5 Air, Noise, and Vibration; Population and Human Health, Roads, Traffic and Transportation

During construction, excavations may require drilling and the use of plant, with noise and vibration affecting nearby residents, and visitors' use and enjoyment of the site. These impacts will be monitored during construction to ensure that it is within acceptable levels, in accordance with a Construction Management Plan. These effects are not expected to be significant as there is a relatively shallow depth to the proposed development, and the effects will be temporary.

During operation, it is anticipated that increased traffic volumes from the development will generate a negligible increase in noise from traffic and will not have significant effect on nearby residents or impair user's enjoyment of the site amenities. There will be no impact on air quality from increased traffic volumes.

15.3.6 Landscape and Visual Resources; Population and Human Health; Biodiversity, Material Assets (Forestry)

During construction and for a short period thereafter the landscape will be disturbed and views will be compromised locally, affecting people's residential amenities and visitors' enjoyment of the site. During operation, it is predicted that the landscape quality and views will improve and continue improving over time, as the large area of mixed deciduous woodland on the eastern face of Montpelier Hill matures and the other physical improvements to the site including the introduction of an attractive building take effect. The effects on the landscape and views will in turn have a beneficial impact on people's enjoyment if the site.

The landscape changes, notably the conversion of coniferous forest to woodland, the surface water drainage features, and proposals for restoration of the Glendoo Brook corridor and associated trail realignment, will have positive impacts on biodiversity. The effects of increased usage of the landscape for recreation on biodiversity will be monitored and managed.

The landscape change on part of the Hell Fire forest property (an area of 26 ha excluding areas to be occupied by the expanded parking area, buildings and any new trails, etc.), from productive coniferous forestry to mixed deciduous woodland managed for amenity and biodiversity, will reduce the value of the property as a forest asset.

15.3.7 Archaeology and Cultural Heritage; Architectural Heritage and Population and Human Health

Interactions of archaeology and cultural heritage and architectural heritage with other environmental topics are discussed jointly in this section.

During construction all excavation and construction works with potential effects on archaeological features will be preceded by test excavations by a licensed archaeologist, subject to requisite ministerial consent and permissions. These may increase understanding of the archaeological landscape of the Dublin Mountains. Any information recovered from these investigations will be incorporated in to the exhibition in the visitor centre along with information gathered from archaeological excavations at the Hell Fire Club in 2015 and 2016.

Reparation works and minor interventions are proposed to improve the condition of the Hell Fire Club and its safety for visitors. Vegetation clearance is proposed in the Massy's Wood walled garden, for protection of the structure and better appreciation by visitors. A programme of initial inspection and repair if necessary, followed by annual monitoring of condition/effects of visitors and mitigation measures if necessary is proposed for all architectural heritage features. The effects of this will be improved condition and protection of the architectural heritage, with benefits for visitors to the site – existing and new.

During operation the proposed interpretation of the site archaeological, cultural and architectural heritage, and associated opportunities for education and tourism development, will increase the attractiveness of the site for visitors, and increased usage will benefit the population and human health.

15.3.8 Roads, Traffic and Transportation; Population and Human Health; Architectural Heritage

During construction, there will be an increase in traffic on the road although two-way vehicular flow will be maintained throughout. An Outline Construction and Traffic Management Plan will be agreed and implemented to ensure that any traffic based threat to traffic flow and roads, cyclist and pedestrian safety is minimised.

The increase in traffic to the site during construction and operation is not predicted to cause a significant noise impact on the local population.

During construction, the localised widening of the R115 along the Massy's Wood frontage will impact on the estate boundary wall, and the setting of the gothic lodge located close to the wall near the Massy's entrance. Careful road widening, including a small buried retaining wall to accommodate the level difference between the road and the ground level at the gate lodge, will ensure no damage to the building, and the western elevation of the gate lodge will become the boundary at this point, revealed to public view (the lodge is currently hidden from view).

During operation, the provision of a footpath and cycle lane on the R115 will improve accessibility and safety along the road for all modes of transport, with significant positive impact. The provision of a shuttle bus from Tallaght to the site will constitute a further significant positive impact by making the Dublin Mountains more accessible to more people.

During operation, increase in parking provision on the site, combined with an on-site capacity for parking management, will reduce illegal parking on the R115 and associated safety risks for all road users. The provision of the pedestrian bridge over the R115 will reduce the number of pedestrians crossing the road, with further road safety benefits.

15.9 CUMULATIVE IMPACTS

The EU Guidelines define *cumulative impacts* as:

"Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. For example:

- *incremental noise from a number of separate developments;*
- *combined effect of individual impacts, e.g. noise, dust and visual, from one development on a particular receptor; and*
- *Several developments with insignificant impacts individually but which together have a cumulative effect".*

The EPA Guidelines on the Information to be contained in Environmental Impact Statements mirrors this approach and defines cumulative impacts as *"The addition of many small impacts to create one larger, more significant, impact".* Accordingly, the assessment of cumulative impacts considers the total impact associated with the proposed development when combined with other past, present, and reasonably foreseeable future developments. Consideration of the potential for any other projects to contribute cumulatively to the impacts from this project was considered during the preparation of this EIAR.

No other projects or plans have been identified which would result in significant negative cumulative impacts. Other initiatives to improve access to and appreciation of the Dublin Mountains landscape, natural and cultural heritage resources (e.g. those of the DMP, Coillte and SDCC) could increase use of the site by visitors, but this is intended and no significant negative impacts are predicted to arise as a result.

End